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#### ABSTRACT

A library-oriented, concentrated course in the use of computers in libraries is a definite need in the profession. Librarians can learn the use of computers even though they have no background in data processing. The profession is also in need of a course syllabus which can be used either in a formal college course or in an in-service training situation. One of the by-products of this institute will be such a syllabus. Pre-institute activities included a programmed instruction course to acquaint participants with terminology, theory, and logic of computers and to furnish all participants with a common store of background knowledge. Eight manufacturer's representatives presented their firm's hardware capabilities, library applications, cost and learning arrangements, and impending developments of interest to the library user. Fourteen papers on automating library technical processes, problems in library technical processes, systems analysis and flowcharting, and COBOL programming language are included. (Author)

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### Planning and Implementing Academic Library Automation Programs

Proceedings of the Librarianship Training Institute held at Louisiana Tech University June 14 - 28, 1970

> Compiled and Edited by Sam A. Dyson, Director

Conducted under a grant from the United States Office of Education, Title II-B Higher Education Act of 1965, P. L. 89-329, as amended.

> Ruston, Louisiana Prescott Library Publicati 1971

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### LIBRARY AUTOMATION INSTITUTE

### PROCEEDINGS

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### LIBRARY AUTOMATION INSTITUTE

### PROCEEDINGS

### INTRODUCTION

On June 14 - 27, 1970 there was held a federally sponsored Training in Librarianship institute entitled "Planning and Implementing Academic Library Automation Programs". The site the institute was the campus of Louisiana Tech University in Ruston, Louisiana. The institute was conducted under a grant from the United States Office of Education, Title II-B of the Higher Education Act of 1965, P. L. 89-329, as amended. The grant was in the amount of \$20,273.00 and was directed by Sam A. Dyson, Director of Libraries at the University, with the cooperation of the University's College of Education.

Several reasons prompted the application to the federal government for funds to support this institute. Presently, if an academic librarian wants to take courses in computer science, he is obliged to take them as offered in schools of business or engineering. The courses are not oriented at all toward the bibliographic needs experienced in libraries. The examples, illustrations, problems, and terminology are all foreign to him, making the course more mysterious and difficult. Few librarians can afford to take off from their responsibilities for extended periods of time required of formal courses in computer science. A library-oriented, concentrated course in the use of computers in libraries is a definite need in the profession. Librarians can learn the use of computers even though they have had no background in data processing. This institute proved that beyond doubt. The profession is also in need of a course cyllabus which can be used either in a formal college course or in an in-service training situation. One of the by-products of this institute will be such a syllabus.

One of the first steps necessary in the all wing of this institute was to secure a well qualified faculty. Several criteria for selection to the faculty were used:

- (1) They must have had experience in automating library processes.
- (2) Background in both librarianship and computer science was highly desirable.
- (3) They must want to participate in the institute after closely reading the formal application as submitted to the Office of Education.
- (4) Each faculty member must have had teaching experience with the language selected by the faculty for use in the institute.
- (5) One of the faculty members must have had thorough knowledge of the Louisiana Tech Computing Center.
- (6) Each of four faculty members must have had working experience with automating processes in one of the following areas: (a) acquisitions, (b) cataloging, (c) circulation, and (d) serials.



The faculty members selected were as follows:

(1) For teaching the language: Mr. Roland Gatlin, Ph. D. candidate and CDP, Mississippi State University

(2) For teaching acquisitions automation: Mr. Bruce Alper, Library Systems Analyst, Florida Atlantic University

(3) For teaching cataloging automation: Mr. John P. Kennedy, Data Processing Librarian, Georgia Tech

(4) For teaching circulation automation: Mr. Gerry Guthrie, Director of Research and Development, Ohio State University Library

(5) For teaching serials automation, systems analysis, and flowcharting: Mr. Sam A. Dyson, Director of Libraries, Louisiana Tech University

(6) For Tech Computing Center knowledge, and teaching theory and terminology: Mr. A. G. McKee, Director of the Computing Center, Louisiana Tech University

The selection of the language to be taught during the institute was based upon two things: a questionnaire submitted to the faculty requesting they list languages in which they felt competent to teach, and a conference telephone call during which they made a final decision. The language chosen was COBOL. This choice turned out to be a fortunate one, since all of the computer configurations represented by the participant's institutions already possessed the COBCL compiler.

The next major consideration was the selection of the participants. The application submitted to the office of education required that twenty (20) he selected. The original application had the following geographic limitations: the State of Louisiana, East Texas, South Arkansas, and West Mississippi. One hundred eleven applications were received from all over the United States. Based upon this response, the geographic limitations previously intended were dropped. Preference was given to applicants from the State — out lane.

In order to be eligible, an applicant had to be employed in an academic library, a graduate professional librarian (implying a master's degree in librarian-ship), no previous experience or training in computer science, charged by their supernors with library automation responsibilities, and have access to a computer. There were only a few exceptions to the above qualifications, and so the qualifications seemed to be valid ones.

The selection committee was composed of the Director and Associate Director of the institute. A meeting was held in the Associate Director's office nine months before the institute was to begin, and twenty participants and fifteen alternates were chosen.



Of the twenty who were chosen, one had to drop out of the institute at the very last minute—the day before the participants were to arrive. His library director died very suddenly, and he was unable to come during that time of crisis for his institution. The hour being very late, the selection committee decided it was too late to get a replacement and the institute proceeded with nineteen participants from eleven states. Between the time that the selection was made and the beginning of the institute, seven of the fifteen alternates were eventually contacted. Participants in the institute are listed in the Appendix (See Appendix A).

In order to compile the class schedule, the Director mailed a tentative class schedule to each member of the faculty prior to the conference telephone call. During the telephone conversation, adjustments were made to the schedule. Several weeks before the institute was to begin, one of the faculty members, Bruce Alper, arranged, and the State of Florida financed, an addition to the schedule allowing Dr. William Axford, Director of the Florida Atlantic University Library, to come and meet with the participants and make a presentation on automating academic library budgets. Prior to that fortunate addition to our schedule, Mr. Alper volunteered to present the relatively new concept of Computer Output Microfilmers. This offer was enthusiastically accepted by the Director of the institute. Because of the wide interest in COM, the Director invited academic librarians and computer personnel from all over the State of Louisiana to attend this presentation. As the program worked out, Mr. Alper was helped in the presentation by Mr. John P. Kennedy and about twenty (20) visitors were present for this portion of the institute.

The final program schedule as it was executed is included in the Appe. ii. of this publication (see Appendix B).

Pre-institute activities included a programmed instruction course, faculty meetings, and a "get acquainted" session Sunday night before the institute. The purpose of the programmed instruction course was to acquaint participants with terminology, theory, and logic of computers and to furnish all the participants with a common store of background knowledge. The text chosen was Science Research Associates' COMPUTER SYSTEMS FUNDAMENTALS in three volumes, published in Chicago in 1967. Each participant was asked to take the course at his own speed before arriving at Tech. Since only nine of the nineteen participants said they finished the course, its value to the program is questionable.

The faculty meetings held prior to the institute were four. The first one was the telephone conference call previously alluded to several times. In addition to the other items already related, the faculty asked that the Director furnish them with a list of participants, including addresses, the computer configurations available to each participant, and a copy of the programmed



instruction course. The faculty was asked to furnish the Director with any audiovisual equipment needs they had so that the equipment could be scheduled in advance. The Director agreed to secure sample MARC II tapes for use of the cataloging group and for any other data uses found necessary. Finally, the faculty was asked to furnish the Director with an up-to-date salary figure so that their actual pay would be reflected in their institute compensation.

Three days of faculty meetings were scheduled immediately prior to the The agenda for these meetings is included in the arrival of the participants. Appendix (see Appendix C). At the first meeting the faculty received duplicates to the packets each participant was to receive. In addition to the usual "Chamber of Commerce" materials such packets usually contain, the collowing is a list of the academic materials and supplies in the packet: a COM glossary, COM equipment descriptions and articles, IBM COBOL Language Specifications and Programmer's Guide with accompanying TECHNICAL NEWSLETTERS, an IBM Application Brief describing Florida Atlantic University's system, a flowcharting template, Bibliographies, a class schedule, a list of the names and room assignments of all the participants, an institute brochure, an IBM Data Processing Glossary, COBOL coding sheets, flowcharting forms, "Serials Automation", and a schedule of Manufacturer's Representatives presentations. Each faculty member added material to the above on his area of interest. A nameplate was also included in each packet, and this served as identification to all campus personnel so that faculty and participants could have access to all eating, recreational, library and other services of the campus.

The second day of faculty meetings included a final look at the class schedule, an outline of each faculty member's plan for his formal presentation, the schedule for the informal meetings of the participants, and an outline of the parameters for the group problems. The outlines were valuable because they allowed each faculty member to coordinate his presentations and plans with the other members of the teaching team. The faculty members freely questioned, made suggestions, and discussed one another's plans—and improvements were made.

On the third day of faculty meetings, Mr. A. G. McKee went over the system requirements for Tech's Computing Center. The procedures to be used were presented in writing to each faculty member (see Appendix D). Faculty questions were answered by Mr. McKee and a clear understanding of the Tech center was achieved. The proposed teaching syllabus was the next topic of conversation. The faculty decided to postpone this discussion until the Director could submit a draft to them after the institute was over. The faculty decided to include everything possible in the proceedings of the institute. It will be the most complete document resulting from the program. It will be written by all the faculty and edited and compiled by the Director. Each participant is to receive

a copy and the profession will have access to it by purchase. The participant evaluation will take the form of an anonymous questionnaire. Minor changes in the form were incorporated into the final document as approved by the faculty. This questionnaire is included in the Appendix of this publication (see Appendix E). Faculty evaluation will take place at a critique on the final day of the institute.

Manufacturer's representatives were secured through direct contact with the various firms. Eight major manufacturers were invited to make presentations. The Director worked with each firm individually. The representatives were given the following specific directions: They were to present their firm's hardware, its capabilities, library applications, cost and leasing arrangements, and impending developments of interest to the library user. They could present any "handouts" they desired, and were encouraged to entertain questions from the audience. They were not under any circumstances to participate in questioning representatives from rival concerns. Some of them gave the director a list of their equipment needs for their presentations. The representatives who participated are listed in the schedule published in the Appendix (see Appendix F). It should be noted here that General Electric's representative failed to show up, probably because the Computer Division of G. E. was allegedly sold to Honeywell shortly before they were to appear.

After the arrival of the participants on the fourteenth of June, they were all assigned quarters in one of Tech's high-rise air-conditioned dormitories. At approximately 6:30 p.m. all the participants and faculty met in one of the meeting rooms in the dormitory where the Director briefly acquainted them with Tech and the City of Ruston. Meal tickets were sold to those who wanted them, and preparations were made for the receipt of room rent. Prior to their arrival, the participant's packets were placed in their rooms, so as soon as they arrived, they had them. Materials in the packet were emphasized to the participants in order that they may know how much of it to bring to class with them. The location of the dining hall, library, classrooms to be used by the participants, and recreational facilities were explained, as were the procedures used in each facility. The importance of their "I.D." badges was emphasized. Overall, the group seemed to be very enthusiastic from the very start.

Perhaps a note on the method used to compile these proceedings will be of value or interest. For all the formal presentations (automation of the various processes, COM, Systems Analysis and Flowcharting, etc.) a tape recorder was used to record the actual presentation. These tapes were transcribed and then submitted to the one making the presentation for editing. The edited paper was accepted as submitted with only a few additions such as appendix notes, pagination, and so on. The group proceedings were submitted by the faculty member in charge of the group activity. Changes were made only to achieve more conformity in presentation and format. Other notations were written by

the Director from his notes and knowledge of the overall program. The main difficulty experienced was in capturing on tape the questions of the participants and comments made by faculty members from various points in the meeting rooms. This valuable part of the "feed back" was virtually lost to the record. Another area which was not recorded was the informal meetings both in the dormitory and in the computing center. Mr. Alper's very extensive and intensive demonstration programs were likewise not recorded. If this is ever attempted again, these valuable sessions should be given much thought in order to capture them for the record.

FIRST DAY, June 15



# THEORY, TERMINOLOGY, AND TOUR OF THE COMPUTING CENTER

By

A. G. McKEE



## THEORY, TERMINOLOGY, AND TOUR OF THE COMPUTING CENTER

### By A. G. McKee

First I would like to pass out this general information on the closed shop procedure we maintain in the computing center here at Tech. (See Appendix D) Take one and pass the rest back. Perhaps the first thing we should do is build an information dissemination system to take care of all this stuff.

As Mr. Dyson said, the services of the computing center will be at your disposal for the entire period you are here: during our regular closed shop procedure or on a scheduled basis, depending upon what Mr. Gatlin and the other gentlemen decide when the time comes for the actual processing of application programs. The Center will be available on a scheduled basis for you to come in whenever the decision is made that it would be desirable. We will go through this procedure with you in detail right now. I will give just a few remarks about the Computing Center here at Tech and then we will go down and go through it and let you see what we have, how it operates, and just get the lay of the land on what is down there and how we use it.

We do operate an IBM 360 Model 30. A Model 30 is at the low mid-range of IBM 360 computer systems. It is as large a model 30 as we can get core wise; the next step up would be some other model in the 360 system. I think it will be adequate to handle the needs that we find in this group—we certainly hope so. We will do everything in our power to see that it does.

We have two tape drives and three disc drives with a card reader, and printer with various other unit record equipment in the room. I am not going into detail with you on hardware because you are not particularly interested in it. Your interest lies principally in what that hardware can do for you as librarians.

The system is operated on what we call "closed shop" basis—we have trained operators, full-time staff operators, and student operators. The computer system is somewhat complex to operate, as is the operating system that resides in the computer. The user is never allowed to push the buttons of the machine. We leave this to the trained operators so they know at all times what is going on in the system, and can take care of it. We operate the computing system on a closed shop basis for the user who brings his programs—the work to be done—to a dispatching window and leaves that work to be processed during the day and comes back there and picks it up.

We provide key punch service to all users. Now most of you, well, I guess all of you, received this programmed instruction course before you came, and you have learned through it that our principle means of communication with the computer system is through punched cards. This punched card is punched on a machine called a keypunch which operates much like a typewriter. It does print across the top of the card the characters that are punched in the card, but the computer reads the holes in the card, not the printing. We are going to show you how the holes are punched and give you some instructions on the use of the keypunch machine itself downstairs in the Computing Center.

The Computing Center will provide keypunch service to you. You have coding sheets here that will be given you when you start writing your programs. You will write the programs on these coding sheets, bring them to the dispatching window, and at the Computing Center we have keypunch operators who will keypunch those coding sheers for you, and then you may return a short time later to pick up your decks. Be sure to proofread them. Just go through them and see if they look right. We will keypunch and verify everything and they should be right, based on what you put on the coding sheet. Our keypunch girls are like be seball umpires -- I tell them to call 'em as you see 'em, so if they see an s as a c, they will keypunch a c. Now, I hope that this type of thing gets caught at the verifying stage, because we have Barbara keypunching and Janet is verifying. The girls do not verify their own punching, so this gives an excellent check for errors. All of your programs should be keypunched correctly. So I ask you, please, when you write on these coding sheets, to write as plainly as possible and as neatly as possible because neatness is of vital importance in transcribing from the coding sheet to the punched card.

Then you will, after getting your programs keypunched, present them into the computing system to be processed. You will probably have errors and will not want to go back through this formal process of getting errors corrected by keypunching through the closed shop system, although you certainly may, if you wish. You have this prerogrative. The other possibility is that, hopefully, we will give you enough instruction on the use of the keypunch that you will correct your own errors. Especially if they are just small—one character or figure or something like this. If you do wish to go back through the keypunch service to get corrections made, take a coding sheet and code just that part of your program that needs correcting. Do not submit your whole deck to be done over. Write on the coding sheets just those lines that need corrections, and then when you get those new cards back you may substitute them for the ones in error. You will understand this better after having had experience at it. I am sure Mr. Gatlin will tell you more about this and we will all be working together.

Do you have any questions? Any time you are in the Computing Center and have a question about something, just ask any of us down there and we will

be glad to help you and work with you. If we cannot answer your question, we will find someone who can. I have eight very competent student programmers in the Computing Center who are versed in nearly all the programming languages, so we do have help available if we need it. Let's adjourn now to the Computing Center in the ground floor of this building.

(NOTE: At this point Mr. McKee took the entire group on a detailed tour of the Computing Center. Each machine was explained from the point of view of speed, capacity, and function. This presentation was heavily reinforced by the demonstrations given by Mr. A' are during our "hands on" scheduled hours. The tour terminated in the keypurch room where each faculty member took several of the participants and gave them instructions and experience on keypunching procedures. At the end of this period, all the students were competent enough on the keypunch to make their town corrections. This was the beginning of many opportunities the participants had to use keypunch equipment.

SYSTEMS ANALYSIS AND FLOWCHARTING

Ву

SAM A. DYSON



### SYSTEMS ANALYSIS AND FLOWCHARTING

### By Sam A. Dyson

Your class schedule this afternoon calls for a soliloquy, I guess you might say, on systems analysis and flowcharting. Since many of you have already isolated the area in which you will begin your automation activity, perhaps we are somewhat justified in giving only passing thoughts to systems analysis and giving major emphasis in this institute to flowcharting.

This afternoon we are going to discuss the more important devices in systems analysis, one of which is flowcharting. We are going to discuss kinds and treatment of flowcharts.

You discovered in your programmed instruction book that there are five steps in solving data processing problems. Does anyone want to tell me what they were? Define, Analyze, Program, Implement, and Document your problem. The art work on this flip chart is courtesy of Sam Dyson, MFA (Moderately Finished Art). The five steps used in solving data processing problems then are: (1) Defining the Problem. (2) Analyzing the Problem. (3) Programming the Solution. (4) Implementing the Solution. (5) Completing the Documentation.

Which of these five steps would you suppose is most concerned in systems analysis? All five have implications for systems analysis, but those most concerned are problem definition and analysis.

When one <u>defines</u> the problem, what did your programmed instruction course book tell you happened? One develops a <u>problem statement</u> containing (1) a job description, (2) input information, (3) processing information, and (4) output information. "The final problem statement is a complete outline or narrative containing all the information relevant to the solution of the... problem..."

The gathering of this data is part of systems analysis. Here you describe what is going on-what is being done presently. The procedural steps you now take, the forms you now use, the format, contents, and arrangement of those forms, and many other related points. You usually include in the definition of the problem samples of all the forms you use so the person who is going to take this problem can see at a glance exactly what you are presently doing.

What did your programmed instruction course book tell you that problem <u>analysis</u> involved? "...deciding how to proceed in solving the problem and listing the operations that are required." The "deciding" and "listing" are important parts of systems analysis. Tools that are used in

problem analysis, two of which are decision tables and flowcharts, are very important parts of systems analysis. Not only is it important to construct decision tables and flowcharts describing what you want to do but also one must not overlook the extreme value of first describing what present practice is. This is all systems analysis.

When you analyze the job as defined, you look at it and ask questions about it. You ask if there is anything you are doing you can leave out. Each step of the procedure is examined. You ask, "Why do we do this?" You try to answer that question honestly. There may be perfectly valid reasons for each step taken. On the other hand, you may do it because it mas always been done that way. This kind of analysis will surprise you! There are more things than we like to admit that you and I do every day that we have no reason for doing. We have always done it the way we do it; the one who had the job previously did it that way; and, therefore, we can do it that way, too. There are a lot of little "picky" things that can, if left out of your operation, save you tremendous amounts of time and money over a period of time. You need to ask yourself questions about the steps you outlined up in your job description—why you are doing them; who does them; could someone else do them better; are they done in the proper sequence; or could they just be left out entirely? Flowcharts and decision tables help you do this questioning.

Beyond these statements, systems analysis involves am overall but highly detailed look at the operations in a business, firm, or institution. It seeks to discover what is now being done; the procedures, equipment, people and forms used; and the costs required for each step taken. Then, it tries to rearrange all the ingredients in the organization to achieve the most efficient, logical, and productive methods for both doing the same jobs and making it possible to do more jobs with the same resources.

We had a systems analysis of Prescott Library a couple of years ago in conjunction with a university-wide analysis. The library's analysis was about two and one quarter inches thick and included forms, charts, graphs, statistics and a step-by-step detailed description of everything we do in the library. When the analyst sat down and went through it, he knew every process that we have in the library--it was quite a formidable volume when we got through it.

Once you have defined and analyzed your problem, your next step is to program the solution. This is where analysis and programming overlap. Your analysis has made it possible for you to see areas for improvement. You have changed some steps completely, altered the sequence of steps, designed software, and, in short, have arrived at a whole new set of procedures. The new procedures have been flowcharted, decision tables have been designed, and now you are ready to write the program in a language that your computer can use. We will use the COBOL language, which is a very sophisticated,



flexible, and compatible language to bibliographic data. If you have designed your flowcharts and decision tables well, the Procedure Division of your COBOL program will be a very simple translation of the steps in the flowchart into the form required by the language.

After programming your solution, the next step is to implement your solution on whatever equipment you have—whether abacus, quipus, typewriter, adding machine, TWX, calculator, computer, or even a pencil and piece of paper. This is where you run your program with test data, and "de-bug" it—in other words, get the mistakes out. At this point, adjustments will be made in your program and also in your flowchart. Documentation requires that your final flowchart exactly reflect how the finished program is written.

Here at Louisiana Tech we are at this point in our serials automation program. We have finished de-bugging and are ready to complete keypunching our serials holdings file. We have these nine programs on serials that are ready to run with actual data.

The material you have gathered; -your problem definition, analysis, your COBOL program, flowcharts, decision tables, old and new forms --is all organized as a part of your documentation. You will not stay where you are forever, and you need to give the next fellow who follows you all the records so he can see how and why you decided to do what you did. When someone else comes along and asks, "Why do we do this?", he can go back to your documentation and at least offer an explanation.

In solving data processing problems you will, consciously or unconsciously, actually perform each one of the above steps. They may not be distinctly done--they all have a tendency to overlap--but when you finish the job, you will find that each of the steps were completed. For this reason, you really may do flowcharting in problem definition, analysis or programming, and will definitely include your prepared flowcharts in documentation.

You will recall from our flip chart that the second thing we are going to discuss this afternoon is some important devices for solving problems. Two I will only mention and give you a reference on them in case you want more information. One is the Program Evaluation Review Technique, commonly referred to as PERT. This device is used rather extensively by the armed forces and is a very elaborate set of steps to be taken to evaluate work flow. A second device, called Work Breakdown Structure (WBS), is used by the building industry as a logistics device to assure construction materials and equipment are on site at the precise time they are needed. If you would like to read further on these two devices, Fred L. Bellamy has an excellent article on them in the JOURNAL OF LIBRARY AUTOMATION, vol. 2, no. 4, 1969, pages 187-217.



Decision tables are useful when you ask yourself a question answerable by "yes" or "no", and based upon your answer any one of several steps may be taken. This device was outlined for you in rather minute detail in your programmed instruction course. For more complicated programs with various possible actions based on equally varied decisions, you will want to construct these tables in order to be sure you have considered every conceivable alternative. Mr. Gatlin will point out, I am sure, that the computer will make no assumptions unless it is programmed to do so. You will get a nasty error message and your program will not continue past the point where you neglected to tell it what to do under a particular set of circumstances. This kind of precise thinking will be very good for you in the next two weeks, for it will not allow you to leave any "loose ends" lying around.

The device on which we want to spend the remaining time we have is the <u>flow chart</u>. There are two kinds of flowcharts with which you will have experience: the <u>program</u> flowchart and the <u>system</u> flowchart. If you have your template, the envelope it comes in has on one side the program symbols, and the other has system symbols. You will notice that there are several that are identical. These are basic symbols. Specifically they are input-output, processing, and direction-of-flow. On a flowchart, the normal flow direction is left to right, top to bottom. As long as your chart flows normally, you do not have to indicate with an arrowhead the specific direction. If you depart from the normal flow, however, you must add an arrowhead to your direction-of-flow line. We'll look at a couple of flowcharts to prove that you are more familiar with flowcharting than you perhaps realize.

We have mentioned system and program flowcharts, but first we need to define a flowchart in general:

(1) ... a graphic representation of the definition, analysis, or solution of a problem, in which symbols are used to represent operations, data, flow, equipment, etc.

(2) ... a means of presenting information and operations so that they are easy to visualize and follow. They show the flow of data through an information processing system, the operations performed in the system, and the sequence in which they are performed.

(3) ... a combination of symbols that represent the sequence in which a combination of operations is to be performed.

In short, a flowchart is a picture of the steps you take toward a solution to a problem-whether it be literary, administrative or computer oriented.

You have already seen some of the value of flowcharts, but let me be more definite. They serve the following purposes: A flowchart ...

- (1) ... defines steps to be taken in problem solving.
- (2) ... establishes the most efficient sequence for these steps.



- (3) ... provides a picture of the entire problem.
- (4) ... promotes understanding of the problem and solution.
- (5) ... aids in the documentation of the solution.
- (6) ... presents graphically the "...logic used for coding, desk checking, and debugging while testing."
- (7) ... permits verification "...that all conditions possible have been considered."

Flowcharting is valuable whether or not you ever use a computer. It is an everyday tool that you can use to get a deeper understanding of your present work. Now for those flowcharts I promised.

(Plate I) This is a flowchart of a literary outline which traces the flow and limits of ideas. It happens to be one I constructed for the preparation of this paper. You can readily see the logic and relationship of the various parts to the whole. It is incomplete primarily because I could not get the complete chart on a single page. It is called PRINCIPLES OF FLOWCHARTING, and is divisible into six parts: introduction, definitions, purpose, procedure, examples, and problems. I have further broken down the introduction part to let you see the relationships. You will recognize that we are now at the point labeled "Devices in Problem Analysis" at the sub-division called "Flowchart". From just what you see here, we still have a long way to go, do we not? In preparing any speech you are concerned about the logical flow of ideas. Your outline is, in a sense, a flowchart.

(Plate II) Another familiar sight to you, especially the administrators in the group, is what we all refer to as an organizational chart. This, too, is a flowchart which traces the flow and limitations of responsibility. At the top we have the Director of Libraries with his advisory committees and special personnel. We are proposing here four coordinators: Technical Services, Administrative Services, Readers' Services, and the new Media Services. This chart details, to some degree, the Media Coordinator's responsibilities. He (or she) has much to do. The service, scheduling, media systems, Electronic Programs Learning Center, and Microprint Media personnel are all his responsibility. He will work closely with the other coordinators and even with the area librarians to take maximum advantage of the non-print media services his division offers. One can see at a glance what his responsibilities and limitations are. Were this a complete chart for our library, with a very little effort one could see his place in the overall picture of library service at Tech. So you see, flowcharting is something you have been doing in one form or another all along.



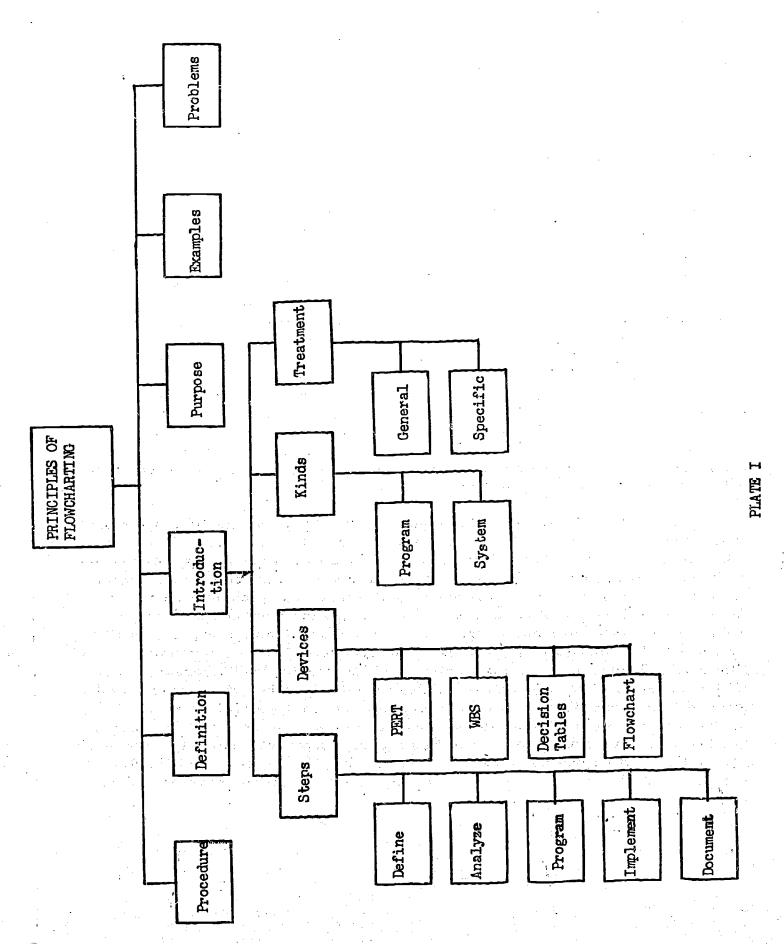


PLATE II

ERIC

The literary flowchart we saw a few minutes ago promised that we will now turn to a consideration of the kinds of flowcharts. We have already noted that there are two kinds of flowcharts: PROGRAM and SYSTEM flowcharts. We have also noted that there are three basic flowcharting symbols which are common to both kinds of flowcharts: INPUT-OUTPUT, PROCESSING, and DIRECTION-OF-FLOW. Other symbols used will be discussed as occasion to use them occurs in our various presentations.

The following definitions of program flowcharts will help clarify the usefulness of this device:

(1) ... describes what takes place in a stored program.

(2) ... displays specific operations and decisions, and their sequence within the program.

(3) ... a diagram of operations and decisions and the sequence in 12 which they are performed by a data processing computer.

(4) ... provides a pictorial description of a program.

(5) ... clearly shows the functions of a program (or a routine) and the relationship of the functions to each other.

A program flowchart is what you will prepare and use in writing your program in the COBOL language. It will aid tremendously in programming your solution. It leads you step-by-step through your problem to completion.

System flowcharting uses the same basic symbols as does program flowcharting, but there is a vast difference between the two. Here, the emphasis is not the program, but the equipment or hardware through which the program has to travel. An entire program run may be represented by a single system symbol. Let's look at these system flowchart definitions:

(1) ... describes the flow of data through all parts of a system. 15

(2) ... an entire program run or phase is always represented by a single processing symbol, together with the input-output symbols. 16

(3) ... aids in assigning computer hardware to execute the steps in a program.

You will learn from Mr. Gatlin that you have to actually assign the machine to perform a task--again, the machine assumes nothing. You tell the machine that I want this program and my data is on a certain piece of equipment. A system flowchart helps to make certain you have not left the machine to make unwarranted assumptions.



Now, let's see if we can distinguish between the two kinds of flowcharts.

(1) ... many steps of a <u>program</u> flowchart may take place at one point or symbol in a <u>system</u> flowchart.

(2) ... the shape of the symbols used in a <u>system</u> flowchart specify the machine which will perform the function, whereas the shape of the symbols used in a <u>program</u> flowchart specify the format of the input-output data used.

(3) ... a <u>system</u> flowchart traces work flow and progress through the <u>hardware</u> or <u>machinery</u> of a system, while a <u>program</u> flowchart traces the sequence, logic, and progress of the program through the system.

All these symbols you will find on your flowcharting template. Unfortunately, these symbols are not standarized, and so it is very helpful if in your documentation you indicate what your symbols mean by use of a Table of Symbols—especially if your chart is to be universally used.

Now, let's turn to flowchart <u>treatment</u>. There are two ways of treating a flowchart, and we will in the course of this institute, see both kinds: general or MACRO flowcharts, and specific or MICRO flowcharts. Some of the examples we have for you today will be very general; others you design in your group sessions will be extremely specific. In your first study of a particular problem, you will probably need a general overview of your problem—a MACRO flowchart will do very well. Later on, it may be that each one of the steps you made in the MACRO chart will become a whole page of symbols in a MICRO chart.

With all that for a background, let's get down to specifics. There is a procedure which I have found very useful in working out a flowchart problem. (Plate III) First of all, you isolate the segment to be automated. For some of you that is a real problem, and for others it was no problem at all--you were told, "We've got to automate circulation or lose our status in the academic community!" Well, somebody has to decide where to begin. There are definite ways to make this decision, but, in the interest of time, we will not go into them here. Then, you analyze the present practice. In your analysis, the first thing you will do is to list the steps you take now. You need to firmly understand the way the job is now done. After you have all the steps listed, look at the list again. Ask yourself, "Are all the steps there?" If you leave out a step, it will cause you some grief later on. Then ask yourself two more questions: "Are all the steps listed necessary?" and "Are they in the proper sequence?" Based on your answers to these questions, you change, adapt, and improve the list.

Now, friends, when you get to this point your operation will improve almost automatically, whether you ever do anything with computers or not.

### FLOWCHARTING PROCEDURE

- Isolate the segment to be automated.
- Analyze the present practice.
  - 1. List the steps taken.
  - 2. Examine the sequence.
    - a. Are all steps necessary?
    - b. Are they in the proper sequence?
    - c. Change, adapt, improve.
  - 3. Note the type of operation for each step.
    - a. Input
    - b. Processing
    - c. Output
  - 4. Fit each step into the appropriate symbol.
  - 5. Add direction of flow lines.
- C. List steps necessary prior to and following this segment.
  - 1. Information
  - 2. Procedures
  - 3. Sequence
  - 4. Fit each of these steps into a flowcharting symbol, if required.
- D. Place C.4. and B.4. together, if practical.
- E. Using C.4. or B.4. above, draw the flowchart.

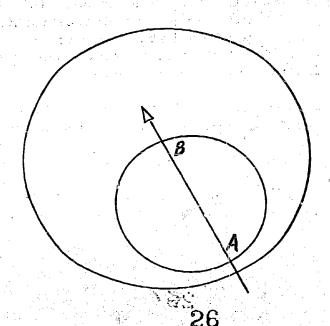
PLATE III

This drill cannot help but improve your operation -- if nothing else, it will acquaint you with what is going on in your library.

The next thing we will want to do in this analysis is to note the type of operation that each step calls for, whether input, output, processing, or whatever. I usually indicate this by putting the symbol beside the statement concerned. The final step in this analysis is to fit each step into the appropriate symbol with the flow direction indicated. Voila! You have flowcharted the segment.

There are some additional things we should not overlook at this point. When you choose a segment to be automated, you must not isolate it to the extent it becomes an unassociated process. It must remain in context with the processes that precede it and those that follow it. You need to have well in mind what happens before the material gets to your segment, and what happens to it after it leaves this segment. You should also keep in mind that any single automated segment must be designed to be compatible with the overall system design you envision. You make keep these things in mind best if you list them. They, too, may be put impossible for possible future reference. They will be helpful if you decide later on to automate those processes, too.

Let's take an example. The segment we have isolated for automation is MONTHLY PERIODICAL CHECK-INS. We have automatically set some of the parameters of our problem: (1) periodicals, (2) monthly, (3) check-in procedure only, and we will also say (4) they are current subscriptions—no new titles included. What you want to do is trace a monthly periodical from the time it gets to the serials operation until it leaves. Of course, there is a lot that happens to a periodical before it is considered a current acquisition; select, order, set it up in the files, receive it, catalog it, etc. before you get to the place we want to start. Also, one of our parameters is that the present procedure we are going to flowchart is a manual system, and we are only concerned with one copy of the journal. You are only tracing the progress of the periodical from point A to point B.



ERIC

Full Text Provided by ERIC

Shall we list the steps taken in our arbitrary example?

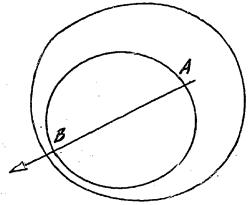
(1)	Receive the issue.	
(2)	Batch for check-in.	
(3)	Alphabetize by title.	
(4)	Take to record file.	
(5)	Find the record card.	
(6)	Correct the alphabetical arrangement.	
(7).	Record the issue on the card.	
(8)	Write the call number on the issue.	
(9)	Batch the completed issues.	
(10)	Forward them for shelving by others.	7-7

Now, this arbitrary, fictitious list of steps is more or less complete. We ask ourselves questions about this list: Are all the steps necessary? Can number four be omitted? Are they already at the record file when they get to serials? Can 2 be omitted? Do you really batch them for check-in? Is 6 necessary? Is 3? Does the same person do 7 and 8? If not, why not? Are the steps in the correct sequence? Should 3 come before 2? Should 9 be done during 8?

For purposes of illustration let's assume this is the sequence we want. The next thing we want to note is the kind of operation each step requires. Numbers 1 and 10 are different from the others. What kind of a process is number 1? INPUT, that is correct. How about number 10? OUTPUT, right. Now, what are all the rest? PROCESSING, yes, that is right. By placing small symbols adjacent to each step listed above, we get a good idea what our final flowchart will look like. Connecting each symbol with a direction-of-flow line, we have a slightly MACRO chart of our process.

Do you want another example? All right, let's take a circulation problem. Putting our circles down again, we want to trace a book from the time it is

brought to the charging desk until it leaves with the patron and the cards are properly filed. Again, from A to B.



Our parameters are as follows: (1) it is a manual system; (2) a one card charging system is used with color coded card cover indicating date due; (3) These are books which have been in the collection for some time--no new books; (4) we use a two week charge; (5) it is a normal charge—no special features. What is the first thing we do? Yes, we list the steps:

- (1) Student brings the book to the desk to charge it.
- (2) Check student I.D. card.
- (3) Student signs the book card indicating address.
- (4) Compare I. D. information with that on the card.
- (5) Stamp the date due in the book.
- (6) Student takes the book and the I.D. card.
- (7) Stamp the date due on the book card.
- (8) Attach color coded card cover.
- (9) File book card by call number in circulation file.

What is next? Ask yourself all the proper questions: Are the steps in logical order? Are they all necessary? Assuming that they are, what do you do next? That's right, you put a symbol beside each step. What is the first step? INPUT, that is right. Is there any other step that could be input? NO, not in this MACRO chart. Which steps could involve a decision? Numbers 2 and 4. Look on your flowcharting template under program symbols and see if you can



find one for a decision. The DIAMOND shaped one is the decision symbol. Put that beside each of the steps number 2 and 4. Which of the remaining steps are processing steps? 3, 5, 7 and 8, yes! There are two steps remaining; what symbols do they require? OUTPUT is correct. Connecting these symbols with direction-of-flow lines and you have a near complete flowchart. One other symbol should be added to each end of the chart--what do you think that might be? TERMINAL symbols, yes. One could be labeled "start" and the other "stop". Does anyone notice something we have not allowed for? What if the picture on the I. D. card, or the name and address de not match? We have accounted for a "yes" answer to the decision symbol, but what happens if the answer should be "no"? The charge should fail, should it most? Another processing symbol should be entered to the right of the first decision symbol in which are written the words "charge fails", and then another terminal symbol indicating a "Stop" to the right of that. The "no" branch beside step 4 can lead to the same two added symbols above -- be sure you add an arrowhead to the line violating our normal flow pattern. There are many other steps we could take on this problem, but this is sufficient for our present purposes. (See Plate IV for completed flowchart)

It would not be fair of me to let you go this afternoon without giving you an assignment. Therefore, please do the following and let me look at it before tomorrow morning. You will have some time now to get started.

ASSIGNMENT: Choose a well defined and limited problem area in your library and flowchart the present practice. (After a few minutes the participants were asked to report on what area they had chosen for flowcharting. Some of the problems were too broad for our purposes and they were asked to further limit them. It is interesting to note that there were no two problems alike--every one of them chose a different problem area. The charts were completed and the faculty members made suggestions for improvement.)

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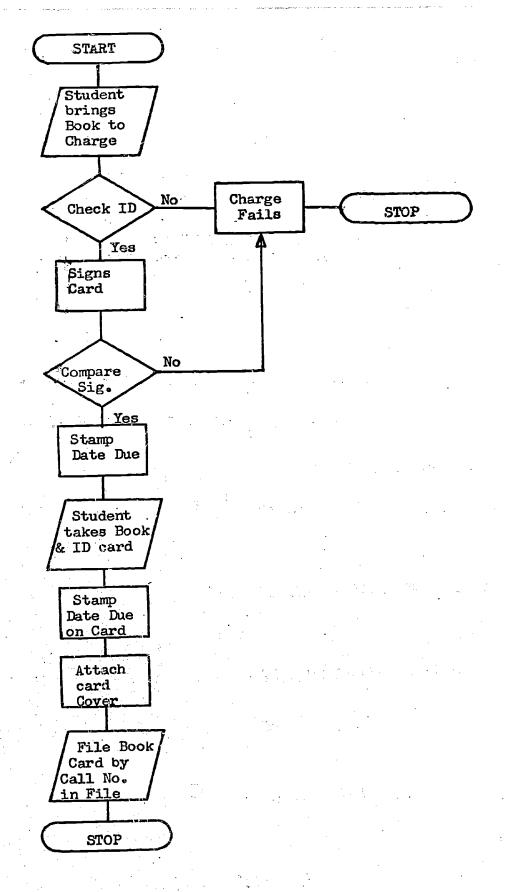


PLATE IV

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- Science Research Associates, Inc. COMPUTING SYSTEMS FUNDAMENTALS ECHNIQUES. Chicago, Science Research Associates, 1969. p. 1.
- 3<sub>OVERV</sub>EW, loc. cit.
- <sup>4</sup>TEC ENQUES, op. cit., pp. 52-73.
- 5<sub>IBM</sub>: publication C20-1699-0 entitled A DATA PROCESSING GLOSSARY. p. 24.
- 6<sub>IBM</sub> publication C20-8152, entitled FLOWCHARTING TECHNIQUES. p. 1.
- <sup>7</sup>TECHNIQUES, op. cit., p. 74.
- <sup>8</sup>IBM's publication C20-8152, op. cit., p. 15.
- 9Loc. cit.
- 10<sub>IBM¹ ≡ publication C20-8152</sub>, <u>op. cit.</u>, p. 1.
- 11<sub>Ibid.</sub>, p. 15.
- <sup>12</sup>IBM's publication C20-8152, <u>loc. cit</u>.
- 13 Loc. cit.
- <sup>14</sup>Ibid., p. 15.
- 15<sub>IBM</sub>'s publication C20-8152, op. cit., p. 15.
- 16 Loc. cit.



SECOND THROUGH FOURTH DAY
June 16 -18



COBOL PROGRAMMING LANGUAGE

Вý

ROLAND D. GATLIN

### COBOL PROGRAMMING LANGUAGE

Instructor: Roland Gatlin

Summary by Sam Dyson

Mr. Gatlin began his three day presentation with a brief survey of how a computer works. He presented the "on" - "off" binary principle and transferred this concept to the current of a core of computer memory. The bit, byte, and character storage was clearly, but rapidly presented with some reference to hexadecimal representation.

Next his attention was turned to computer logic. He noted that contrary to common belief, a computer is not a "mechanical brain" but a tool just as a calculator, and adding machine, or any other piece of equipment. A computer is only as accurate and efficient as the data fed into it and programmer instructing it. A computer can assume nothing. Therefore, one must consider every conceivable condition in instructing a computer; otherwise, he will be asking the computer to make an assumption. Flowcharts and decision tables are tools which are used to make this problem easier.

In instructing a computer, one must identify the program, assign the equipment to be used, describe in detail the data which will be presented and the storage areas required, and then outline in simple step-by-step statements how the problem is to be solved. COBOL programming language lends itself well to this kind of problem solving.

Mr. Gatlin presented COBOL in its four divisions. Each division was considered with emphasis on the simplest required statements. In order to illustrate the divisions, the students were asked to code and punch a set of address cards in the following format:

### Card one:

name	cols.	1 - 30			6.5 miles
 institution		31-60			<b>73.66</b> 1
sex		61,	value,	M if male,	I if female
 participation		62,	value,	1 if faculty	, 2 if student
room	(	63 <b>-6</b> 5			
telephone	(	66-69			
blank		70-79			
code		80,	value,	· <b>1</b>	



Card two:

street address cols. 1-30
city-state 31-55
zip code 56-60
blank 61-79
code 80, value, 2

During the next class period, these cards were collected and duplicated so that each class member was given a complete set including faculty.

Using these address cards as data, the class was asked to flowchart, code, keypunch, and run a class directory for their use. They were given the required control cards, and the faculty helped them to get started.

The first program produced an unformatted printing of the information contained on the cards in the order appearing on the cards. (See Flowchart A, Program A, and Printout A.) By the end of the second day of COBOL language instruction, every member of the class had succeeded in this program.

The second program produced a formatted list with uniform spacing, and having little relationship to the appearance of the data on the cards. (See Flowchart B, Program B, and Printout B.) This gave every participant a class directory.

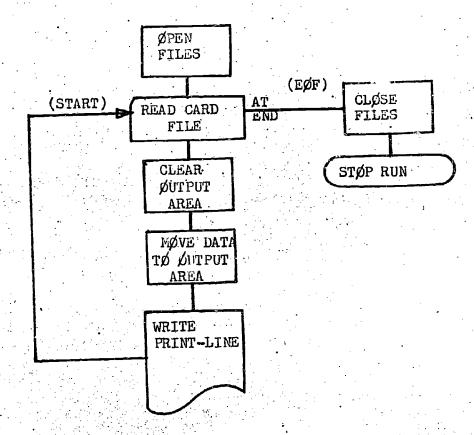
The third program asked for a selective printout of all the participants from East of the Mississippi River, and a count of all the participants from West of the Mississippi River. (See Flowchart C, Program C, and Printout C.)

At the end of the second day of instruction in COBOL the class was asked to take the COBOL EXERCISE (which see, following Printout C). This was an anonymous exercise, and was very revealing with reference to our desired success. The entire faculty helped to correct misconceptions and to give help as requested in the exercise. The faculty was very pleasantly surprised at the grasp the students had of the COBOL language at this point.

With this background, and with successful experience with the computer, the participants were now ready to tackle various problem areas of library technology. The success of the students bears testimony to the excellent instruction which Mr. Gatlin presented, and to the very helpful attitude of the faculty.

Of course, COBOL was used throughout the institute, and so the participants had ample experience with it in relation to library problems. This three day introduction gave the participants an idea of the power, use, and flexibility of the COBOL language.





Flowchart A



#### PROGRAM A

IDENTIFICATION DIVISION.

PROGRAM-ID. 'LAI01'.

AUTHOR. AHW.

REMARKS. LAI PARTICIPANTS LIST.

ENVIRONMENT DIVISION.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT CARD ASSIGN TO 'SYS012' UNIT-RECORD 2540R.

SELECT PRINTER ASSIGN TO 'SYS014' UNIT-RECORD 1403.

DATA DIVISION.

FILE SECTION.

FD PRINTER RECORDING MODE IS F, RECORD CONTAINS 133 CHARACTERS, LABEL RECORDS ARE OMITTED, DATA RECORD IS PRINT-LINE.

01 PRINT-LINE.

02 FILLER

PICTURE X(133).

FD CARD RECORDING MODE IS F, RECORD CONTAINS 80 CHARACTERS, LABEL RECORDS ARE OMITTED, DATA RECORD IS ADD-CARDS.

01 ADD-CARDS.

02 FILLER

PICTURE X(80).

PROCEDURE DIVISION.

OPEN INPUT CARD. OUTPUT PRINTER.

START. READ CARD AT END GO TO EOF.

MOVE SPACES TO PRINT-LINE.

MOVE CARD TO PRINT-LINE.

WRITE PRINT-LINE.

GO TO START.

EOF. CLOSE CARD, PRINTER.

STOP RUN.

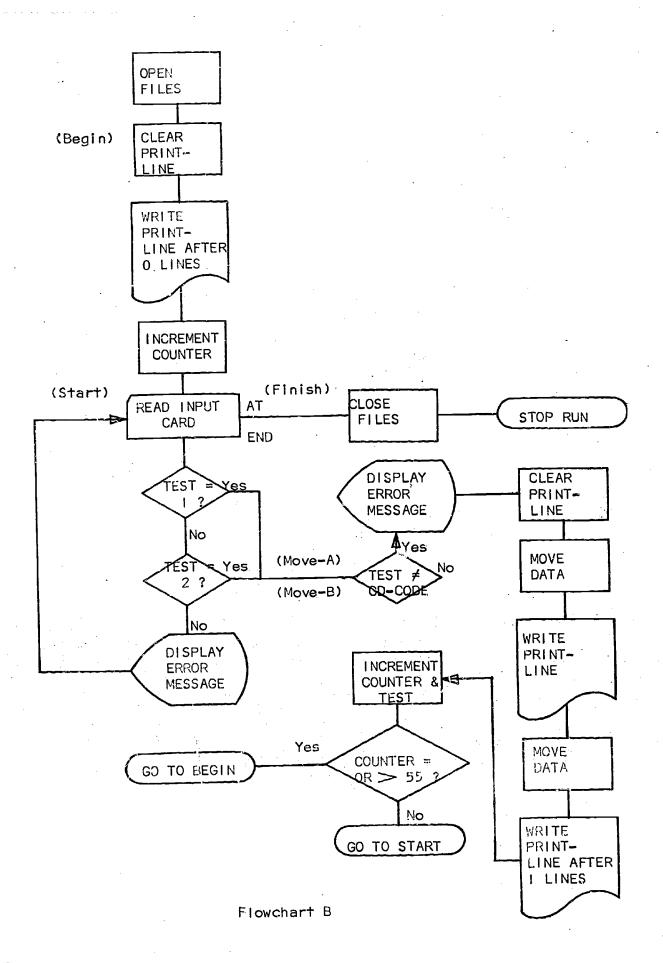




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GUTHRIE, GERRY D.	OHIO STATE UNIVERSITY	M132235.45
GUTHRIE, GERRY D.  RESC. CTR. 1314 KINNEAR RD.  KENNEDY, JOHN P.  1308 VALLEY VIEW RD.	COLUMBUS, OHIO	43212M1322
KENNEDY. JOHN P.	GEORGIA_TECH	M13202778
1208 VALLEY VIEW RD.	DUNWOODY, GEORGIA	30338M1320
BRUCE H. AL PER	FLORIDA ATLANTIC UNIVERS	SITY M13212481
LOC BOYN DAIM WAY	BOCA RATON, FLORIDA	33432M1321
TOTACLE FOWARD A.	UNIV OF THE SOUTH	M22144123
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MAYU UKAKE	SHREVEPORT	71102M131
3756 KICHMUND AVENUE	SOUTHERN UNIVERSITY	M23093974
MITCHELL LA FOUNCY	BATON ROUGE, LOUISIANA	70813M2039
BOX 10031 300 HEVE DIGHTON	NEWARK STATE CULLEGE	M23173183
TERRARA HAND DELVE	NEWARK, NEW JERSEY	07106M2317
CO MANUN DRIVE	STETSON UNIVERSITY	M23154214
MAYO DRAKE  3756 RICHMOND AVENUE MITCHELL L. POUNCY BOX 10031 SOUTHERN BRANCH FERRARA, MARK M 25 MANOR DRIVE DUDLEY YATES ROUTE 2 BOX 667 D F. LANDON GREAVES	DELAND FLORIDA	32720M2315
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P. LANDUN GREAVES	HAMMOND LOUISIANA	70401M2315
P.U. 302 CULLEGE STATION	BELMONT COLLEGE	M23084061
F. LANDON GREAVES P.O. 302 COLLEGE STATION HUGH A. BROWN BELMONT COLLEGE JOHN M. CARTER	NASHVILLE, TENNESSEE	37203M2308
BELMUNI COLLEGE	MISSISSIPPI STATE UNIVE	RSITY M2312
JUHN M. CARTER	STATE COLLEGE. MISS.	39762M2312
P.U. BUX 2340	APKANSAS STATE UNIVERSI	TY M22134034
TAYLUR, GERRY M	STATE UNIVERSITY. ARK	72467M2213
JOHN M. CARTER P.O. BOX 5346 TAYLOR, GERRY M BOX 1017 TAYLOR, MYRA BOX 1017 DINO A ALBERTI P. O. BOX 607 EDWARD E. CARRAWAY	ARKANSAS STATE UNIVERSI	TY F32134034
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929 ROBERT PLACE	CENTENARY COLLEGE OF LA	F23014787
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GRAHAM SANDRA D 840 PLYMOUTH DR. BOX 202	DUDANCE COLERADO	81301F23034787
840 PLYMOUTH UK. BUX 202	NORTHEAST LA STATE COLLE	
MC DONALD BAXTER JR	MONROE LA	71201M23074194
2207 GALE ST	MEMPHIS STATE UNIVERSIT	
WICKER, WILLIAM W.	MEMPHIS, TENNESSEE	38116M2318
924 MOSBY ROAD GIBSON DENNIS A	UNIVERSITY OF SOUTHWEST	FRN LA M23054592
GIBSON DENNIS A	DEDDA IV	70575M23054592
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JOHN JOSEPH MINITER	MALLEC TEVAC	· 75234M2316
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JOHN JOSEPH MINITER  13511 HEARTSIDE PLACE  ROLAND D. GATLIN P. O. BOX 863	CTATE COLLEGE MICE	39759M1323
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PRINTOUT A





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IDENTIFICATION DIVISION.
PROGRAN-ID. LAIZ'.
AUTHOR. WWW.
REMARKS. INSTITUTE DIRECTORY - SECOND EDITION.
ENVIRONMENT DIVISION.
INPUT-DUTPUT SECTION.
FILE-CONTRCL.
    SELECT CARD-IN ASSIGN TO "SYSO12" UNIT-RECORD 2540R.
    SELECT DIRECTORY ASSIGN TO 'SYSO14' UNIT-RECORD 1403.
DATA DIVISION.
FILE SECTION.
   CARD-IN RECORDING MODE IS F. RECORD CONTAINS BU CHARACTERS.
      LABEL RECORDS ARE OMITTED, DATA RECORDS ARE RECORD-A.
      RECORD-B.
    RECORD-A.
01
                     PICTURE X(30).
PICTURE X(30).
        NAME
    02
         INST
    02
                     PICTURE A.
         SEX
    02
                     PICTURE 9.
         CODE-PART
    02
                     PICTURE XXX.
         ROCM
    02
                     PICTURE 9999.
         TELEPHONE
    02
                     PICTURE X(10).
         FILLER
    02
                     PICTURE 9.
         CD-CCDE
    02
    RECORD-B.
01
                      PICTURE X(30).
         ST-ADD
     02
       PLACE.
     02
                      PICTURE X(25).
             CTY-ST
         03
                      PICTURE X(5).
             ZIP
         03
                      PICTURE X(19).
         FILLER
     02
                      PICTURE 9.
        CARD-CODE
     DIRECTORY RECORDING MODE IS F. RECORD CONTAINS 133 CHARACTERS
FD
                      ARE OMITTED, DATA RECORD IS PRINT-LINE.
       LABEL RECORDS
     PRINT-LINE.
 01
                      PICTURE X(20).
     02 FILLER
     02 PHONE.
        03 XCHANGE PICTURE X (4).
             NUMBER PICTURE 9(4).
         0.3
             FILLER.
                      PICTURE XX.
         03
                      PICTURE X (30).
         DATA-FIELD
                      PICTURE X(73).
         FILLER
 WORKING-STURAGE SECTION.
                                     WALUE ZERO
                      PICTURE 99
 77 COUNTER
                                       VALUE 1.
                      PICTURE 9
     TEST
 77
 PROCEDURE DIVISION.
     OPEN INPUT CARD-IN, OUTPUT DIRECTORY.
 BEGIN.
      POVE SPACES TO PRINT-LINE.
      WRITE PRINT-LINE AFTER O LINES.
      MOVE 01 TO COUNTER.
 START. READ CARD-IN AT END GO TO FINISH.
      IF TEST = 1 GO TO MOVE-A.
      IF TEST = 2 GO TO MOVE-B, OTHERWISE DISPLAY 'INVALID CARD COD
      'E NUMBER'.
      GO TO START.
 MONE-A. IF CD-CODE NOT EQUAL TO TEST CISPLAY SORRY, CARD NOT IN
      ·CORRECT SEQUENCE .
```

## SOURCE STATEMENT MOVE SPACES TO PRINT-LINE. MOVE 1257-1 TO XCHANGE. MOVE TELEPHONE TO NUMBER. MOVE NAME TO DATA-FIELD. WRITE PRINT-LINE AFTER 2 LINES. MOVE SPACES TO PRINT-LINE. POVE INST TO DATA-FIELD. WRITE PRINT-LINE AFTER 1 LINES. MOVE SPACES TO PRINT-LINE. COMPUTE COUNTER = COUNTER + 3. COMPUTE TEST = 2. TO 50 OR COUNTER GREATER THAN 50 GO TO IF COUNTER EQUAL BEGIN, OTHERWISE GO TO START. MOVE-B. IF CARD-CODE NOT EQUAL TO TEST DISPLAY SORRY. BUT CARD I MOVE SPACES TO PRINT-LINE. MOVE ST-ADD TO DATA-FIELD. WRITE PRINT-LINE AFTER 1 LINES. MOVE SPACES TO PRINT-LINE. MOVE PLACE TO DATA-FIELD. WRITE PRINT-LINE AFTER 1 LINES. COMPUTE COUNTER = COUNTER + 2. MOVE 1 TO TEST. IF COUNTER EQUAL TO 50 OR COUNTER GREATER THAN 50 GO TO BEGIN OTHERWISE GO TO START. FINISH. CLOSE CARD-IN. DIRECTORY. STOP RUN. PROGRAM B cont.

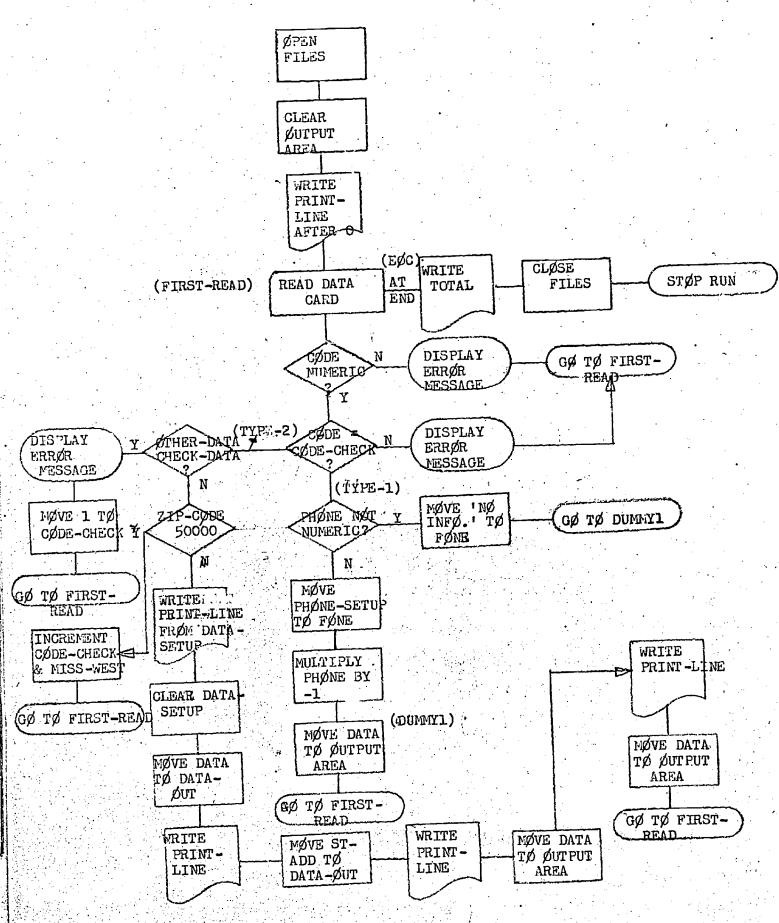
251-4209	LA POLYTECHNIC INST	
	P. C. BCX 607	
	JONESBORO, LOUISIANA	71251
	JUNE SOUNDY LOUIS	
257-2607	ALPER, BRUCE H.	
231-2031	FLORIDA ATLANTIC UNIVERS	ITY
	100 ROYAL PALM WAY	
	BOCA RATON, FLORIDA	33432
257-4866	AMBLER, MARY ELIZABETH	
231 4000	THE LINDENWOOD COLLEGES	
	929 ROBERT PLACE	
	KIRKWCOD, MISSOURI	63122
257-3872	ARCHER, DAVID	
23, 30,12	CLEVELAND STATE COMM COL	Ĺ
	1100 20 ST NW	
	CLEVELAND. TENNESSEE	37311
257-4061	BROWN, HUGH A.	
251 4001	BELMONT COLLEGE	
•	BELMONT COLLEGE	
	NASHVILLE, TENNESSEE	37203
267-2586	CARRAWAY, EDWARD E.	
271-2200	WICHITA STATE UNIVERSITY	
	1547 N. YALE BLVD.,	
	WICHITA, KANS.	67208
257-	CARTER, JOHN M.	
ng na 1945 <b>620 T</b> (1945 1945) Taganagan	MISSISSIPPI STATE UNIVER	RSITY
	P.O. BOX 5346	
	STATE COLLEGE, MISS.	39762
27-346 <u>8</u>	DRAKE, MAYO	
<u> </u>	LSU MED SCH IN SHREVEPOR	रा
	3756 RICHMOND AVENUE	
	SHREVEPORT, LOUISIANA	71104
257-4334	DYSON, SAM A.	
	LOUISIANA TECH UNIVERSI	ry
	2 WESTHOOD HILLS	
	RUSTON, LOUISIANA	71270
257-3183	FERRARA, MARK M	. <u> </u>
<u> </u>	NEWARK STATE COLLEGE	
<b>建</b> 1000 1000 1000 1000 1000 1000 1000 10	25 MANOR DRIVE	
	NEWARK NEW JERSEY	07106
<b>。</b>		
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	PRINTOUT B	<u> </u>

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257-2481	GATLIN, ROLAND D.	
	MISS. STATE UNIVERSITY	
	P. C. 80X 863	20750
	STATE CCLLEGE. MISS.	39759
257-4592	GIBSON, DENNIS A	
	UNIVERSITY OF SOUTHWESTER	RN LA
	P O BCX	
	PERRY LA	70575
	·	
257-4787	GRAHAM, SANDRA D.	
251 4101	FT. LEWIS CELLEGE	
	840 PLYPOUTH DR. BOX 202	
	DURANGO, COLORADO	81301
267 4214	GREAVES, LANDON	
251-4214	SHUTHEASTERN LA. COLLEGE	*.
	P.O. 302 COLLEGE STATION	•
	HAMPOND LOUISIANA	70401
	HAMPOND FOOTSTANA	10.02
257-3545	GUTHRIE, GERRY D.	
	THIO STATE UNIVERSITY	
	RESC. CTR. 1314 KINNEAR	RU.
	COLUMBUS, OHIO	43212
257-2778	KENNEDY. JOHN P.	
	GEORGIA TECH	
	1308 VALLEY VIEW RD.	
	DUNWOCDY, GEORGIA	30338
	DOMINOUS IV COUNTY	
0.5% 4104	MC DONALD, BAXTER JR.	
257-4194	NORTHEAST LA. STATE COLL	EGE
	2207 GALE ST	
		71201
	MONRGE + LA +	11201
	•	
257-	MINITER, JOHN J.	
	TEXAS WOMAN, S UNIVERSITY	
	13511 HEARTSIDE PLACE	7577
	DALLAS. TEXAS	75234
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257-3974	POUNCY . MITCHELL L.	
	SOUTHERN UNIVERSITY	
	BOX 10031 SOUTHERN BRANG	CH
발표를 잃어 하는 사람들이 되었다. 생각한	BATON ROUGE, LOUISIANA	70813
257-4034	TAYLOR, GERRY M	
291-4034	ARKANSAS STATE UNIVERSI	TY
	BOX 1017	
	STATE UNIVERSITY, ARK	72467
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<u>。这个数据的人员,但这个时间是这个人。</u>	PRINTOUT B	
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TAYLOR, MYRA 257-4034 ARKANSAS STATE UNIVERSITY BOX 1C17 STATE UNIVERSITY, ARK 72467 TRIBBLE, EDWARD J. UNIV OF THE SOUTH 257-4123 RT 1 BOX 57 SEWANEE TENNESSEE 37375 WHITE, ANNA H. 257-4787 CENTENARY COLLEGE OF LA. 231 CARROLLTON AVE. SHREVEPORT. LOUISIANA 71105 WICKER, WILLIAM W. MEMPHIS STATE UNIVERSITY 257-3084 924 MOSBY ROAD MEMPHIS, TENNESSEE 38116 YATES, DUDLEY 257-4214 STETSON UNIVERSITY ROUTE 2 BOX 667 D 32720 DELAND FLORIDA

PRINTOUT B

cont.



Flowchart C

ERIC

E NO	SEQ. NO.	SOURCE STATEMENT AMBLER MARY	CBD CL3-5
		IDENTIFICATION DIVISION.	
1	00104	PROGRAM-ID. 'LA102'.	
3	00106	ALTHOD, MARY FLITABETH AMBLEK.	
4	00107	REMARKS. LAI PARTICIPANTS LIST.	
5	001071	THE LINDENWOOD COLLEGES.	
6	00108	ENVIRONMENT DIVISION.	and the second s
7	00109	INPUT OUTPUT SECTION.	
· 8		FILE-CONTROL.  SELECT CARD ASSIGN TO 'SYSO12' UNIT-RECORD 2540R.	
9	00111	SELECT PRINTER ASSIGN TO SYSDIA! UNIT-RECORD 1403	•
10	00112	DATA DIVISION.	•
12		A T. A CAPATION	C &
13		tabel becoming how limitien kelikkuliku muus v	)
14	00116	RECORD CONTAINS 133 CHARACTERS DATA RECORD 132 KT	The Alverton
15	00117	O1 PRINT-LINE	
16		02 FILLER PICTURE X(133).	and the same part over the first that the first tend to the same of the same o
17	00119	FO CARD LABEL RECORDS ARE UMITTED RECORDING MODE IS F RECORD CONTAINS 80 CHARACTERS DATA RECORDS ARE NAM	E-CARD.
18	00120_	ADD-CARD.	• •
19	•	01 NAME-CARD.	
20 21	00201	AT MANE PICTURE XIOUIA	•
22		10 A A A A A A	1
23	00202	02 OTHER-DATA.	1
24	00204_	03 SEX PICTURE X.	1
25		03 PART PICTURE X. 03 ROOM PICTURE XXX.	1
26		03 ROOM PICTURE XXX.	
27	00207	OZ PHONE PICTURE 9999.	
28	00208	02 FILLER PICTURE X(10).  02 KODE PICTURE 9.	1 2
29	00209		
30_		O1 ADD-CARD.  O2 ST-ADD PICTURE X(30).	
31 32	00211	no city-state Picture X(25).	4
33	00213	02 7TP-CODE PICTURE XXXXX	
34	00214	02 FILLER PICTURE X (20).	<del>1</del>
35	00215	LORDETNO_CTOPACE CECTION.	(4) (1)
36			
37	00217	77 CODE-CHECK PICTURE XXXXXX.  77 CHECK-DATA PICTURE XXXXXXX VALUE IS PHONE  77 PHONE-SETUP PICTURE XXXXXXXX VALUE IS PHONE	2571.
38	00218	77 INSTI-S PICTURE X(30).	A Part of the Control
39	00219	TATE INSTITUTE CONTRACTOR OF THE CONTRACTOR OF T	
40		NATAL CETIO	<b>建</b> (4)
41		01 DATA-SETUP.  02 FILLER PICTURE X(10) VALUE IS SPACES.	1 1000
42		DICTURE XXXXXX	
44		02 PHONE-OUT PICTURE	
45		10 PILLER PILLER AND PILLORE AND PARTY OF THE PROPERTY OF THE	
46	10.5	D2 DATA-OUT.	
47		03 FIRST-PART PICTURE X(2)1.	1
48	00308	03 ZIP-OUT PICTURE XXXXX.	
49	C0309	05 EILTER BICINKE XIAN ANTOS 12 3 LYON	-La
50		O1 COUNTER-SETUP. 2 O2 FILLER PICTURE X VALUE IS SPACES.	
51	and the same of th	Companies to the companies of the compan	ARE
52		3 (4) (4) (5) (5) (6) (6) (6) (7) (7) (7) (8) (8) (8) (8) (8) (8) (8) (8) (8) (8	
53 54	. 1 March 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	DARTICIPAN UNITED TO PARTICIPAN	ITS THAT LIV
<u> </u>		Proceedings to the process of the control of the co	
EDIC	00497	OZ FILLER PICTURE X1721 VALUE IS SPACES.	
EKUC		46	
	<ul> <li>A control of the second of the</li></ul>	。1、2、1、1、1、1、1、1、1、1、1、1、1、1、1、1、1、1、1、1	

# Program C (cont.)

	57	00310	PROCEDURE DIVISION.
	58	00311	
	59		MOVE SPACES TO PRINT-LINE.
	60		WRITE PRINT-LINE AFTER ADVANCING O LINES.
	61	00312	FIRST-READ.
	62	00313	READ CARD AT END GO TO EOC.
	63	00314	IF KODE IS NOT NUMERIC THEN DISPLAY "CARD CODE ERROR"
	64	00315	GO TO FIRST-READ.
	65	00316	IF KODE IS EQUAL TO CODE-CHECK GO TO TYPE-1, TYPE-2
	66	00317	DEPENDING ON KODE OTHERWISE DISPLAY CARD OUT OF SEQUENCE
	67	00318	
• •	68	00319	TYPE-1.
	69	00320	
	70	00401	MOVE PHONE-SETUP TO FONE. MULTIPLY PHONE BY -1 GIVING
	71	00402	PHONE-OUT.
· .	72	00403	·DUMMY1.
· · · · · ·	73	00494	MOVE NAME TO DATA-OUT.
	74	90405	MOVE INSTITUTION TO INSTI-S.
S	75	00406	MOVE' 2 TO CODE-CHECK.
	76		MOVE OTHER-DATA TO CHECK-DATA.
	77	0 74 08	
	78	00409	TYPE~2.
	19	00410	IF OTHER-DATA IS NOT EQUAL TO CHECK-DATA THEN DISPLAY 'SOR
	^^	00/11	
	_ UU	00411	BUT THE SECOND CARD DID NOT MATCH THE FIRST CARD. MOVE
	8U 81	00412	CODE-CHECK GO TO FIRST-READ.
ماند د الماند د الماند		00412	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK
	81	00412 00413	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.
	81 82	00412 00413	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.
	81 82 83	00412 00413 00414	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.
	81 82 83 84 85 86	00412 00413 00414 00415 00416 00417	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.
	81 82 83 84 85	00412 00413 00414 00415 00416 00417	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.
	81 82 83 84 85 86 87 88	00412 00413 00414 00415 00416 00417 00418 00419	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.
	81 82 83 84 85 36 87 88	00412 00413 00414 00415 00416 00417 00418 00419	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK 1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.
	81 82 83 84 85 86 87 88	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK 1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.
	81 82 83 84 85 36 87 88 89 90	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  MOVE ZIP-CODE TO ZIP-OUT.
	81 82 83 84 85 36 87 88 89 90 91	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.
	81 82 83 84 85 36 87 88 89 90 91 92	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502 00503	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE MISS-WEST TO NO-W.
	81 82 83 84 85 86 87 88 89 90 91 92 93	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502 00503 00504	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE MISS-WEST TO NO-W.  MOVE COUNTER-SETUP TO PRINT-LINE.
	81 82 83 84 85 86 87 88 89 90 91 92 93 94	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502 00503 00504 00505	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK 1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-SETUP.  MOVE INSTI-S TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE MISS-WEST TO NO-W.  MOVE COUNTER-SETUP TO PRINT-LINE.  MOVE 1 TO CODE-CHECK. GO TO FIRST-READ.
	81 82 83 84 85 86 87 88 89 90 91 92 93 94 95	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502 00503 00504 00505 00507	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE MISS-WEST TO NO-W.  MOVE COUNTER-SETUP TO PRINT-LINE.  MOVE 1 TO CODE-CHECK. GO TO FIRST-READ.  ECC. WRITE PRINT-LINE FROM COUNTER-SETUP AFTER ADVANCING 2 LIPECC.
	81 82 83 84 85 86 87 88 89 90 91 92 93 94	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502 00503 00504 00505	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE MISS-WEST TO NO-W.  MOVE COUNTER-SETUP TO PRINT-LINE.  MOVE 1 TO CODE-CHECK. GO TO FIRST-READ.  ECC. WRITE PRINT-LINE FROM COUNTER-SETUP AFTER ADVANCING 2 LIPECC.
	81 82 83 84 85 86 87 88 89 90 91 92 93 94 95	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502 00503 00504 00505 00507	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DAYA-SETUP AFTER ADVANCING 1 LINES.  MOVE MISS-WEST TO NO-W.  MOVE COUNTER-SETUP TO PRINT-LINE.  MOVE 1 TO CODE-CHECK. GO TO FIRST-READ.  ECC. WRITE PRINT-LINE FROM COUNTER-SETUP AFTER ADVANCING 2 LIPECC.
	81 82 83 84 85 86 87 88 89 90 91 92 93 94 95	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502 00503 00504 00505 00507	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE MISS-WEST TO NO-W.  MOVE COUNTER-SETUP TO PRINT-LINE.  MOVE 1 TO CODE-CHECK. GO TO FIRST-READ.  EOC. WRITE PRINT-LINE FROM COUNTER-SETUP AFTER ADVANCING 2 LINES.  CLOSE CARD PRINTER. STOP RUN.
	81 82 83 84 85 86 87 88 89 90 91 92 93 94 95	00412 00413 00414 00415 00416 00417 00418 00419 00420 00501 00502 00503 00504 00505 00507	CODE-CHECK GO TO FIRST-READ.  IF ZIP-CODE IS NOT LESS THAN '50000' MOVE 1 TO CODE-CHECK  1 TO MISS-WEST GO TO FIRST-READ.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 2 LINES.  MOVE SPACES TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE ST-ADD TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE CITY-STATE TO DATA-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE ZIP-CODE TO ZIP-OUT.  WRITE PRINT-LINE FROM DATA-SETUP AFTER ADVANCING 1 LINES.  MOVE MISS-WEST TO NO-W.  MOVE COUNTER-SETUP TO PRINT-LINE.  MOVE 1 TO CODE-CHECK. GO TO FIRST-READ.  EOC. WRITE PRINT-LINE FROM COUNTER-SETUP AFTER ADVANCING 2 LINES.  CLOSE CARD PRINTER. STOP RUN.

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## Printout C

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PHONE 257-2697	ALPER, BRUCE H.		
FIGHE EST EST	FLORIDA ATLANTIC UNIVERS	ITY	
	100 ROYAL PALM WAY	,	
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PHONE 257-3872	ARCHER, DAVID	_ <u>i</u>	
	CLEVELAND STATE COMM COL	Ĺ	
	1100 20 ST NW		
and the second of the second o	CLEVELAND TENNESSEE	37311	
	والمستخد والمستدون والمراث وال		ادر در د
PHONE 257-4061	BROWN, HUGH A.	•	
	BELMONT_COLLEGE		
	BELMONT COLLEGE		
	NASHVILLE, TENNESSEE	37203	
NO INFG3586	CARTER, JOHN M.	فإمستند ولدخمة	
· ·	MISSISSIPPI STATE UNIVER		* * *
	_P.O. BOX 5346	<u>_</u>	
	STATE COLLEGE, MISS.	39762	
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。"""我,我们我们的,我们们的,我们的,我们的我们的我们的,我们就是一个人的,我们就会看到这个人,我们就会会看到这个人。""我们就是这个人,我们就是这个人,我	*****	- 7 H F 11	

## HOMEWORK FOR PROGRAMMING - SESSION # 1

Punch a set of cards with the following information about yourself.

Card	Card Column(s)	Description
# 1	1 - 30 31 - 60 61 62	NAME INSTITUTION SEX (M or F) Participation Code (1 faculty, 2 student)
	63 - 65 66 - 69 70 - 79 80	Dorm Room Telephone GARBAGE Card Code (1)
<b># 2</b>	1 - 30 31 - 55 56 - 60 61 6.2	P O or Street Address City and State ZIP CODE SEX (M or F) Participation Code (1 faculty, 2 student)
	63 - 65 66 - 79 80	Dorm Room GARBAGE Card Code (2)

These cards will be used in the Homework assignment for Programming Session # 2.

## COBOL EXERCISE NO. 1

1.	Name the divisions in a COBOL Program.				
2.	What does 'FD' mean?				
3.	What is the relation of a data record to a file?				
4.	Name three COBOL verbs.				
5.	The 01 level is written starting in which margin?				
6.	In what division of a COBOL Program are the actual processing instructions written? (NOTE: Where is the work done?)				
7.	What does 1/0 mean?				
8.	A card reader (2540R) is what class of device? (Input or Output)				
9.	Write a COBOL picture to fit the following numeric item: 12484				
10.	Write a COBOL picture to fit the following Alpha/numeric item:  L. A. Institute				
11.	What input picture would you use for the following numbers:  123.6 Punched as 1236  1.148 Punched as 1148  444.1 Punched as 4441  The decimal is not punched				



12. On what topic (already covered) would you like to have additional help?

FIFTH DAY, June 19

CATALOGING GROUP PROCEEDINGS

Bv

JOHN P. KENNEDY



### L. A. I. CATALOGING GROUP

- A. Members of the group described the libraries with which they were affiliated.
- B. A system design problem was defined.
  - 1. Members of the group agreed on characteristics, size and processing volumes for a hypothetical library for which a system was to be designed.
  - 2. It was specified that the IBM 360 configuration and allable in the Louisiana Tech Computer Center was available for the use of the library and that the Marc tapes were being received by the Library.
  - 3. Members of the class were instructed to do the general design of a system to produce catalog cards from the MARC records.
  - 4. Group members raised the possibility of storing the MARC file and the library's catalog on direct access storage devices. As a first step in designing the system, group members were instructed to determine the average record size required and then to estimate the number of 2311 disk drives (the direct access device available on the Louisiana Tech system) which would be required to store the entire catalog on line at one time.
- C. The MARC Project was described.
  - 1. The history and objectives of the MARC program at the Library of Congress were reviewed.
  - 2. The MARC II format was described. The use of variable length fields, delimiters, subfields codes and the record directory were introduced. The great flexibility of the MARC format was emphasized.
- D. Group members' solution on disk storage estimates were examined.

  Through this review it was brought out that:
  - 1. In addition to the characters required for the contents of the data fields determined to be essential, it was necessary to allow for tags, delimiters, control codes and indexes to the file.
  - 2. The characteristics of the hardware device available might influence storage efficiency. The possibility of storing eight 453-character physical records on each 3625 character track of the disk was considered.
  - 3. The economic impracticality of this type of storage for most libraries was brought out. Estimates of the number of disk drives which would be required for storing minimum data for the libraries represented were in the 15 to 50 range.
- E. Possibilities for storing large catalog files on other direct access storage devices at centers serving groups of libraries were considered.

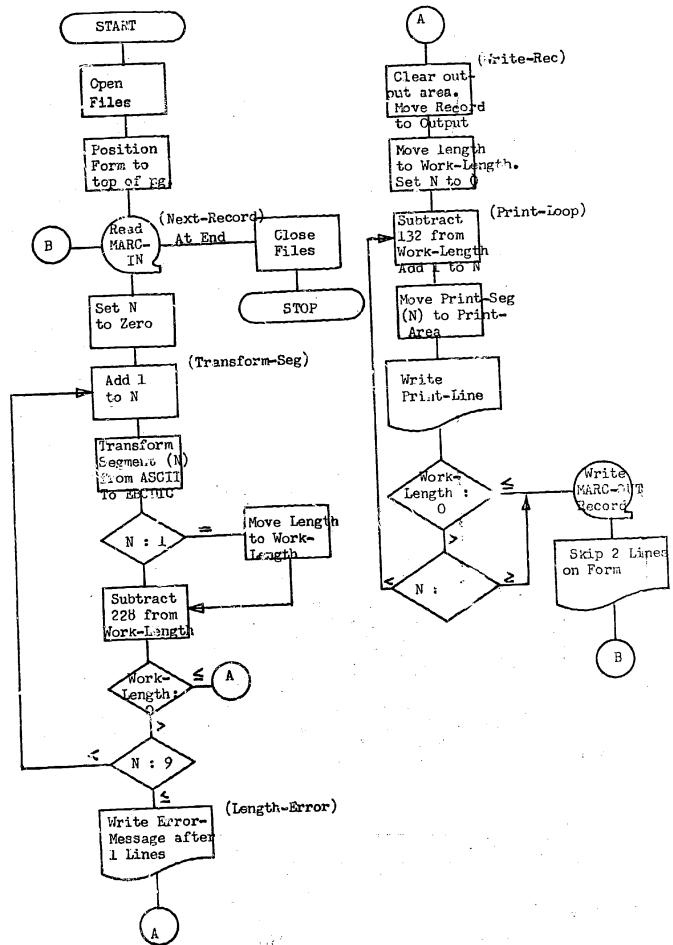


F. The group developed a flowchart for a program to convert records on a MARC tape from the modified ASCII code to EBCDIC code, to print the converted records, and to write a new output file containing the converted records. New COBOL concepts introduced were the REDEFINES clause, the use of tables and subscripts, and the use of loops within a loop.

Prior to this session the instructor coded the program which had been flow-charted during the previous session.

- G. Group members' system designs for the problem presented during the first session were presented and discussed.
- H. The system flowcharts for catalog production at Georgia Tech were examined.
- I. Discussion led to the conclusion that libraries of the sizes and nature represented in the group could not economically automate their catalog production at present but that they could mefit through the services of automated processing centers.
- J. Group members keypunched the program which had been flowcharted in the previous session.
- K. Evening session in the Computer Center
  The program which had been keypunched during the afternoon session
  was tested and debugged. The flowchart of this program is presented
  as Figure A. The program listing is presented as Figure B, and a
  page of the printed output is presented as Figure C. This program
  is not presented as a model for the most efficient means of converting
  MARC records but as a class-developed program.
- L. The converted MARC records printed by the class program were examined. The MARC II format was reviewed and studied in greater detail by analyzing the printed records.
- M. The group flowcharted a second program to select specified records from 'ne tape output of the previous program and to print a list of the short titles of the selected records. Records to be selected were to be determined from a card file with the selected LC card numbers punched in the first twelve columns and formatted in the same way as LC card numbers on the MARC tapes. New programming concepts introduced were file processing logic, the use of PERFORMed subroutines and the use of program switches. It was emphasized that the subroutines developed to locate the title field in the MARC records and to move the short title to the print area could be used for locating and moving other data items by supplying different tags to the first subrou' ne. The flowchart and DATA DIVISION coding developed for this program are presented as Figures D and E.





ERIC
Full Text Provided by ERIC

FIGURE A

```
I-DENTIFICATION DIVISION.
00104
      PROGRAM-ID. 'TRNSMARC'.
CC105
CO106: AUTHOR. CATALOGING GROUP.
      DATE-COMPILED.
00107
      REMARKS. READS MARC RECORDS. TRANSFORMS CHARACTER CODES FROM
00108
          THE MARC VERSION OF ASCIL TO ENCOIC FOR 18M 360. WRITES
CO109
          TRANSFORMED RECORDS ON TAPE AND PRINTS A PROOFLISTING.
C011C
      ENVIRONMENT DIVISION.
CO111
      INPUT-GUTPUT SECTION.
C0112
      FILE-CONTROL.
00113
          SELECT MARC-IN ASSIGN TO 'SYSO15' UTILITY 2400.
C0114
          SELECT MARC-CUT ASSIGN TO "SYSOI6" UTILITY 2400.
000141
          SELECT PRTR-FILE ASSIGN TO 'SYSO14' UNIT-RECORD 1403.
C0115
      DATA DIVISION.
C0117
      FILE SECTION.
GC118
      FD MARC-IN
00119
           LABEL RECORDS ARE OMITTED
C0120
          RECORDING MODE IS U
C0121
          RECORD CONTAINS 50 TO 2052 CHARACTERS
00122
          DATA RECORDS ARE MARC-REC MARC-REC2.
00123
       01 MARC-REC.
                      PICTURE X(228) OCCURS 9 TIMES.
           C2 REC-SEG
       01
           MARC-REC2.
                      PICTURE 9(5).
           02 LENGTH
                      PICTURE X(2047).
           02 FILLER
       FD
           MARC-OUT
           LABEL RECORDS ARE OMITTED
           RECORDING MODE IS V
           RECORD CONTAINS 50 TO 2112 CHARACTERS
           DATA RECORD IS MARC-OUT-REC.
      01
           MARC-CUT-REC.
           OZ DATA-MARC PICTURE X OCCURS 2052 TIMES DEPENDING ON LENGTH.
      FD PRTR-FILE
           LABEL RECORDS ARE OMITTED
           RECORDING MODE IS F
           RECORD CONTAINS 133 CHARACTERS
           DATA RECORD IS PRINT-LINE.
           PRINT-LINE.
       01
           02 CC
                  PICTURE X.
           C2 PRINT-APEA PICTURE X(80).
           02 FILLER PICTURE X(52).
       WORKING-STORAGE SECTION.
00301
      77
           WORK-LENGTH PICTURE $9(5).
00302
              PICTURE 99.
 00303
       77
 003031 01 ASCII.
           02 P1 PICTURE X(120) VALUE *
 003032
                                                    , %_>?
                                     5*}/
                         3/+1>.
 003033-
 003034-
                                     STUVWXYZ 0123456789
           C2 P2 PICTURE X(28) VALUE
 003035
           EBCDIC.
003036 01
           02 PT1 PICTURE X(118) VALUE
 003037
           *#~/$ ~##$%&~()*+,~./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
 003038
           003039-
           O1 MARC-REC-SETUP.
```

#### SOURCE STATEMENT

```
02 MARC-CUT-SEG PICTURE X(80) OCCURS 26 TIMES.
QQ307
       PROCEDURE DIVISION.
           OPEN INPUT MARC-IN
€0308
                               WITH NO REWIND
                              OUTPUT MARG-OUT PRTR-FILE.
           MOVE SPACES TO PRINT-LINE. WRITE PRINT-LINE AFTER O.
003081
       NEXT-RECORD.
00309
           MOVE SPACES TO MARC-REC.
           READ MARC-IN AT END GO TO DONE.
00310
QC311
           MOVE ZERC TO No
       TRANSFORM-SEG.
0.0312
00313
           ADD 1 TO N.
           TRANSFORM REC-SEG (N) FROM ASCII TO EBCDIC.
003140
           IF N = 1 MOVE LENGTH TO WORK-LENGTH.
004
           SUBTRACT 228 FROM WORK-LENGTH.
004
           IF WORK-LENGTH > ZERO NEXT SENTENCE
004
             ELSE GC TO WRITE-REC.
CC4
           IF N < 9 GO TO TRANSFORM-SEG.
004
       LENGTH-ERROR.
0.04
           MOVE * LENGTH ERROR IN FOLLOWING RECORD. TO PRINT-AREA.
Q04
€04
           HRITE PRINT-LI. AFTER 2.
004
       WRITE-REC.
           MOVE SPACES TO MARC-REC-SETUP.
C04
           MOVE SPACES TO MARCHOUTHREC.
           MOVE MARC-REC TO MARC-OUT-REC.
004
           MOVE THARC-REC TO MARC-REC-SETUP-
004
           MOVE LENGTH TO WORK-LENGTH.
           MOVE ZERO TO N.
004
       PRINT-LOGP.
604
           SUBTRACT 80 FRUM WORK-LENGTH.
004
©04
           ADD 1 TO N.
004
           MOVE PARC-OUT-SEG (N) TO PRINT-AREA.
           WRITE PRINT-LINE AFTER 1.
CO4
004
           IF WORK-LENGTH > ZERO NEXT SENTENCE
             ELSE GO TO FINISH-REC.
004
           IF N < 26 GO TO PRINT-LOOP.
00501
       FINISH-REC.
C0512
           WRITE MARC-OUT-REC.
00513
           MOVE SPACES TO PRINT-LINE.
00504
           WRITE PRINT-LINE AFTER 2.
00505
           GO TO NEXT-RECORD.
00506
00507
      DONE .
          CLOSE MARCHIN MARCHOUT PRINTFILE.
00508
00509 STOP RUN.
```

#### SUBSTITUTION TABLE

PRINTI	NG CHARAC	TER	Sill	estituted_for
	\$		De:	limiter Character
	1	•	Fi	eld Terminator
) N	#		Es	cape Character
			Al	l Diacriticals
	in the second			ostrophe o <b>r</b> Single Quote
				d of Record Charac- ter and all other Characters not available on the Print Chain

FIGURE C



CC190130CCCCC080041CC0130500014000540820008000682450081 CO84CNAM 22CC193 00762600038001573CC0C31001955CC0151CC2265C40029CC37765000450040665000580045165C 69013480 /69102751969 NYUA C4300509700003500552710006000587/ /O \$ABF38\$B.H8/ \$A150/O \$AHUMAN ACTION: \$BCONCEPTUAL AND EMPIRICAL ISSUES SCECITED BY THEOCORE MISCHEL./C SANER YORK, SBACADEMIC PRESS, SC1969./ \$AXI, 293 P. SBILLUS. SC24 CM. / SATHE PAPERS ARE THE RESULT OF A WORKING CONFERENCE HELD: A THE CENTER FOR CONTINUING EDUCATION OF THE UNIVERSITY OF CHICAGO, SEPT. 27-OCT \$AINCLUDES BIBLIOGRAPHIES. / OSAPSYCHOLOGY SXACCRESSES. ESSAYS. LECTU 1, 1967./ ES./ DSAMOTIVATION (PSYCHOLOGY) SXADDRESSES. ESSAYS, LECTURES./ OSAEMOTIONS SXADD ESSES, ESSAYS, LECTURES./10\$AMISCHEL, THEODORE, \$D1925-\$EEP./10\$ACHICAGO.\$BUNIVE 

CC100130CCC0C08CC41CC0130500018000540820014000721C00027 C0862450053CC11325CO0130016626COC210C1793C00039C02003500010002396C0003900249/ 69013510 /691024S1969 HIUA 00100BENG /0 \$ANC237.L53\$BD3/ \$A759.13 AB/1C\$ADAVIS, BERNARD, \$D1911-/1 \$ALEETEG CF TAHITI; \$BMASTERPIECES ON BLACK VELV T./ \$A-1ST ED./1 \$AHONOLULU, \$C1969-/ \$A266 P.\$BILLUS. (PART COL.) \$C23 CM./ \$ 15.CO/10\$ALEETEG, EDGAR WILLIAM, \$D19C4-1953. - aaaaaaaaaaaaa

CC100130CCCCC0800410C01301500140005402C00140006805CCC21 2200229 C1045NAM C08208200100010324501680C11326C0081CC281300004100362350001000403500009500413504 0310050865C0055005396500052005947CC004200646710004000688710009200728/ \$AB69-16787/ \$A333101804/0 \$AHD82 / 1C1CO ENG ENKAB В /69102451969 E-B215 1969/ \$A338-9/0 \$ABACKWARD AREAS IN ADVANCED COUNTRIES: \$BPRGCEEDINGS OF A CONFERENCE HELD BY THE INTERNATIONAL ECONOMIC ASSOCIATION -AT VARENNA, 1967-; CEDITED BY E. A. G. ROBINSON./O SALONDON, SAMELBOURNE -ETC. - SBMACMILLAN; SANEW YO K, \$BST. MARTINGS PRESS, \$C1969. 7 TAXVIII, 474 P. \$BILLUS., MAPS. \$C23 CM./ SAFELD JOINTLY WITH THE EUROPEAN CENTRE FOR THE CO-ORDINATION OF RESEARCH A \$ABIBLIOGRAPHICAL FOOTNOTES./ OSAECONOMIC CEVELOPMENT \$XADORE C DCCUMENTATION./ SES, ESSAYS, LECTURES. / OSAREGIONAL PLANNINGSXADDRESSES, ESSAYS, LECTURES. / 1054 CBINSON, EDWARD AUSTIN GOSSAGE, SEED. / 20 SAINTERNATIONAL ECONOMIC ASSOCIATION. / 20 AEUROPEAN CENTRE FOR THE CO-ORDINATION OF RESEARCH AND COCUMENTATION IN SCCIAL 

C010C130CCCCC080C41CC0130410011000540500018000651C0C033 2200181 C1595CAM C0832450085CC11626C0055C02053000C24C026035CC00900284504004100293505102500334651 В OCCOO ENG C35C135965C0C2O01394/ 69013727 /690604S1969 CAU NGSPA/O \$AF1409.7\$B.135/10\$AIGLESIA, RANION, \$D1905-1948.41 \$ACOLUMBUS, CORTIES, BAND OTHER ESSAYS & CTRANSLATED AND EDITED BY LESLEY BYRD SIMPSON . 70 \$4-BERKELEY \$BUNIVERSITY OF CALIFORNIA PRESS, \$C1969./ \$AXII, 286 P. \$C23 CM./ \$A7.95/ \$\$AI CLUCES BIBLIOGRAPHICAL REFERENCES. /O SATHE MAN COLUMBUS. -- TWO STUDIES ON THE SA E SUBJECT: BERNAL DITAZ DEL CASTILLO AND POPULARISM IN SPANISH HISTORIOGRAPHY. ERNAL DITAZ DEL CASTILLO-S CRITICISM OF LICPEZ DE GIOMARA-S HISTORY OF THE CONQ EST OF MEXICO .-- INTRODUCTION TO THE STUDY OF BERNAL DITAZ DEL CASTILLO AND HIS RUE HISTORY .-- THE DISILLUSIONMENT OF DON CARLOS .-- THE HISTORIAN-S DILEMMA .- TON HE PRESENT STATE OF HISTORICAL STUDIES .-- RIGHT AND LEFT IN THE MORELIA HISTORIC L CCNGRESS. -- THO NOTES ON MEDIEVAL CASTILIAN HISTORIOGRAPHY .-- HERNIAN CORTIES .--PETER MARTYR --- GONZALO FERNIANDEZ DE CVIEDC --- FERDINAND COLUMBUS --- MORISON-S AD IRAL OF THE OCEAN SEA .-- ZWEIG-S AMERIGO. A COMEDY OF ERRORS .-- IYLANEZ- CRIGNICA DE LA CONQUISTA DE MIEXICO. -- PADARIAGA-S HERNIAN CORTIES. -- CAREIA-S CRIONICA O ICIAL DE LAS INDIAS --- OTS CAPDEQUII-S INSTITUCIONES SOCIALES DE LA AMIERICA ESP INOLA .-- HARING-S COMMERCE AND NAVIGATION .-- ACOSTA-S HISTORIA NATURAL Y MORAL .--EICH PINELO-S PARATISO EN EL NLEVO MUNDO. -- SIEGFRIED-S AMTERIQUE LATINE. -- RAMOS PROFILE OF MEXICO. / OSALATIN AMERICASXHISTORICGRAPHY. / OSAHISTORIOGRAPHY. - 2

CC673NAM 22C0181 CC100130CCCCC0800410001302000140005405C001700068082C016
CO851CCCC220C1012450C780C12326C0C52C02013CC0022002534900085002755000048003606C0
ERIC340874C0C35C0457/ 69013797 /691C28S1969 GHU B 00010 ENG / \$A
ERIC340874C0C35C0457/ 69013797 /691C28S1969 GHU B 00010 ENG / \$A
CHECKLIST OF THEODORE DREISER, \$CCCMPILED BY HUGH C. ATKINSON. /O \$ACCLUMBUS, OHI

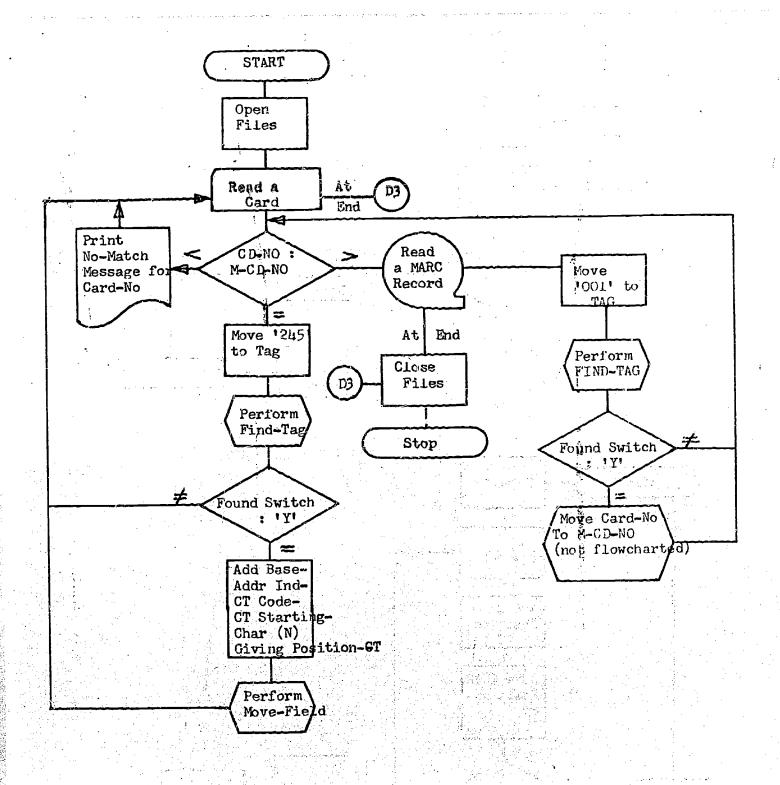
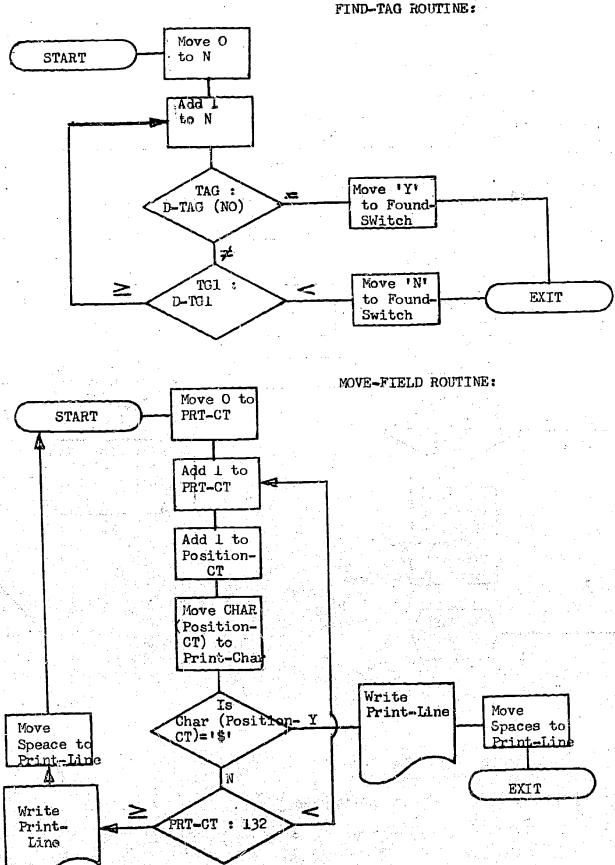


FIGURE D

ABOT MET A A



#### FIGURE E

#### SELECTIVE TITLE LIST

#### Cataloging Class

DATA DIVISION. FILE SECTION. FD MARC-FILE

DATA RECORDS ARE MARC-REC MARC-REC2.

MARC-REC.

02 LEADER.

03 FILLER

PICTURE X(10).

03 IND-CT

PICTURE 9.

03 CODE-CT

PICTURE 9.

03 BASE-ADDR

PICTURE 99999:

03 FILLER

PICTURE X(7).
OCCURS 168.

02 DIRECTORY-ENTRY

(Y-ENTRY O

03 D-TAG.

04 D-TG1

PICTURE 9.

04 D-TG2-3

PICTURE 99.

03 LENGTH

PICTURE 9999.

03 STARTING-CHAR

PICTURE 99999.

OZ FILLER

PICTURE X(8),

01 MARC-REC2.

02 CHAR

PICTURE X

CURS 2048.

#### FD PRINTER-FILE

DATA RECORD IS PRINT-LINE.

01 PRINT-LINE.

02 CE PICTURE X.

02 PRINT-AREA.

03 PRINT-CHAR PICTURE X OCCURS 132.

#### FD CARD-FILE

DATA RECORD IS SELECT-CARD.

01 SELECT-CARD.

02 CD-NO PICTURE X(12).

02 FILLER PICTURE X(68).



WORKING-STORAGE SECTION.

77 N PICTURE 9999.

77 POSITION-CT PICTURE 9999.

77 PRT-CT PICTURE 999.

77 FOUND-SWITCH PICTURE X.

01 TAG.

02 TG1 PICTURE 9.

02 TG2-3 PICTURE 99.

01 M-CD-NO.

02 CD-NO-CHAR PICTURE X OCCURS 12.

FIGURE E continued

CIRCULATION GROUP PROCEEDINGS

Ву

GERRY D. GUTHRIE



## THE CIRCULATION FACULTY GROUP PROBLEM

On Friday, June 19, the four participants of the circulation faculty group problem met for their first four hour session. I began by presenting the basic circulation problem (see page 63 .) I then presented a short lecture describing a typical circulation system showing each program and how it fit into the total system. The participants were then asked to select one of the four computer programs as their individual problem.

Work began immediately on the creation of a forms design. This is an essential step in the participant's solution of the problem in that he is required to analyze what pieces of information should appear on his particular report and what he would have to do in his computer program to get this information.

Three four hour sessions were held on Tuesday, Wednesday and Thursday of the following week. These sessions were essentially work sessions with the participants working individually on their program with assistance from the instructor when necessary. Questions that arose which were of common interest to the group would be presented to the group as a whole and a short discussion would follow. Evening sessions were held in the dormitory and later on in the week at the Computer Center for actual testing and debugging.

At the conclusion of the institute two of the participants had successfully completed their circulation problem, one of the participants had a completed error-free compile listing that had not achieved a successful test, and the fourth participant had not successfully completed an error-free compilation. The final step of the group problem, which would have involved a discussion of their problems and their solutions, was not held because of lack of time. The participants without exception worked very hard on this problem and spent many long hours working on their individual programs. The results of the group problem were quite surprising considering the short amount of time the participants had at their disposal. In general the participants felt that working on their own individual computer programs gave them a much greater understanding of the complexities involved in library automation.

#### CIRCULATION PROBLEM

 Your problem is based on a typical automated circulation system. The four computer programs listed below are an essential part of an integrated system. One program will be assigned to each participant.

Essentially the problem will involve (1) designing a form for the computer output which will display all information required, (2) write a flow chart to show how your program will logically accomplish this task, and (3) test and debug your program so that it will accurately produce the required report.

The four problems (i.e. programs) are as follows:

- a. Daily Circulation Report Run
- b. Overdue Notice Print Run
- c. Hold Notice Print Run
- d. Fine Notice Print Run

A description of these programs and how they fit into the circulation system will be described in a lecture given during the first class session.

- 2. All programs use a common data base which is a tape file. See the "File Description" for the contents of the file.
- 3. Assumptions:
  - a. All transactions have been posted to the file and it is ready to produce the weekly reports.
  - b. All data on the file is valid and does not contain errors.
  - c. The report date is 2/15/70.
- 4. The basic problem can be expanded to include more advanced concepts if time permits. These will be assigned according to individual progress.
- 5. At the end of the problem each participant will be expected to complete a
  - a. Forms Layout
  - b. Flow Chart
  - c. Cobol Compile Listing
  - d. Printed Report
- 6. On Thursday, June 25 from 1:00 5:00 be prepared to present your solution to the circulation group. We will discuss:
  - a. Forms design
  - b. Problems encountered in programming
  - c. Clerical operations at <u>your</u> library which could be eliminated if your program were implemented.



## FILE DESCRIPTION

The following describes the characteristics of the test file used in the circulation exercise:

- 1. Label records are standard.
- 2. Records are 127 characters long blocked at 10.
- 3. Data fields:

3. Data fields:	•	
FIELD NAME	SIZE	VALUES
Media Code	<b>1</b>	M - Monograph S - Serial X - Special
Location Code	1	<ul> <li>1 - Undergraduate</li> <li>2 - Hospital</li> <li>3 - Law School</li> <li>4 - Engineering</li> <li>5 - Main Library</li> </ul>
Call Number	12	Alpha-numeric
Date Charged	6	Month-day-year from 01-01-70 to 02-20-70
Date Due		Month-day-year from 01-15-70 to 03-05-70
	julija sa katalogija sa ka Katalogija sa katalogija s	C - In circulation D - Discharged R - Recall H - Hold
Main Entry	. German kris	Alpha-numeric
Title	20	Alpha-numeric
Patron I. D. No.	9	Numeric
User Name	15	Alpha-numeric
Address l	## 1 <b>5</b> * 45 *	Alpha-numeric
Address 2	15 × 15	Alpha-numeric
	13.00	F - Faculty S - Student C - Courtesy Card
Holdings	10	Alpha-numeric (Indicates volume and copy)

### CIRCULATION PROBLEM

#### INDIVIDUAL PROGRAMS

## 1. Overdue Notices

Using the printer lay-out forms, design a form for an overdue notice which will be mailed to library patrons. Using data elements from the file, determine which fields are to be printed on the notice. It will be necessary to select only those records on the file which are actually overdue.

Use your own experience at your library in designing the form and writing the program.

### 2. Fine Due Notices

Using the printer lay-out forms, design a form for a fine due notice which will be mailed to library patrons. Using data elements from the file, determine which fields are to be printed on the notice.

It will be necessary to select only those records on the file which have been discharged and were overdue.

Use your own experience at your library to design the form and write the program.

## 3. Hold Return Notice

Using the printer lay-out forms, design a form for a hold return notice which will be mailed to library patrons. Using data elements from the file, determine which fields are to be printed on the notice.

It will be necessary to select only those records on the file which have been discharged with a hold.

Use your own experience at your library to design the form and write the program.

## 4. Circulation Listing

Using the printer lay-out forms, design a form for a daily circulation listing which will be given to the circulation department. Using data elements from the file, determine which fields are to be printed on the report.

It will be necessary to select only those records on the file which would be of interest to the circulation desk.

Use your own experience at your library to design the form and write the program.



ACQUISITIONS GROUP PROCEEDINGS

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## ACQUISITIONS GROUP PROJECT

The Acquisitions group undertook three separate projects. The first was the writing of a program by each group member to list information contained in the FAU L.A.I.S. data card. The problem statement (problem No. 1) and three of the programs written are included. All members of the group succeeded in producing working programs.

The second project was the design of an order follow-up Sub-System for the FAU system. The problem statement (problem No. 2) and the resultant system design documentation are included. The design of the Sub-System is that of the students and the wording of the documentation is also their own. It is the feeling of this instructor that this project was extremely successful and the resultant system designing is of very high quality.

The final project was the re-design of the FAU L.A.I.S. to suit the needs of the institutions the students represented. A complete system package was developed and is included in this document. The system speaks for itself; there is little doubt that it will meet the design criteria and function properly.

## ACQUISITIONS PROBLEM NO. 1

PROGRAM OBJECTIVE: Produce a list of paid items for student and faculty use. Printout size is to be limited to an 8 1/2 by 11 inch size to allow placing it in a standard 3 ring binder. This list will be a weekly accessions list.

INPUT FILE: Punched card. Format defined by page 19 of LAIS Documentation.

OUTPUT FILE: Printer. Use up to 80 print positions. (The printer has 10 print positions to the inch, horizontally.)

NOTE: The computer printer prints 6 lines to the inch vertically.

## REQUIRED SYSTEM DESIGN:

- 1. Define fields to be listed, and their format in the printer list.
- 2. Flowchart the program. Be sure to provide for the following:
  - A. Serial items do not use the Author field. All of the first 40 card positions are used for the title.
  - B. Do not list postage transaction.
  - C. Provide some method of identifying serial items.
  - D. Approval plan items should also be uniquely identified.
- 3. Decide in what sequence you want the items listed.
- 4. Provide the program with a page overflow routine and use your institutions name in the page heading.



```
SOURCE STATEMENT
LINE NO. SEQ. NO.
               IDENTIFICATION DIVISION.
         001
  S
     2
         001
               PROGRÁM-ID. 'LAI3'.
     34
  S
               AUTHOR. DRA.
         001
 S
               REMARKS. WEEKLY ACQUISITIONS LIST
         001
 Š
               ENVIRONMENT DIVISION.
     5
         001
 S
        001
               INPUT-OUTPUT SECTION.
  S
               FILE-CONTROL.
         001
  S
                   SELECT CARD
     - 8
         001
                   ASSIGN TO 'SYSO12' UNIT-RECORD 2540R.
  S
     9
         001
                   SELECT PRINTER ASSIGN TO 'SYSO14' UNIT-RECORD 1403.
  S
    10
         001
  5
    11
         001
               DATA DIVISION.
         001 FILE SECTION.
    12
               FD CARD LABEL RECORDS ARE OMITTED, RECORDING MODE IS F,
  S
    13
         001
                   RECORD CONTAINS 80 CHARACTERS, DATA RECORD IS TRAN.
  S
    14
         001
  S
    15
         001
               01
                   TRAN.
  S
                   02 FIRST-40.
         001
    16
                  03 AUTHOR PICTURE X(16).
  S
    17
         001
                   03 TITLE PICTURE X(24).
  S
    18
         001
                   02 FILLER PICTURE X(18).
  S
    19
         001
                   02 COPIES PICTURE XX.
  S
    20
         001
                  02 FUND PICTURE XXXX
  S
         001
    21
                   02 FILLER PICTURE X(9).
  S
         0.01
    22
                   02 PAID PICTURE 9999V99.
  S
    23
         001
                   02 FILLER PICTURE X.
  S
         001
    24
               FO PRINTER LABEL RECORDS ARE OMITTED, RECORDING MODE IS F.
         002
    25
                   RECORD CONTAINS 86 CHARACTERS, DATA RECORDS ARE HDR.
  S
         002
    26
         002
                   DATALINE .
  S
    27
         002
                01 HDR.
  S
    28
         002 FILLER PICTURE X(23).
  S
    29
         002 SCHL-N PICTURE X(40).
  S
    30
         002 O2 FILLER PICTURE X(4).
  S
    31
         002
                   02 DATE-OUT PICTURE X(B).
  S
     32
  S
                   02 FILLER PICTURE XX.
         002
     33
    34 002 02 PG-OT PICTURE X(5).
35 002 02 PAGE-OUT PICTURE ZZZ9.
36 002 01 DATALINE.
  S
  S
  S
     37 002
                02 FILLER PICTURE X.
  S
               02 AUTH-TTL.
03 TL-OT PICTURE X(24).
         002
  S
    38
         002
  S
    39
               03 FILLER PICTURE X(5).
  S
        002
002
     40
        002 03 AU-OT PICTURE X(16).
002 02 FILLER PICTURE X(5).
002 02 FND-OT PICTURE XXXX.
  S
     41
  S
     42
  S
    43
        002 OZ FILLER PICTURE X(5).
  S
     44
                  02 P-OT PICTURE ZZZ9.99.
  S
    45
         002
                   02 DOLTL REDEFINES P-OT PICTURE X (7).
        002
  S
    46
                   02 FILLER PICTURE X(19).
     47
         002
              WORKING-STORAGE SECTION.
     48
        003
                  LINCT PICTURE 99 VALUE IS 60.
  S
    49
         003
                77 PCT PICTURE 914) VALUE IS 0.
  S
    50
         003
                    P-DATE PICTURE X(8).
UPSI PICTURE X.
         003
  S
    51
               77
    52 003
53 003
               77 UPSI PICTURE X.
  S
                PROCEDURE DIVISION.
  S
                   OPEN INPUT CARD OUTPUT PRINTER.
     54
         003
         003
                   INCLUDE 'CBLOOOL'.
    55
                  ENTER LINKAGE.
     56 *
```

D.ARCHER

CBD CL

```
LINE NO. SEQ. NO.
                     CALL "GETDAT" USING P-DATE , UPSI.
     57 *
                      ENTER COBOL.
     58 *
     59
          003
                 READ-CARD.
                      READ CARD AT END GO TO EOF.
 S
     60
          003
                      IF COPIES = "PO" GO TO READ-CARD.
 S
          003
     51:
                      IF LINCT > 55 GO TO OFLOW.
     62
          003
                 OFLOW-RIN. MOVE SPACES TO HOR.
          003
     63
                      IF COPIES = FPR' GO TO SERIAL.
  S
     64
          003
                      MOVE TITLE TO TL-OT.
  S
     65
          003
                      MOVE AUTHOR TO AU-OT.
  S
     66
          003
  S
                  SERIAL-RIN.
     67
          003
                      IF FUND = '0100' MOVE 'AVPL' TO FND-OT ELSE MOVE FUND TO
  S
     68
          003
  S
     69
          003
                      FND-ET.
                      MOVE PAID TO P-OT.
  S
          003
     70
                      WRITE HDR AFTER 1.
  S
     71
          003
                      ADD 1 TO LINCT.
  S
     72
          003
                      GO TO READ-CARD.
  S
     73
          003
                  SERIAL.
     74
          004
                      MOVE FIRST-40 TO AUTH-TTL.
  S
     75
          004
                      GO TO SERIAL-RTN.
  S
     76
          004
  S
                  OFLOW.
     77
          004
                      MOVE SPACES TO HDR.
  S
     7 Š
          004
                                  CLEVELAND STATE COMMUNITY COLLEGE! TO SCHL-N.
     7ģ
  S
          004
                      WRITE HOR AFTER O. MOVE SPACES TO HOR.
     8Ŏ
          004
                                     WEEKLY ACQUISITIONS LIST' TO SCHL-N.
     8 i
          004
                      MOVE P-DATE TO DATE-MUT. ADD 1 TO PCT.
     82
          004
                      MOVE PCT TO PG-OT. MOVE 'PAGE ' TO PG-OT.
     83
  ς
          004
                      MOVE PCT TO PAGE-OUT.
          004
  S
     84
                      WRITE HOR AFTER 1. MOVE SPACES TO HOR.
  S
     85
          004
                      MOVE 'TITLE' TO TL-GI.
  S
          004
     86
                      MOVE 'AUTHOR' TO AU-OT.
  S
     87
          004
                      MOVE 'FUND' TO FND-OT.
  S
           004
     88
                      MOVE . COST. TO DOLTL.
  ડ
     89
           004
                      WRITE HOR AFTER 1. MOVE SPACES TO HOR.
  S
     90
          004
                     WRITE HDR AFTER 1.
MOVE O TO LINCT.
GO TO OFLOW-RIN.
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EOF. CLOSE CARD PRINTER. A MARKET

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TITLE	AUTHOR	FUND	COST	. ;
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DATRIX REF OVER 10 OPTCL FUND OF UNDERWATER MODERN TRUST FORMS V.1 1969 AMER STRING TCHRS ASSN 1970 ANNUAL INST ON EST PLANNING BERKELEY TRIBE 1/70-12/70 BIBLIOGRAPHCL SOC OF AMER 1 BROADCASTING 1970 YEARBO VOL 1-9 1955-64 FAIRCHILD TROPICAL GARDEN 1	DATRIX	0000	D•00	
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BERRELET TRIBLE 17 TO AMER 1	970 MEMB -	0300	10.00	
BIBLIUGRAFACE SOC OF AMERICA	nk	0300	11.50	
BROADCASTING 1970 TEAMBO	DRAMA REVIEW	3800	202.50	•
VOL 1-9 1955-64 CARDEN 1	170-17/70	0300	3.00	
FAIRCHILD TROPICAL GARDEN 1 FLA STATE HORTICULTURAL SOC JAPAN STATISTICAL YRBK 1969	MEMR 19A9	0300	6.00	
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ORPHEUS 1/70-12/70		1300	108.00	
RICKENBACKER REPORT 5/1/70-	5/1/71	0300	295.00	
UTILITIES LAW REPORTS 6/70-	6/71	0200	4.95	
NATL SOC FOR STDY OF EDUC Y NEGOTIATIONS MGMT SERV MEM LIB OF CONGRESS NATL UNION BANK AUDITING & ACCNTG REPT HANDBUCK PHYSIK BD 25 TL 20 AMER MATHEMATICAL SOC TRANS RADIOPHYSICS & QUANTUM ELECTRONS	RBK 1967 PT 1	0300	55-00	
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LIB OF CONGRESS NATL UNION	CATALOG 69-72	0300	28 00	
BANK AUDITING & ACCUTG REPT	5/70-5/71	0300	20.00	
HANDSHOK PHYSIK BD 25 TL 20	SUP PR	0300	26.40	
AND MATHEMATICAL SOC TRANS	L 2 NO.86	0300	10.80	
AMERICAN ELECTION OF THE COLOR	T V 11 1968	0300	160.00	
RADIUPHISIUS & GUARTON ELLE	RENNETT E N	3400	10.50	
DOWNFALL OF DERVISHES	BERNARD H W	2200	4.95	
READINGS IN HUMAN DEVL	ATRKELAND T	2100	3.49	
RADIOPHYSICS & QUANTUM ELECTOWNFALL OF DERVISHES READINGS IN HUMAN DEVL WHEN THE COCK CROWS MAKING OF MID SCHLS THE SACRED PIPE SUMMERFOLK	DDOWN & F	2400	18.50	•
MAKING OF MID SCHLS	DROWN 1 F	5100	5.36	
THE SACRED PIPE	DECEMBER OF	2100	3.29	\$
SUMMERFOLK	BURN D	2100	6.34	
LAND & WILDLIFE OF AFRIC		2100	6.34	
THE REPTILES	CARR A		5.34	
THE MAMMALS	CARRINGTON R		3.25	
HORATIO	CLYMER E	2100	6.69	
GROWING YEARS V 3	COIT M L	2100	6.69	
SWEEP WESTWARD	COLT M L		6.00	
SEL CHARACTER OF AMER SE	COUNTS G S	2400	4.25	
JOE & THE SNOW	DE PAGLA T	2100	12.32	
NGMT INFO SYSTEM	DEARDEN J	1300		
THE PRIMATES	DEVORE I	2100	6.34	
WHEEL'S FOR A NATION	DONOVAN F DUBOS R	2100	6.26	
HEALTH & DISEASE	DUBOS R	2100	6.34	
DEVL OF LABOR SURPLUS EC	FFI J	5200	7.65	•
DEVE UP LABOR SURFLUS LO	FRITZ J	2100	3.49	
GEO WASHINGTON BREAKFAST	GARFIELD L	2100	4.50	•
DEACK JACK	GOLDMAN A S	1400	12.15	
PAINTAINABILITY	HAMILTON E I	6000	9.00	
APPLIED GEOCHRONOLOGY	HAMILION C 4	2400	8.55	المراجع المراجع
SUPERVISORY LEADERSHIP	HARRISON R. H.	2100	3.49	
BASEBALL MOUSE	HOFF S	2400	5.95	
READINGS ON LNG & TCHNG	HOOVER K H	5100	3.15	
WELSH RURAL COMMUNITIES	JENKINS D	5100	9.90	
ANTHROPOLOGISTS IN FLD	JONGMANS D G	44 (a) 10 (a) 10 (a) 10 (b) 10	5.40	
MEASUREMNT OF MODERNISM	KAHL J	5100	3.29	1.1
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ERICA DOGS & TRAMPS	KIRCHNER C	2100	3.29	
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•	CLEVELAND STATE COMMI	UNITY COL	LEGE	
•	WEEKLY ACQUISITION	S LIST	06	/25/70 P
TITLE	WEEKLY ACQUISITIONS AUTHOR	FUND	COST	
COMM & DEVELOPMENT RISE OF ROMANOVS CLASSICAL RHETORIC IN EN EFF FOREIGN LANG INSTR COMM IN EXPANDING ORGAN EMMA, LADY HAMILTON CONELICT & UNDERSIG IN	and the second of the second o		2.04	
COMM & DEVELOPMENT	LAKSHMANA Y V	2100	5.90 11.49	
RISE OF ROMANOVS	KLYUCHEVSKY V	AVPL	0.05	
CLASSICAL RHETORIC IN EN	VICKERS B	AVPL	0.97 5 47	
EFF FOREIGN LANG INSTR	SMITH G E	AVPL	4 40	
COMM AN EXPANDING ORGAN	MCUNMAN E	AVPL	7 • 7 V 5 6 B	
EMMA, LADY HAMILTON	HARDWICK M	AVPL	2 05	and the second second
EMMA, LADY HAMILTON CONFLICT & UNDERSTG IN THE COSSACKS CONTEMPORARY JEWELRY NOTEBKS OF T WOLFE LIVES OF W BENTON SCENE OF CHANGE AUTHORITY & ADDICTION URBAN CHALL TO PSYCHIATR GENRL SYST THEORY & PSYC BOOK OF MUSICAL DOCUMNTS CLIMATE VEGETATION & MAN BEHAVRL REPERTOIRE OF ST	PLATINEK P	AVPL	6.39	
THE COSSAEKS	LUNGWUKIH P	AVPL	9-64	
CONTEMPORARY JEWELRY	MUKTUN P G	AVPL	27.54	
NOTEBES OF T WOLFE	WULFE	AVPL	9.18	
LIVES OF W BENIUN	HYMA 3	AVPL	5.36	
SCENE OF CHANGE	WEAVE W	AVPL	13-08	
AUTHORITY & AUDICITUM	BRILL L	AVPL	14.54	
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BOOK OF MUSICAL DUCUMNIS	NEIL P	AVPL	15.00	
CLIMATE VEGETATION & MAN	HAULUW L	AVPL	14.05	
BEHAVEL REPERTOIRE OF ST	BERIKANU M	AVPL	10.00	* *
CIVIL DISOBEDIENCE	THUREAU H U	AVPL	70.00 7.25	
GODS AND GAMES	MILLER U L	AVPL	11 50	
HURRICANES	TANNEHILL I R	AVPL	4 80	
PSYCH FOR PEDIATRICIAN	FINCH S M	AVPL	4 30	
DIVORCED MOTHER	MINDLEY C	AVPL	7 20	
BEHAVRL REPERTOIRE OF ST CIVIL DISOBEDIENCE GODS AND GAMES HURRICANES PSYCH FOR PEDIATRICIAN DIVORCED MOTHER BOUND TO EXILE OF HUMAN INTERACTION TOLKIEN CRITICISM NETHERLANDISH PAINTERS ARCHITECTURE IN NO GHANA SOUTH AND THE NATION FOR A NEW AMERICA SCIENCE FICTION IN CINEM VETERINARY HELMINTHOLOGY BOOKS FOR JR COLL LIB	EUWARDES M	AVPL	1 • 50 4 · 54	• •
OF HUMAN INTERACTION	LUFT J	AVPL	4 25°	4
TOLKIEN CRITICISM	WEST R C	AVPL	4 • £ 3 2 /	
NETHERLANDISH PAINTERS	BERNI W	AVPL	9797	
ARCHITECTURE IN NO GHANA	PRUSSIN L	AVPL	0 • 4 4 5 4 9	
SOUTH AND THE NATION	WATTERS P	AVPL	0.19	
FOR A NEW AMERICA	WEINSTEIN J	AVPL	7.10	
SCIENCE FICTION IN CINEM	BAXTER J	AVPL	17 00	
VETERINARY HELMINTHOLOGY	DUNN A M	AVPL	17.00	
BOOKS FOR JR COLL LIB	PIRIE J W	AVPL	11 69	
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CHEMISTRY OF CARBOXYLIC	PATAI S	AVPL	38.10 8.72	
SOVIET HERETIC	ZAMYATIN Y	AVPL	and the second second second second	
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RCOTS & RHYTHMS	NETTLEFORD R	AVPL	and the second s	المراجع والمتحدث والمتحدال
PHILOS USE OF CATEGORIES	BAER R A	AVPL	6.70 4.54	
OPEN CLASSROOM	KOHL R R	AVPL	the region was to get the control of	
MEMOIRS OF CONSERVATIVE	DAVIDSON J C C	AVPL	7.10	
READING DIFFICULTIES	DURR W K	AVPL	7.50	e e e e e e e e
BALLAD AS SONG	BRONSON B H	AVPL	7.30	
UPROOTED CHILDREN	COLES R	AVPL	3.95	حاورادياه أدياه أهبأ أبيا اليوافيان بيهين بالهيد
RADICALISM, RACISM & PAR	CURRY R O	AVPL	9.69	
ROOSEVELT, LEWIS, & NEW	MCFARLAND C K	AVPL	3.50	
CLASS-CERAMICS & PHOTO	BEREZHNOI A I	AVPL	36.72	
FREE NITROXYL RADICALS	ROZANTSEV E G	AVPL	17.90	
RADIATN FROM APERTURES	ZAKHARYEV L N	AVPL	12.00	
VOLCANISM & UPPER MANTLE	GORSHKOV G S	AVPL	32.13	The second section of the second section of the second section of the second section s
ADJUSTMENT	TUCKER I F	AVPL	8.24	
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·	CLEVELAND STATE COMMU	NITY CO	ULLEGE	_
TITLE	WEEKLY ACQUISITIONS AUTHOR	LIST FUND	06/25/70 COST	P
CITY WITHOUT WALLS TOLSTOY MELVILLE SON OF ROYAL LANGBIRTH INFO FOR MGMT DECISIONS CHARLES KEMBLE FRENCH SOGIALISTS IN SEA	AUDEN W H CHRISTIAN R F SEELYE J HOWELLS W D GOLDSCHMIDT Y WILLIAMSON J L SIMMONS H G	AVPL AVPL AVPL AVPL AVPL AVPL	4.50 8.72 6.78 9.64 10.66 7.30 8.95	
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E.J. TRIBBLE
INE NO. SEQ. NO.
                          SOURCE STATEMENT
                                                                          CBD CL3+5 0
    1
                IDENTIFICATION DIVISION.
                PROGRAM-ID. 'ACCUIS1'.
                AUTHOR. ETRIB.
                REMARKS. ACQUISITIONS PROBLEM ONE WEEKLY LIST OF PAID ACCESSIONS.
                ENVIRONMENT DIVISION.
                INPUT-OUTPUT SECTION.
                FILE-CONTROL.
                    SELECT CARD ASSIGN TO 'SYSO12' UNIT-RECORD 2540R.
    9
                    SELECT PRINTER ASSIGN TO 'SYSO14' UNIT-RECORD 1403.
   10
                DATA DIVESION.
                FILE SECTION.
   11
   12
                    CARD LABEL RECORDS ARE OMITTED, RECORDING MODE IS F. RECORD
   13
                    CONTAINS 80 CHARACTERS, DATA RECORD TRAN.
   14
                01
                    TRAN.
   15
                    02 FST-40.
                    03 AUTHOR PICTURE X(16).
   16
   17
                    03 TITLE PICTURE X(24).
                    02 FILLER PICTURE X(18).
   18
   19
                    02 POST PICTURE XX.
   20
                    02 FUND PICTURE XXXX.
   21
                    02 FILLER PICTURE X(9).
   22
                    02 PAID PICTURE 9999V99.
   23
                    02 FILLER PICTURE X.
   24
                    PRINTER LABEL RECORDS ARE OMITTED, RECORDING MODE IS F RECORD
   25
                    CONTAINS 86 CHARACTERS, DATA RECORDS ARE HDR, DATALINE.
   26
                01
                    HDR.
   27
                    02 FILLER PICTURE X(23).
   28
                    02 SCHL-NAM PICTURE X(40).
   29
                    02 FILLER PICTURE XXXX.
   30
                    02 DATE-OUT PICTURE X(8).
   3.1
                    02 FILLER PICTURE XX.
   32
                    02 PG-OT PICTURE XXXXX.
   33
                    02 PAGEOT PICTURE ZZZ9.
   34
                    DATALINE.
                01
   35
                    02 FILLER PICTURE X.
   36
                    02 AUTH-TIL.
   37
                    03 TL-OT PICTURE X(24).
                    03 FILLER PICTURE XXXXX.
   38
   39
                    03 AU-OT PICTURE X(16).
   40
                    02 FILLER PICTURE XXXXX.
   41
                    02 FNDOT PICTURE XXXX.
   42
                    02 FILLER PICTURE XXXXX.
   43
                    02 P-OT PICTURE ZZZS.99.
   44
                   02 DOLTL REDEFINES P-OT PICTURE X(7).
   45
                   . 02 FILLER PICTURE X(19).
                WORKING-STORAGE SECTION.
   46
   47
                   LINCT PICTURE 99 VALUE IS 60.
   48
                    PCT PICTURE 9(4) VALUE IS 0.
   49
                77
                    P-DATE PICTURE X(8).
   50
                77
                    UPSI PICTURE X.
                PROCEDURE DIVISION.
                    OPEN INPUT CARD OUTPUT PRINTER.
   52
   53
                    INCLUDE *CBLOOO1 .
   54 *
                    ENTER LINKAGE.
   55 *
                    CALL GETDAT! USING P-DATE , UPSI.
```

ENTER COBOL.

```
LINE NO. SEO. NO.
```

#### SOURCE STATEMENT

```
RC.
57
               READ CARD AT END GO TO EOF.
58
               IP POST = 'PO' GO TO RC.
59
               IF LINGT > 55 GO TO OFLOW.
60
           OFLOW-RIN. MOVE SPACES TO HOR.
41
               IF POST = 'PR' GO TO SERIAL.
62
               MOVE TITLE TO TL-OT.
64
               MOVE AUTHOR TO AU-OT.
65
           SERIAL-RIN.
               IF FUND = ' 0100' MOVE 'APVL' TO FNDOT ELSE MOVE FUND TO
66
67
               FNDOT.
            MOVE PAID TO P-OT.
68
               WRITE HDR AFTER 1.
69
               ADD 1 TO LINCT.
70
               GO TO RC.
71
72
           SERIAL.
               MOVE FST-40 TO AUTH-TIL.
73
               GO TO SERIAL-RTN.
74
75
           EOF.
               CLOSE CARD, PRINTER. STOP RUN.
76
           OFLOW.
77
               MOVE SPACES TO HDR.
78
               MOVE .
                              UNIVERSITY OF THE SOUTH' TO SCHL-NAM.
79
               WRITE HDR AFTER O. MOVE SPACES TO HDR.
80
               MOVE . WEEKLY ACQUISITIONS LIST! TO SCHL-NAM.
81
               MOVE P-DATE TO DATE-OUT. ADD 1 TO PCT.
82
               MOVE PUT TO PAGEOT. MOVE 'PAGE ' TO PG-OT.
83
               WRITE HDR AFTER 1. MOVE SPACES TO HDR.
84
               MOVE 'TITLE' TO TL-OT. MOVE 'AUTHOR' TO AU-OT.
85
             MOVE 'FUND' TO FNDUT.
86
              MOVE ' COST' TO DOLTL.
               WRITE HOR AFTER 1. MOVE SPACES TO HOR.
88
               WRITE HDR AFTER 1.
89
             MOVE ZERO TO LINCT,
90
               GO TO OFLOW-RTN.
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IDENTIFICATION DIVISION.
     00104
1
             PROGRAM-ID. 'LAI3'.
     00105
2
             AUTHOR - AHW-
     00106
3
             REMARKS. LAI ACQUISITIONS SEC1.
     00107
             ENVIRONMENT DIVISION.
     00108
             INPUT-OUTPUT SECTION.
     00109
             FILE-CONTRCL.
7
                  SELECT CARD ASSIGN TO 'SYSO12' UNIT-RECORD 2540R.
     00110
                  SELECT PRINTER ASSIGN TO 'SYSO14' UNIT-RECORD 1403.
     00111
     00112
9
             DATA DIVISION.
     00113
10
             FILE SECTION.
                  CARD LABEL RECORDS ARE OMITTED, RECORDING MODE IS F, RECOR
     00114
11
     00115
12
                  CONTAINS 80 CHARACTERS, DATA RECORD IS TRANS
     00116
13
                  TRAN.
              01
     00117
14
                  02 FIRST-F.
     00118
15
                       03 AUTH PICTURE X(16).
     00119
16
                       03 TIL PICTURE X(24).
     00120
                  02 FILLER PICTURE X(18).
17
     00201 .....
18
                  02 COPIES PICTURE XX.
    00202
19
                  02 FUND PICTURE XXXX.
20
     00203
                  02 FILLER PICTURE X(9).
      00204
21
                  02 PAID PICTURE 9999V99.
      00205
22
                   02 FILLER PICTURE X.
                   PRINTER LABEL RECORDS ARE OMITTED RECORDING MODE IS F.
      00206
23
                   RECORD CONTAINS 86 CHARACTERS, DATA RECORDS ARE HDR,
24
      00207
      00208
25
                   DATA-LINE.
      00209.
26
              01
                   HDR.
27
      00210
                   02 FILLER PICTURE X(23).
28
      00211
                   02 SCHL-NAM PICTURE X (40).
29
      00212
      00213 02 FILLER PICTURE XXXX.
              O2 FILLER PICTURE XXXX.

O2 DATE-OUT PICTURE X(8).

O2 FILLER PICTURE XX.

O2 PG-OT PICTURE X(5).

O2 PAGEOT PICTURE ZZZ9.

O1 DATA-LINE.

O2 FILLER PICTURE X.

O2 AUTH-TIL.

O3 TIL-OT PICTURE X(24).

O3 FILLER PICTURE X(5).
30
      00214
31
      00215
32
33
      00216
      00217
34
      00218 01 DATA-LINE.
00219 02 FILLER P
 35
 36
      00220
37
      00306 02 FILLER PICTURE X(5).
00308 02 P-OT PICTURE ZZZ9.99.
00307 02 DOLTL REDEFINES P-OT PICTURE X(7).
      00307 02 DOLTL REDEFINES POT PICTURE X(17)
00309 02 FILLER PICTURE X(19)
00401 WORKING-STORAGE SECTION.
00402 77 LINCT PICTURE 99 VALUE IS 60.
 45
 46
 47
 48
               77 PCT PICTURE 9(4) VALUE IS 0.
77 P-DATE PICTURE X(8).
       00403
 49
       00404
00405
 50
               77 UPSI PICTURE X.
 51
       00406 PROCEDURE DIVISION.
00406 OPEN INPUT CARD OUTPUT PRINTER.
00408 INCLUDE CBLOOOL.
 52
 53
 54
              ENTER LINKAGE.
 55 *
                  CALL GETDAT USING P-DATE , UPSI.
 56 *
```

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LINE NO. SEQ. NO. SOURCE STATEMENT
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H. W. E.A.

ora Trad Great

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ENTER COBOL.
57 *
             RC .
     00409
58
                 READ CARD AT END GO TO EOF.
     00410
59
                 IF COPIES = 'PO' GO TO RC.
     00411
60
                 IF LINCT > 55 GO TO OFLOW.
     00412
61
            OFLOW-RIN. MOVE SPACES TO HOR.

IF COPIES = PR' GO TO SERIAL.
     00413
62
     00414
63
                 MOVE TIL TO TIL-OT.
64
     00415
                 MOVE AUTH TO AUTH-OT.
     00416
65
             SERIAL-RIN.
                 IF FUND = "0100" MOVE "APVL" TO FUND-OT ELSE MOVE FUND
     00417
66
     00418
67
                 TO FUND-OT.
     00419
68
                 MOVE PAID TO P-OT.
     00420
69
                 WRITE HOR AFTER 1.
     004201
70
                 ADD 1 TO LINCT.
     00501
71
                 GO TO RC.
72
     00502
             SERIAL.
      00503
73
                  MOVE FIRST-F TO AUTH-TIL.
74
      00504
                  GO TO SERIAL-RTN.
      00505
75
             EOF. CLOSE CARD. PRINTER. STOP RUN.
76
      00506
             OFLOW-
77
      00507
                  MOVE SPACES TO HDR.
      00508
78
                  MOVE . CENTENARY COLLEGE LIBRARY TO SCHL-NAM.
      00509
79
                  WRITE HOR AFTER O. MOVE SPACES TO HOR.
                  MOVE . WEEKLY ACQUISITIONS LIST. TO SCHL-NAM. MOVE P-DATE TO DATE-OUT. ADD 1 TO PCT.
      00510
80
81
      00511
      00512
82
                  MOVE PCT TO PAGEOT. MOVE 'PAGE ' TO PG-OT.
83
      00513
                  WRITE HOR AFTER 1. MOVE SPACES TO HOR.
84
      00514
                  MOVE 'TITLE' TO TIL-OT.
85
      00515
                  MOVE 'AUTHOR' TO AUTH-OT.
 86
      00516
                  MOVE 'FUND' TO FUND-OT.
 87
      00517
                  MOVE . COST. TO DOLTL.
 88
      00518
                  WRITE HOR AFTER 1. MOVE SPACES TO HOR.
                 WRITE HDR AFTER 1.
MOVE ZERO TO LINGT.
GO TO OFLOW-RIN.
 89
      00519
 90
      00520
      00601
 91
      00602
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	CENTENARY COLLEGE LIE WEEKLY ACQUISITIONS		· .	06/24/70	PΑ
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는 사이 그는 일이 되는 이 회회를 했다면 되는 것은 사이에 보면했다는 것 그는 것이 말하는 것인 하는 생생님, 것이 되는 것은 것이 되는 것을 밝혔다.		
지원 사이지 그 물로 활동하는 이 교육되었다.		
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		당한 경험 등에 가장하는 사람들이 되는데 가장을 하는데 있다. 2013년 2월 2일 전 1일 전 10일 전 1
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## DESIGN FOR A CLAIMS FOLLOW-UP SUB-SYSTEM

The following procedure is designed to supplement the Florida Atlantic University Library Acquisitions Information System (LAIS). The general processing flowchart on page 14 of the LAIS is to be supplemented by the accompanying flowchart representing a claims follow-up sub-system which enters the general processing flow after the "ACCOUNTING LISTING" procedure on page 14 LAIS.

The design elements of this sub-system are: separated into the necessary parameters, data available, additional data needed, and system specifications.

#### I. Parameters

- A. Serials are excluded from this claims sub-system.
- B. All on-order items are not designated for automatically scheduled claiming (e.g., from overseas publishers).
- C. Provisions are made for vendor responses, including status reports on the original orders and replies to claim notices.
- D. First and second notices are sent, then a final cancellation letter.
- E. The format of all notices should be in letter form.

## II. Data Available

- A. Acquisition records giving author, title, publisher, order date, etc.
- B. Business office vendor files giving vendor name and appropriate address for claims correspondence.
- C. Publisher file.

The letter format is designed to have the effect of a personal letter rather than a routine machine printed form. The body of the letter may be varied as desired. Then name and address of the institution appear in letterhead form at the top of the page and the vendor name and address are positioned to fit in a window envelope when folded. The date is printed in formal correspondence style, and is positioned to appear at the top of the page, centered beneath the name of the institution.

The author or title may appear in bold face by use of a double imprint, if desired.



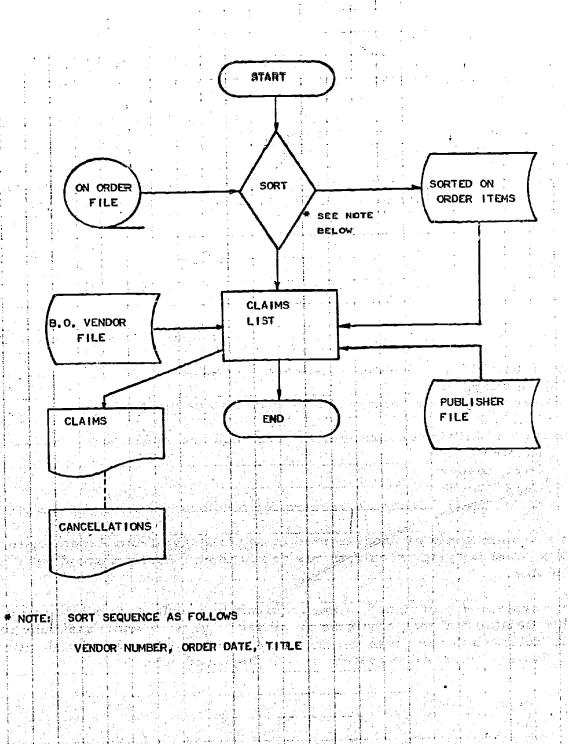
## CLAIMS/FOLLOW-UP SUB-SYSTEM

- I. Problems and Requirements
  - A. Not claim all items past due
  - B. No Serials
  - C. Two notices + cancellation
  - D. Letter format for notice
  - E. Indicator of Vendor response
- Available Data II.
  - A. LAIS Record (includes: Author, Title, Publisher, Ord. date)
  - B. B. O. Vendor file with name and address
  - C. Publisher file
- New Data was good from the way of the account of the second of the second III.
  - A. Claim code and claim date
  - B. Non-Claim code paralenga begins variation is to begin in it was a sub-
- System Specs IV.
  - A. Claims once/mth
  - Overpunch position 52 with '-' if not to be claimed or response from Vendor: And Anthony of the Control o

an and any or and an experience of the control of und daageleg belakelege properties at the confidence of the section of the confidence of the confidence of the

- C. Enter response date from Vendor in paid field.
- D. Punch 'cancel' in invoice positions 65-70 if to be cancelled





ERIC

The acquisitions information system described in the following outline and flow hart was designed for the library with limited computer resources.

The basic design concepts were taken from Florida Atlantic Chiversities This special version has been designed for libraries with less than L.A.I.S. 10,000 volumes acquisitions per year.

The documentation enclosed here is to be used in conjunction with the L.A.I.S. documentation distributed during the L.A.I. presentation off the FAU System.

It is the feeling of this analyst that the system outlined here would take 4 (four) months or less to program and test. With yearly acquisitions of 10,000 volumes or less and one weekly processing run, no more tham I (one) hour of computer time per week would be used.

This system could be easily implemented on small systems of the following types:

IBM 1401, 1130, 360 Model 20, System 3, etc.

NCR Century, 315

Other machines of equal or greater ability may also be used.

The only additional computer hardware required would be as follows:

Printer

Card Reader

Card Punch

Disk File (1 Million characters for temporary work space only)

This system could be programmed in any language from Assembly to Cobol. No special language requirements are needed. Fortran would be quite acceptable.

This system was designed to the requirements of L.A.I. participants but is highly flexible and may easily be amplified to provide additional functions such as the 'follow-up' procedure described as problem #2. ALL the abilities of the FAU System exist in the system design displayed here.

### L. A. I. ACQUISITION SYSTEM

- I. Basic System Design Criteria
  - A. Basic Computer configuration
    - 1. Core 8k words (or equivalent)
    - 2. No disk storage (for working storage only)
    - 3. No tape storage
    - 4. Card Reader is input device
  - B. Input Record Format as defined in Florida Atlantic University L.A.I.S. documentation.
  - C. Vendor name and address file indexed by number will be created.
  - D. Internal Fund file will be required.
  - E. The first program of the basic processing run will check ALL input data for ALL possible errors.
  - F. Vendor number will be limited to 4 digits. (requires change to FAU input card format).
  - G. Vendor table will have provision for at least 200 vendors.
  - H. The fund table will provide for at least 50 funds.
- II. Data File Definitions
  - A. Fund file (table)

Note: See card format for data elements and their allocation. This file is composed of one card for each internal fund used in the Acquisition System. The file is in sequence by fund number. The creation of fund numbers is identical to the procedure outlined in the FAU L.A.I.S. documentation.

This file provides the accounting data on a fund basis. A new file is produced by each processing run of the Acquisition System. This new file reflects the current fiscal status of the funds.

This file forms 1/3 of the input data to the system.

B. Vendor File (table)

Note: See card format for data elements and their allocation.

This file provides for the same function for vendors as the fund file does for the funds. Sequence is by vendor number.

This file provides the second third of the system data base.



C. On-order and Payment File

This file is identical to the file described in the L.A.I.S. documentation. Sequence is by title.

Coding instructions are also contained in the L.A.I.S. documentation.

## III. Description of Individual Program Functions

- A. Program l... Input Edit.
  - 1. Read and store fund and vendor tables (numbers only need be stored).
  - 2. Verify input for errors and list detected errors on printer.
    - a. Valid vendor #
    - b. Valid fund #
    - c. Valid price
    - d. Valid order date
    - e. Author and title except for postage items which MAY be left blank.
    - f. Copies field

      'PO' = Postage

      'PR' = Serial
    - g. If on-order item, invoice and paid amount MUST be blank.

医病性性病毒性 化氯基酚 化氯化 医脓肿 医鼻口 化异

h. If payment, the opposite of 'g' MUST exist.

s and presidence in

3. Save valid input on work disk.

## B. Program 2... List Program

- 1. List any input record and summarize by the following fields:
  - a. Fund #
  - b. Vendor#
- c. Order date
  - d. Invoice #
- 2. Data may be sorted in any sequence

This program is intended to be a utility listing program.

- C. Program 3... Account Listing by Fund.
  - 1. Fund table as input #1.
  - 2. Provides line item detail of paid and ordered items.
  - 3. Items are listed by fund # and title.
  - 4. Starting and ending fiscal balances are listed.
  - 5. New fund table is produced reflecting new fiscal balances.
- D. Program 4... Fund balance Summary
  List cards produced by program 3, (new fund table)

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- E. Program 5... Invoice Summary
  - 1. Vendor table is input.
  - 2. Print list of invoices by vendor with invoice and vendor totals.
  - 3. Create new vendor table cards. (reflecting new fiscal balances)
- F. Program 6... Vendor Balance Summary

List cards produced by program 5. (Vendor table)



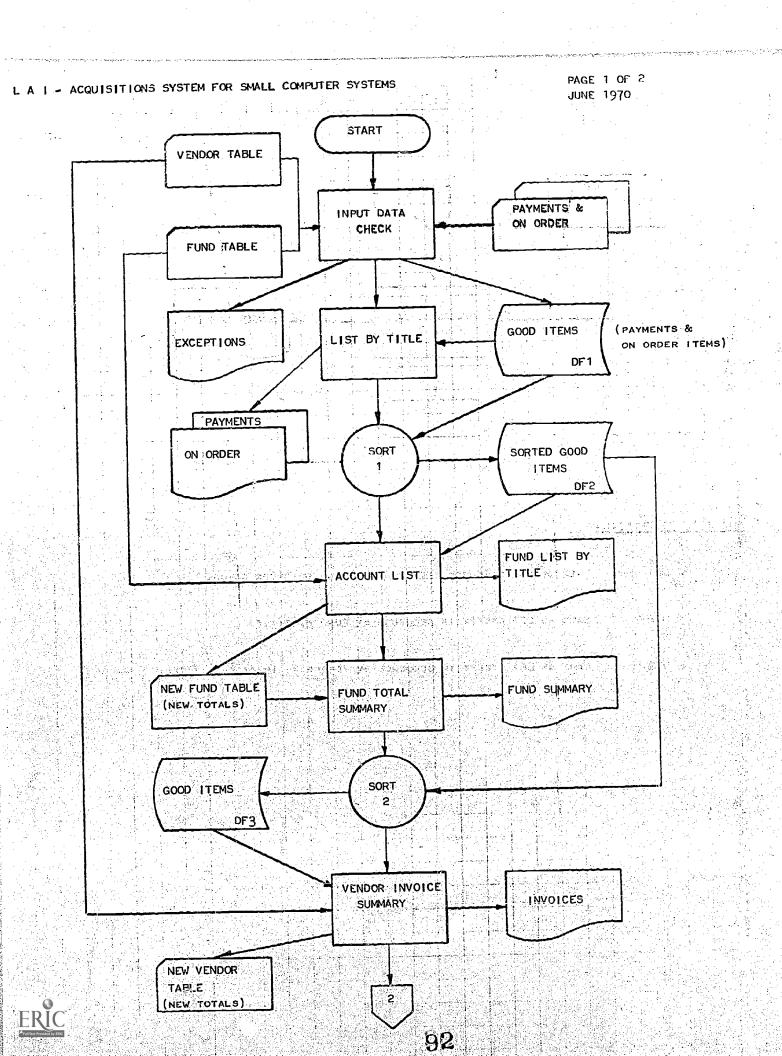
FUND AND VENDOR TABLE CARDS

INTERNATIONAL BUSINESS MACHINES CORPORATION

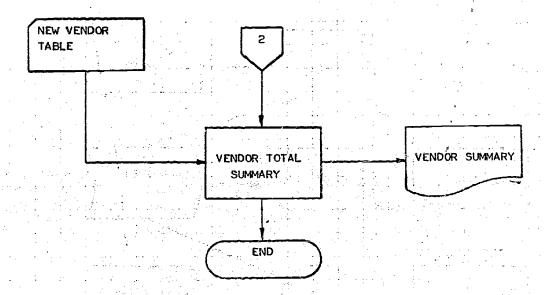
MULTIPLE-CARD LAYOUT FORM

Printed In U.S.A. £X24-6599.0

A Œ, လာ 🕿 ന 🛭 ന 🛭 മെ **ග** දී ඌ ද **ന** ≈ 인 단 თ ≈ Sheet No. 07 X CREATE ARE PUNCHED WITH SLASH TABLE DATE CREATE DATE TABLE SEPERATE ELEMENTS TEMS ORDER ITEMS ON ORDE TTEMS DELIV TTEMS | Job No. DELIV. DECIMAL POINT ပ္ပ UN-ENCUP Dote JUNE 1970 HINO YEAR MM = HONTI DD = DAY YY = YEAR ORDER NOTE: DOTTED LINE IN DOLLAR '\$! FIELDS INDICATES ASSUMED POSITION OF BAL 3 CASH AS FOLLOWS NM/DD/YY WHERE on # PAID TO DATE \$ £ 5 တ ALLOCATION . 5 9 9 9 9 9 23 OF THE DATE FIELDS 3 ACQUISTITIONS SYSTEM VENDOR NAME 9 9 9 9 9 9 9 NOTE: FORMAT FUND TITLE 9 တ္ေ G) ഗ ∞ თ ⇒ ص G7 ~ ص 0, <u>ලා</u> ~ **@** တ ਛ S **ලා 4** ලා ය ල ල ල o, ത 6 **a** 7 7 7 NUMBER **6**0 ↔ 1 2 3 တ CD m TENDOR 80 -80 -90 -ဌာ on ~ 5 Application FUND တ ø, G) (1) o



PAGE 2 OF 2



## DISK FILE DESCRIPT ON

DE1 FILE OF VALID (ERROR FREE) PAYMENT AND ON- ORDER CARDS.

DF2 SAME AS DF1 EXCEPT IN SEQUENCE BY FUND #, TITLE.

DF3 SAME AS DF1 EXCEPT IN SEQUENCE BY VENDOR #, INVOICE #, TITLE.

SERIALS GROUP PROCEEDINGS

Bv

SAM A. DYSON



## SERIALS GROUP PROCEEDINGS

By Sam A. Dyson

The Serials Group was composed of five participants who had indicated an interest in serials automation. In the first meeting the group was led by the instructor to list all the steps necessary to solve a serials problem. This list was then used to provide the group with a flowchart which they could use to solve serials automation problems. This first flowchart is listed as GENERAL FLOWCHART below.

\_\_\_



# START What Data Necessary Format Data Code Data Verify Coding Dunch Data Cards Terify Cards Flowchart Problem Write Program De-Bug Program Correct AND THE PARTY OF THE LABOUR SHOP Flowchart Run Program Finish Documentation STOP

1.t.

GENERAL FLOWCHART

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Then, using the flowchart constructed, the parameters were set for the first problem: (1) Monthly journals only would be included. (2) We assumed that the journals arrive on time or at the expected time. (3) We will work from a card file. (4) Current titles only were considered. (5) Dewey classification is assumed. (6) Data is contained on one 80 column card. (7) Three locations are listed by department and coded as follows: G = General, H = Humanities, and S = Science.

Referring to our flowchart, next the group described the data cards:
(1) Title field - 70 alphameric characters. (2) Volume field - 4 numeric characters. (3) Year field - 4 numeric characters. (4) Format field - 1 numeric character coded as follows: 1 = print, 2 = microform. (5) Location field - 1 alphabetic character coded as follows: G = General, H = Humanities, and S = Science.

The instructor furnished a list of serials and the members of the group prepared coding sheets for data card production. Each member of the group keypunched five data cards, and the instructor punched an additional 43 for use in later programs. The cards were verified and batched in alphabetical order for processing in the programs we were to write.

The specific problem was listed step-by-step. Our first group problem was to simply read the cards and write them on the printer in a to be determined format. The data card's format was already known. The group decided next to format the output record. This format was as follows:

- (1) Filler 10 characters
- (7) Filler 7 characters
- (2) Title 70 characters
- (8) Format 1 character
- (3) Filler 5 characters
- (9) Filler 5 characters
- (4) Volume 4 characters
- (10) Location -1 character
- (5) Filler 5 characters
- (11) Filler -12 characters
- (6) Year 4 characters

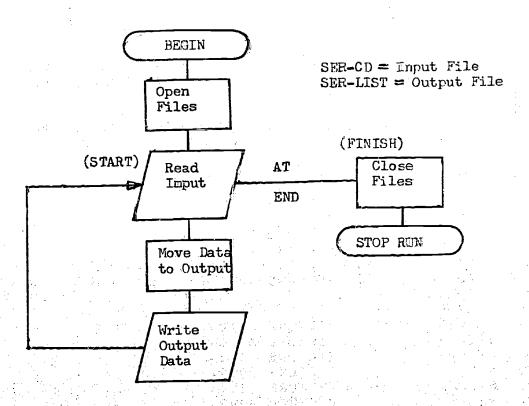
In order to determine the above format, the group used Printer Format sheets.

Our general flowchart next called for the group to flowchart the problem. During the flowcharting, the instructor encouraged the group members to jot down names for input and output files as well as any necessary paragraph names. The problem flowchart below (LAIS1) was prepared.

Still following our General Flowchart, they submitted their program cards and data to the closed shop window for running on the IBM 360. Errors received were corrected, and the programs re-submitted until the finished printout was finally received. As a final step, the documentation was corrected to include all the refinements to the program as it was finally accepted. Documentation for this problem is included immediately below and is as follows:

(1) FLOWCHART - LAIS1, (2) PROGRAM - LAIS1, and (3) PRINTOUT - LAIS1





FLOWCHART - LAISI

```
0.
```

```
IDENTIFICATION DIVISION.
PROGRAM-ID. MAISI!.
AUTHOR. WILLIAM W. WICKER.
REMARKS. SERTALS EXERCISE.
ENVIRONMENT DIVISION.
INPUT-OUTPUT SECTION.
FILE-CONTROL.
    SELECT SER-CD ASSIGN TO 'SYSOLZ' UNIT-RECURD 2540R.
 SELECT SER-LIST ASSIGN TO SYSOLA UNIT-RECORD 1403.
DATA DIVISION.
FILE SECTION.
    SER-CD RECORDING MODE IS F. RECORD CONTAINS 80 CHARACTERS.
       LABEL RECORDS ARE OMITTED. DATA RECORD IS CR-REC.
    CD-REC.
01
                           PICTURE X (70) .
    02
         TITLE
                           PICTURE 9999.
   · 02
         VOL
                           PICTURE 9999.
         YEAR __
    02
         CODES.
    02
                           PICTURE 9.
         03
            FORMAT
                          PICTURE A.
         03 LOCATE
    SER-LIST RECORDING MODE IS F, RECORD CONTAINS 133
     CHARACTERS, LABEL RECORDS ARE OMITTED, DATA RECORD IS
       PRINT-LINE.
    PRINT-LINE -
                                     ا در از این از این
این در این از از ای
01
                           PICTURE X (10).
    02 FILLER
                            PICTURE X (70) .
     OZ TITLE-O
                            PICTURE X (5).
    02
         FILLER
                         PICTURE 9999
     02
         VOL-0
                        PICTURE X (5).
     02
         FILLER
         YEAR-O
FILLER
CODES.
                            PICTURE 9999 ....
     02
                           PICTURE X(5).
     SO
     02
                            PICTURE 9.
         03 FORMAT-O
                            PICTURE XX.
             FILLER
         03
                            PICTURE A.
         03 LOCATE-0
                            PICTURE X (26).
     02 FILLER
PROCEDURE DIVISION.
     OPEN INPUT SER-CD, OUTPUT SER-LIST.
     MOVE SPACES TO PRINT-LINE.
     WRITE PRINT-LINE AFTER ADVANCING O LINES.
START.
     MOVE SPACES TO PRINT-LINE.
     READ SER-CD AT END GO TO FINISH.
     MOVE TITLE TO TITLE-O. MOVE VOL TO VOL-O.
     MOVE YEAR TO YEAR-O.
     MOVE FORMAT TO FORMAT-O.
     MOVE LOCATE TO LOCATE-O.
     WRITE PRINT-LINE AFTER ADVANCING 2 LINES.
     GO TO START.
 FINISH. CLOSE SER-CD. SER-LIST.
```

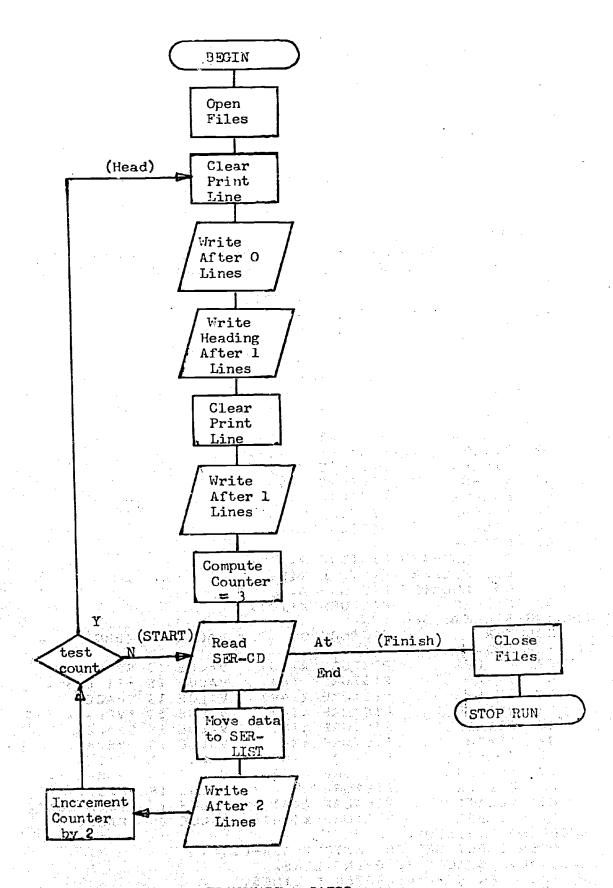
STOP RUN.

ACADEMY OF POLIFICAL SCIENCE, PROCEEDINGS	0026	1957	1 G
ACADEMY OF SCIENCES USSR, PROCEEDINGS, EARTH SCIENCES SECTIONS	0124	1959	1 S
BACTERIOLOGICAL REVIEWS	0001	1937	r S
BANKING	0035	1942	<b>G</b>
BEST'S INSURANCE NEWS, FIRE AND CASUALITY EDITION	0058	1957	<b>-</b>
CANADIAN JOURNAL OF BOTANY	0042	1964	<b>-</b> S
CANADIAN JOURNAL OF CHEMICAL ENGINEERING	0035	1957	<b>~</b> S
CANADIAN JOURNAL OF CHEMISTRY	0028	1950	1 \$
CAMELLIA JOURNAL	0016	1961	2
DESIGN (COLUMBUS, OHIO)	0028	1926	<b>T</b>
DESIGN (LONDON)	0049	1953	<b>-</b>
E L H (ENGLISH LITERARY HISTORY)	0032	1965	<b>E</b>
EAST EUROPE	0007	1958	<b>H</b>
ECOLOGICAL MONOGRAPHS	0001	1166	-
ECONOMIC GEOGRAPHY	0005	1929	1
FARADAY SOCIETY, TRANSACTIONS	0050	1954	2 2
FARM QUARTERLY	0023	1968	u de la companya de l
FEDERAL REPORTER	0100	1939	<b>-</b>
FEED AND FARM SUPPLIER	0036	1962	<b>1 G</b>
GAS	0012	1936	2 8
GAS AGE	0097	1946	7 %
GENERAL ELECIRIC REVIEW	001.8	1915	,n
GENERAL MOTORS ENGINEERING JOURNAL	1000	1953	2 5
GENETIC PSYCHOLOGY MONOGRAPHS	0075	7057	

The next problem is a further development of the first one. It added headings and line counters to our first problem. Some of the steps taken in the first problem did not have to be repeated in this problem, but adjustments had to the made in the program to provide for the counter and headings.

new uprious were introduced here, namely the COMPUTE and IF statement.

Again, all the steps in our General Flowchart were completed and the following documentation resulted: (1) FLOWCHART - LAIS2, (2) PROGRAM - LAIS2, and (3) FRINTOUT - LAIS2.



FLOWCHART - LAISZ



```
IDENTIFICATION DIVISION.
PROGRAM-ID. 'LAIS2'.
AUTHOR. S A DYSON
REMARKS. SERIALS EXERGISE NUMBER 2.
ENVIRONMENT DIVISION.
INPUT-DUTPUT SECTION.
FILE-CONTROL.
    SELECT SER-CD: ASSIGN TO "SYSO12" UNIT-RECORD 2540R.
    SELECT SER-LIST ASSIGN TO 'SYSO14' UNIT-RECORD 1403.
DATA DIVISION.
FILE SECTION.
    SER-CD RECORDING MODE IS F, RECORD CONTAINS 80 CHARACTERS,
FD
      LABEL RECORDS ARE OMITTED, DATA RECORD IS CD-REC.
    CD-REC.
01
                    PICTURE X(70).
    02
       TITLE
                    PICTURE 9999.
    02
        VOL
                    PICTURE 9999.
    02
        YEAR
    02
        CODES.
                    PICTURE 9.
            FORMAT
        03
                    PICTURE A.
            LOCATE
        03
    SER-LIST RECORDING MODE IS E. RECORD CONTAINS 133 CHARACTERS.
FD
      LABEL RECORDS ARE OMITTED, DATA RECORD IS PRINT-LINE.
01
    PRINT-LINE.
                    PICTURE X(10).
        FILLER
    02
                    PICTURE X (70).
    02
        TITLE-0
                    PICTURE X(5).
    20
        FILLER
                    PICTURE 9999.
    02
        VOL-O
                    PICTURE X(5).
        FILLER
    02
                    PICTURE 9999.
    02
        YEAR-O
                   PICTURE X (7).
    02
        FILLER:
        CCDES-C.
    02
            FORMATO PICTURE 9.
        03 FILLER PICTURE X(8).
        03 LOCATED PICTURE A.
                    PICTURE X(18).
        FILLER
WORKING-STORAGE SECTION.
                                   VALUE IS ZERO.
    COUNTER
                  PICTURE 99
01
    HEADING.
                    PICTURE X(30)
                                    VALUE IS SPACE.
        FILLER
                                    VALUE IS 'TITLES'.
    02 TITLEH
                    PICTURE A(6)
                                    VALUE IS SPACE
                    PICTURE X(49)
    02 FILLER
                   PICTURE X(4) VALUE IS
    02 VOLUME
                    PICTURE X(5)
                                    VALUE IS SPACE.
       FILLER
                                             "YEAR".
        YEARH
                                    VALUE IS
                    PICTURE XXXX
    02
                    PICTURE X(5)
                                    VALUE IS SPACE.
    02
        FILLER
                    PICTURE A(6)
                                    VALUE IS
    02
        FORMATH
                                    VALUE IS SPACE.
                    PICTURE XX
    02
        FILLER
                    PICTURE A(8) VALUE IS LOCATION'.
    02
        LOCATION
                    PICTURE X(14) VALUE IS SPACE.
        FILLER
    02
PROCEDURE DIVISION.
    OPEN INPUT SER-CD. OUTPUT SER-LIST.
HEAD. MOVE SPACES TO PRINT-LINE.
    WRITE PRINT-LINE AFTER O LINES.
    WRITE PRINT-LINE FROM HEADING AFTER 1 LINES.
    MOVE SPACES TO PRINT-LINE.
```

WRITE PRINT-LINE AFTER 1 LINES.

#### SEQ. NO.

#### SOURCE STATEMENT

COMPUTE COUNTER = 3.

START. READ SER CD AT END GO TO FINISH.

MOVE SPACES TO PRINT-LINE.

MOVE TITLE TO TITLE-O.

MOVE VOL TO VOL-O.

MOVE YEAR TO YEAR-O.

MOVE FORMAT TO FORMATO.

MOVE LOCATE TO LOCATEO.

WRITE PRINT-LINE AFTER 2 LINES.

COMPUTE COUNTER = COUNTER + 2.

IF COUNTER EQUAL TO 53 OR COUNTER GREATER THAN 53 GO TO HEAD.

OTHERWISE GO TO START.

FINISH. CLOSE SER-CD. SER-LIST.

STOP RUN.

#### TITLES

ACADEMY OF POLITICAL SCIENCE, PROCEEDINGS

ACADEMY OF SCIENCES USSR. PROCEEDINGS. EARTH SCIENCES SECTIONS

BACTERIOLOGICAL REVIEWS

BANKING

BEST'S INSURANCE NEWS FIRE AND CASUALITY EDITION

CANADIAN JOURNAL OF BOTANY

CANADIAN JOURNAL OF CHEMICAL ENGINEERING

CANADIAN JOURNAL OF CHEMISTRY

CAMELLIA JOURNAL

DESIGN (COLUMBUS, OHIO)

DESIGN (LONDON)

E L H (ENGLISH LITERARY HISTORY)

EAST EUROPE

ECOLOGICAL MONOGRAPHS

ECONOMIC GEOGRAPHY

FARADAY SOCIETY, TRANSACTIONS

FARM QUARTERLY

FEDERAL REPORTER

FEED AND FARM SUPPLIER

GAS

GAS AGE

GENERAL ELECTRIC REVIEW

GENERAL MOTORS ENGINEERING JOURNAL

GENETIC PSYCHOLOGY MONOGRAPHS

HARPER'S BAZAAR

VOL.	YEAR .	FORMAT	LOCATION
0026	1957	1	G
0124	1959	1	<b>\$</b>
0001	1937	$\mathbf{l} = \mathbf{l}^{\mathrm{start}} = \mathbf{l}^{\mathrm{start}} = \mathbf{l}^{\mathrm{start}}$	<b>S</b>
0035	1942	1	G
0058	1957	1	G
0042	1964	1	<b>S</b>
0035	1957	1	S
0028	1950	ì	\$
0016	1961	1	<b>S</b>
0028	1926	1	
0049	1953	1	
0032	1965	1	Harris Ha
0007	1958	1	
0001	1931	<b>1</b>	
0005	1929	1	
0050	1954	1	
0023	1968	1	
0100	1939		<b>6</b>
0036	1962	1	<b>G</b>
0012	1936	1	<b>S</b>
0097	1946		
0018	1915	1	<b></b>
0001	1953	1	
0075	1967	3 1	
0122	1958	<b>1</b>	

## TITLES

HARPER S MAGAZINE

HARPER'S WEEKLY

HARVARD BUSINESS REVIEW

HARVARD EDUCATIONAL REVIEW

HARVARD LAW REVIEW

INTERNATIONAL COMMERCE

INTERNATIONAL CHEMICAL ENGINEERING

INTERNATIONAL ECONOMIC REVIEW

INTERNATIONAL GEOLOGY REVIEW

INTERNATIONAL JOURNAL FOR THE EDUCATION OF THE BLIMD

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE

INTERNATIONAL JOURNAL OF MECHANICAL SCIENCES

JOURNAL FUR DIE REINE UND ANGEWANDTE MATHEMATIK

JOURNAL PUR PRAKTISCHE CHEMIE

JOURNAL OF ABNORMAL AND SOCIAL PSYCHOLOGY

JOURNAL OF ENGLISH AND GERMANIC PHILOLOGY

KANSAS UNIVERSITY, SCIENCE BULLETIN

KENYON REVIEW

LADIES HOME JOURNAL

LABOR LAW JOURNAL

LANCET

LAND ECONOMICS

LANDSCAPE ARCHITECTURE

LAW AND CONTEMPORARY PROBLEMS

MC CALL'S



VOL.	YEAR	FORMAT	LOCATION	
0067	1850	· <b>1</b>	G	
0004	1860	1	G	• •
0001	1922	1	н . Н	<u></u>
0035	1965	1	H	
0067	1953	1	Н	
<b>Z</b> .				
0002	1962	. 1	S	•
8000	1967	1	н	
0001	1959	1	S	
0010	1960	1	Н	
0005	1967	1	<b>S</b>	
6001	1960	1	\$	e e e e e e e e e e e e e e e e e e e
0221	1966	1	\$	
0002	1955	1	S	
0048	1953	1	Н	
0066	1367	1	<b>G</b>	
0026	1939	1	<b>S</b>	
0001	1939	1	<b>. . .</b>	
0062	1945	1	G	
0010	1959	1	Н	
0001	1940	1	\$	
0026	1950	1	<b>H</b>	
0030	1959	2	G	
0020	1955	1	н	
0087	1959	1	G	
				and the second of the first

MACHINE DESIGN

MACHINERY

MAGAZINE OF ART

MAGAZINE OF WALL STREET

MANAGEMENT ACCOUNTING, SECTION 1

NATION

NATIONAL ACADEMY OF SCIENCES, PROCEEDINGS

NATIONAL ASSOCIATION OF SECONDARY SCHOOL PRINCIPLES, BULLETIN

NATIONAL ASSOCIATION OF TEACHERS OF SINGING, BULLETIN

OFFICE EXECUTIVE

OFFICE APPLIANCES

DEFICE MANAGEMENT

OFFICE MANAGEMENT AND AMERICAN BUSINESS

PACIFIC AFFAIRS

PACIFIC HISTORICAL REVIEW

QUARTERLY JOURNAL OF ECONOMICS

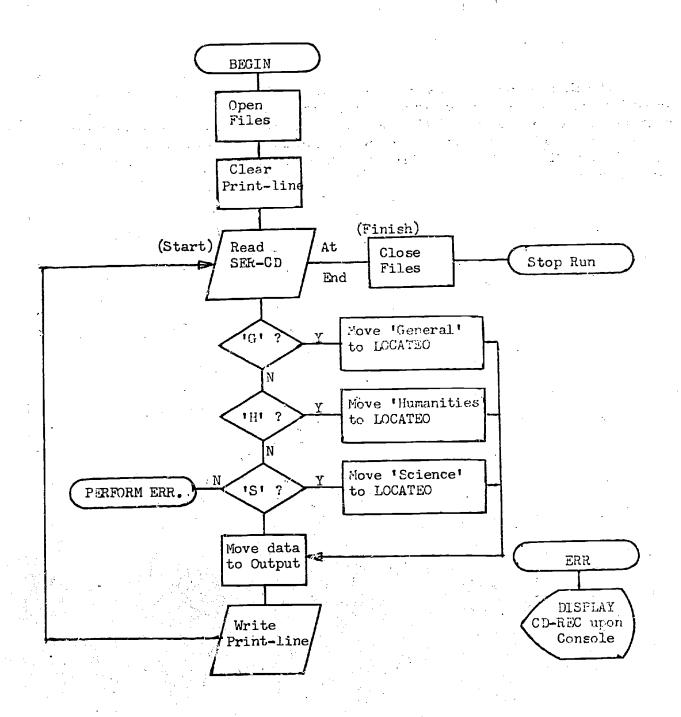
QUARTERLY JOURNAL OF MATHEMATICS

QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE



VOL.	YEAR	FORMAT	LOCATION	
0021	1949	ı	S	
0055	1949	1	S	
0030	1937	1	н	
0092	1953	1	н	
0047	1965	1	Н	
0014	1872	2	G	
0032	1946	2	7.	
0026	1942	2	н	
0014	1958	2	н	
0028	1953	2	н	
0127	1968	S	Н	•
0051	1960	2	н	
0021	1960	2	н	
0001	1728	2	н	
0027	1958	2	н	
0067	1963	2 .	H	
0011	1960	1	S	
0101	1960	1	S	

The third program was in three phases. The first phase interprets the coded location symbol, reads from cards and outputs to tape. It introduced the group members to the PERFORM option, literals, and DISPLAY option. It also introduced them to system cards required for tape output. The resulting PHASE 1 FLOWCHART - LAIS3 and PHASE 1 PROGRAM - LAIS3 follow immediately.

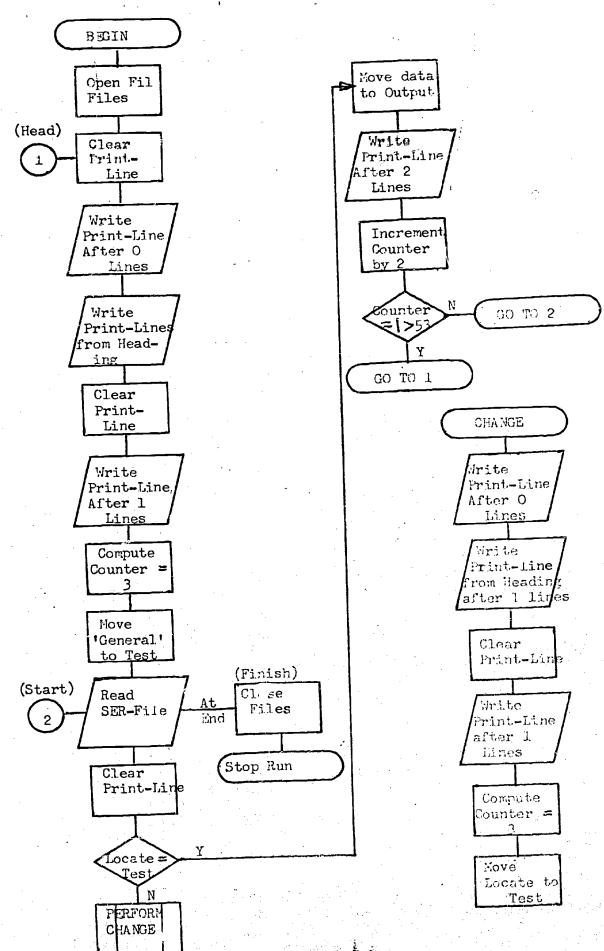


PHASE 1 FLOWCHART - LAIS3

```
IDENTIFICATION DIVISION.
PROGRAM-ID. 'LAIS3'.
AUTHOR. S A DYSON
REMARKS. SERIALS EXERCISE NUMBER THREE--CARDS.TAPE.DSORT.PRINT
ENVIRONMENT DIVISION.
INPUT-OUTPUT SECTION.
FILE-CONTROL.
    SELECT SER-CD ASSIGN TO "SYSO12" UNIT-RECORD 2540R
    SELECT SER-LIST ASSIGN TO 'SYSO16' UTILITY 2400 UNIT.
DATA DIVISION&
FILE SECTION.
    SER-CD RECORDING MODE IS F. RECORD CONTAINS 80 CHARACTERS.
FD
      LABEL RECORDS ARE OMITTED, DATA RECORD IS CO-REC.
    CD-REC.
01
                   PICTURE X(70).
    02 TITLE
                    PICTURE 9999.
    02 VCL
                    PICTURE 9999.
        YEAR
    C 2
        CODES.
    02
        03 FORMAT PICTURE 9.
        C3 LOCATE PICTURE A.
    SER-LIST RECORDING MODE IS F, RECORD CONTAINS 89 CHARACTERS,
FD
      LABEL RECORDS ARE STANDARD, DATA RECORD IS PRINT-LINE.
     PRINT-LINE.
01 -
                    PICTURE X(70).
    02
        TITLE-0
                    PICTURE 9999.
    C2
        VOL-0
                    PICTURE 9999.
        YEAR-O
    02
        CODES-0.
    0.2
        03 FORMATO PICTURE 9.
        C3 LOCATEO PICTURE A(10).
PROCEDURE DIVISION.
    OPEN INPUT SER-CD, OUTPUT SER-LIST.
    MOVE SPACES TO PRINT-LINE.
START. READ SER-CD AT END GO TO FINISH.
    IF LOCATE = 'G' PERFORM PROC-A, ELSE IF LOCATE = TH' PERFORM
        PROC-B, ELSE IF LOCATE = 'S' PERFORM PROC-C OTHERWISE
        PERFORM ERR.
   MOVE TITLE TO TITLE-O.
    MOVE VOL TO VOL-O.
MOVE YEAR TO YEAR-G.
    MOVE FORMAT TO FORMATO.
    WRITE PRINT-LINE.
    GO TO START.
PROC-A. MOVE 'GENERAL' TO LOCATED.
PROC-B. MOVE "HUMANITIES" TO LOCATEO.
PROC-C. MOVE 'SCIENCE' TO LOCATEO.
ERR. DISPLAY CD-REC UPON CONSOLE.
 FINISH. CLOSE SER-CD, SER-LIST.
```

The second phase of the program was one the instructor secured from the library of the Tech Computing Center which sorts information - it reads from a tape on to a disc, sorts by predetermined key, and outputs on to the same tape. The main thing that the group members learned here was the system cards necessary for random and sequential access files from tape and disc. This phase is omitted because it was not the work of the group, but a "canned" program secured to do a specific job. The instructor felt, and correctly so it turned out, that the group would not have time to grasp the full meaning of the sort program and still have time to do phase three of this problem. The input tape for phase two was the output tape prepared in phase one of this problem.

The third phase of this problem reads from the sorted tape output in phase two and prints it out on the printer. This phase introduced no new concepts but instead called for the use of nearly everything we had learned to this point. Adjustments had to be made in the output format, a test area had to be set up, and a deeper logic used to successfully complete this program. The group did not complete this phase before the end of the institute. One participant did get his phase three written and run once on the computer, but it was not successful. Therefore, the phase three documentation included immediately below is the instructor's suggested solution to the problem. Included is PHASE 3 FLOWCHART - LAIS3, PHASE 3 PROGRAM - LAIS3, and PHASE 3 PRINTOUT - LAIS3.



ERIC
Full Text Provided by ERIC

PHASE 3 PROGRAM - LAIS3

```
IDENTIFICATION DIVISION.
PROGRAM-ID. 'LAIS3!.
ALTHOR. S A DYSON
REMARKS. SERIALS EXERCISE NUMBER 3--TAPE TO PRINT OUT.
 ENVERONMENT DIVISION.
 INPUT-CUTPUT SECTION.
 FILE-CONTROL.
     SELECT SER-FILE ASSIGN TO 'SYSOIG' UTILITY 2400 UNIT.
     SELECT SER-LIST ASSIGN TO 'SYSOL4' UNIT-RECORD 1403.
 DATA DIVISION.
 FILE SECTION.
 FD SER-FILE RECORDING MODE IS F. RECORD CONTAINS 89 CHARACTERS.
       LABEL RECORDS ARE STANDARD, DATA RECORD IS FILE-REC.
     FILE-REC.
                      PICTURE X(70).
     02 TITLE
        VOL ...
                      PICTURE 9999.
     02
                   PICTURE 9999.
     CZ YEAR
         CODE.
          03 FORMAT PICTURE 9.
             LOCATE PICTURE A(10).
     SER-LIST RECORDING MODE IS F RECORD CONTAINS 133 CHARACTERS
 FD
        LABEL RECORD IS OMITTED DATA RECORD IS PRINT-LINE.
     PRINT-LINE.
 01.
     02 FILLER PICTURE X(10).
     02 TITLE-O PICTURE X(70).
      02 FILLER PICTURE X(5).
      02 VCL-C PICTURE 9999.
      02 FILLER PICTURE X(5).
      02 YEAR-D PICTURE 9999.
      02 FILLER PICTURE X(7).
      02 CCDES-G.
        03 FORMATO PICTURE 9.
      03 FILLER PICTURE A(10).
03 LOCATED PICTURE A(10).
02 FILLER PICTURE X(12).
 WORKING-STORAGE SECTION.
      COUNTER PICTURE 99 VALUE ZERO.
TEST PICTURE X(10) VALUE SPACES.
 77
1 77
  01 HEADING.
      02 FILLER PICTURE X(30) VALUE SPACES.
      C2 TITLEH PICTURE A(6) VALUE TITLES.
      02 FILLER PICTURE X(49) VALUE SPACES.
      02 VOLUME PICTURE X (4) VALUE VOL. .
      OZ FILLER PICTURE X(5) VALUE SPACES.
      02 YEARH PICTURE A(4) VALUE "YEAR".
      O2 YEARH PICTURE A(4) VALUE 'TEAK'.

O2 FILLER PICTURE X(5) VALUE SPACES.

O2 FORMATH PICTURE A(6) VALUE 'FORMAT'.

O2 FILLER PICTURE XX VALUE SPACES.

O2 LOCATION PICTURE A(8) VALUE 'LOCATION'.

O2 FILLER PICTURE X(14) VALUE SPACES.
  PROCEDURE DIVISION.
      OPEN INPUT SER-FILE, GUTPUT SER-LIST.
  HEAD. MOVE SPACES TO PRINT-LINE.
      WRITE PRINT-LINE AFTER O LINES.
      WRITE PRINT-LINE FROM HEADING AFTER 1 LINES.
      MOVE SPACES TO PRINT-LINE.
```

### SOURCE STATEMENT

WRITE PRINT-LINE AFTER I LINES. COMPLIE COUNTER = 3. MOVE GENERAL . TO TEST. START - KEAD SER-FILE AT END GO TO FINISH. MOVE SPACES TO PRINT-LINE. IR LOCATE NOT EQUAL TO TEST PERFORM CHANGE. MONE TITLE TO TITLE-G. MOVE VOL TO VOL-O. MOVE YEAR TO YEAR-U. MOVE FORMAT TO FORMATO. MOVE LOCATE TO LOCATEQ. WRITE PRINT-LINE AFTER 2 LINES. COMPUTE COUNTER = COUNTER + 2. IF COUNTER EQUAL TO 53 OR COUNTER GREATER THAN 53 GO TO HEAD. OTHERWISE GO TO START. CHANGE. WRITE PRINT-LINE AFTER O LINES. WRITE PRINT-LINE FROM HEADING AFTER 1 LINES. WRITE PRINT-LINE AFTER 1 LINES. COMPLIE COUNTER = 3. MOVE LOCATE TO TEST. FINISH. CLOSE SER-FILE, SER-LIST. STOP RUN.

ACADEMY OF POLITICAL SCIENCE, PROCEEDINGS

BANKING

BEST'S INSURANCE NEWS, FIRE AND CASUALITY EDITION

FEDERAL REPORTER

FEED AND FARM SUPPLIER

HARPER'S MAGAZINE

HARPER'S WEEKLY

JOURNAL OF ENGLISH AND GERMANIC PHILOLOGY

KENYON REVIEW

LADIES HOME JOURNAL

MC CALL'S

VOL.	YEAR	FORMAT	LOCATION
0026	1957	1	GENERAL
0035	1942	1	GENERAL
0058	1957	1	GENERAL
0100	1939	1 ;	GENERAL
0036	1962	1	GENERA'
0067	1850	1	GENERAL
0004	1860	1	GENERAL
0066	1367	1	GENERAL
0001	1939	1	GENERAL
0062	1945	$\mathcal{I}$	GENERAL
0087	1959	1	GENERAL

DESIGN (COLUMBUS, OHIO)

DESIGN (LONDON)

E L H (ENGLISH LITERARY HISTORY)

EAST EUROPE

ECONOMIC GEOGRAPHY

GENETIC PSYCHOLOGY MONOGRAPHS

HARPER'S BAZAAR

HARVARD BUSINESS REVIEW

HARVARD EDUCATIONAL REVIEW

HARVARD LAW REVIEW

INTERNATIONAL ECONOMIC REVIEW

INTERNATIONAL JOURNAL FOR THE EDUCATION OF THE BLIMD

JOURNAL OF ABNORMAL AND SOCIAL PSYCHOLOGY

LABOR LAW JOURNAL

LAND ECONOMICS

LAW AND CONTEMPORARY PROBLEMS

MAGAZINE OF ART

MAGAZINE OF WALL STREET

MANAGEMENT ACCOUNTING, SECTION 1

PHASE 3 PRINTOUR - LAIS3 continued



VOL.	YEAR	FORMAT	LOCATION
CQ28	1926	FOLMAT	HUMANITIES
0049	1953	1	HUMANITIES
0032	1965	1	HUMANITIES
0007	1958	1	HUMANITIES
0005	1929	1	HUMANITIES
0075	1967	1	HUMANITIES
0122	1958	1	HUMANITIES
0001	1922	1	HUMANITIES
0035	1965	1	HUMANITIES
0067	1953	1	HUMANITIES
8000	1967	1	HUMANITIES
0010	1960	1	HUMANITIES
0048	1953	1	HUMANITIES
0010	1959	1	HUMANITIES
0026	1950	1	HUMANITIES
0020	1955	$1_{t+t_{q}}$	HUMANITIES
0030	1937	1	HUMANITIES
0092.	1953	1	HUMANITIES
0047	1965	1	HUMANITIES

ACADEMY OF SCIENCES USSR, PROCEEDINGS, EARTH SCIENCES SECTIONS

BACTERIOLOGICAL REVIEWS

CANADIAN JOURNAL OF BOTANY

CANADIAN JOURNAL OF CHEMICAL ENGINEERING

CANADIAN JOURNAL OF CHEMISTRY

CAMELLIA JOURNAL

ECOLOGICAL MONOGRAPHS

FARADAY SOCIETY, TRANSACTIONS

FARM QUARTERLY

GAS

GAS AGE

GENERAL ELECTRIC REVIEW

GENERAL MOTORS ENGINEERING JOURNAL

INTERNATIONAL CHEMICAL ENGINEERING

INTERNATIONAL GEOLOGY REVIEW 198

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE

INTERNATIONAL JOURNAL OF MECHANICAL SCIENCES

JOURNAL FUR DIE REINE UND ANGEWANDTE MATHEMATIK

JOURNAL FUR PRAKTISCHE CHEMIE

KANSAS UNIVERSITY, SCIENCE BULLETIN

LANCET

MACHINE DESIGN

MACHINERY

QUARTERLY JOURNAL OF MATHEMATICS

QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE

YEAR	FORMAT	LOCATION
1959	FOLMAT	SCIENCE
1937	1	SCIENCE
1964	1	SCIENCE
1957	1	SCIENCE
1950	1	SCIENCE
1961	1	SCIENCE
1931	1	SCIENCE
1954	1 .	SCIENCE
1968	1	SCIENCE
1936	1	SCIENCE
1946	<u> </u>	SCIENCE
1915	1	SCIENCE
1953	<b>1</b>	SCIENCE
1962	1	SCIENCE
1959	1	SCIENCE
1967	1	SCIENCE
1960	1	SCIENCE
1966	1	SCIENCE
1955	1	SCIENCE
1939	1	SCIENCE
1940	1	SCIENCE
1949	1	SCIENCE
1949	1	SCIENCE
1960	1	SCIENCE
1960	1	SCIENCE
	1959 1937 1964 1957 1950 1961 1931 1954 1968 1936 1945 1953 1962 1959 1967 1960 1966 1955 1939 1940 1949 1949 1949	1959 FOLMAT  1937 1  1964 1  1957 1  1950 1  1961 1  1931 1  1954 1  1968 1  1936 1  1945 1  1953 1  1962 1  1959 1  1967 1  1960 1  1966 1  1955 1  1939 1  1940 1  1949 1  1949 1  1949 1

LANDSCAPE ARCHITECTURE

NATION



VOL.	YEAR	FORMAT	LOCATION	
0030	1.959	2	GENERAL	
0014	1872	2	GENERAL	



NATIONAL ASSOCIATION OF SECONDARY SCHOOL PRINCIPLES, BULLETIN
NATIONAL ASSOCIATION OF TEACHERS OF SINGING, BULLETIN
OFFICE EXECUTIVE
OFFICE APPLIANCES
OFFICE MANAGEMENT
OFFICE MANAGEMENT AND AMERICAN BUSINESS
PACIFIC AFFAIRS
PACIFIC HISTORICAL REVIEW
QUARTERLY JOURNAL OF ECCNOMICS



VOL.	YEAR	FÖRMAT	LOCATION
0026	1942	FUZMAT	HUMANITIES
0014	1958	2	HUMANITIES
8200	1953	2	HUMANITIES
0127	1968	2	HUMANITIES
0021	1960	2	HUMANITIES
0021	1960	2	HUMANITIES
0001	1928	2	HUMANITIES
0027	1958	2	HUMANITIES
0067	1963	2	HUMANITIES

The resulting method for solving this problem is <u>not</u> suggested as the best or most efficient way but only as an example of how one group of people who were learning library applications of computers did it. It is remarkable that the participants progressed as far as they did in the short while they had. They deserve a great deal of credit for their willingness to work and learn a tremendous amount of material in only two weeks.

EIGHTH DAY, June 22

正常性特殊技术



# AUTOMATING ACADEMIC LIBRARY BUDGETS

(Note: This presentation was not available for publication)



AUTOMATING ACQUISITIONS

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BRUCE ALPER

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#### AUTOMATING ACQUISITIONS

The library acquisitions information system was designed for a particular astitution at a particular time. At the time it was brought to life, FAU had some ery serious problems. Before I go into the system itself, for which you have ocumentation, I have some notes on acquisition systems in general.

The acquisition system for any library has two halves, the scholarly election of materials to be acquired, and the "nuts and bolts" operation of acuiring those materials and putting them into the cataloging operation. This cholarly process that is called material selection is not to be discussed in his presentation.

Acquisition systems can be classified by their <u>architecture</u>. First, we an describe them by their <u>data content</u>. Some systems include only accounting information, while others include accounting information plus partial bibliographic ata. In still other systems, data content is a pre-cataloging acquisition system. There are, of course, all shades of gray in between these three.

Second, under architecture, we can also talk about the <u>hardware</u> the system uses. You can have a system that uses no hardware at all--completely and operated in every way. Then you can have a mechanically augmented system, where you use a posting machine to list your ledgers. A third step would be the use of an accounting machine. The fourth level is really the first entrance of the computer system, and this would be a computer batch processing operation; by batch processing. I mean discreet stops in the operation. The fifth, and by ar the most expensive system of all, is ne teleprocessing operation using a semote terminal hooked to a central consuter facility somewhere on your cambus or somebody else's campus. This stem can be divided into two parts:

1) where the computer is devoted totally to doing the library work, or 2) time sharing, where others are using the computer simultaneously for other hings.

What are the basic requirements for an acquisitions system? You have a <u>searching process</u> to determine if you already own the material, if it is in process, or on order. The searching process also completes the bibliographic information eccessary to order the volume. The next major phase in an acquisition system would be the <u>placement of an order</u>. You would select a vendor, create a purchase order, and encumber funds for the item. The third operation within the acquisition system would be <u>order follow-up</u>. The fourth operation would be <u>receiving</u>.



Acquisition systems can also be classified by structure of responsibility.

1. The Library can be responsible for all operations.

2. It can request some central agency on campus to order materials.

3. The Library can order through a local <u>co-operative</u> venture. Again, there are various shades of gray between these. You may have a library which uses a cooperative center for <u>part</u> of its acquisitions, and has responsibility for ordering all other materials. FAU has selected a path between number 1 and 2.

FAU's first effort was a full bibliographic system. Use was made of an IBM 1460 computer in this batch processing system. Two persons, professionals, were devoted to nothing but entering and correcting data for the system. There were considerable errors in input. We had a lot of overhead in the system. It took two weeks for a purchase order to get out of the computer and in the mail. In addition, the products of the system were limited. There was no accessions list by title or author. The system was inadequate in every way. Partial shipments were a fantastic problem. Keypunching time for this system ran around ten minutes per title.

Keep in mind the size of FAU. By January, 1967, this system had totally failed. During the period from September, 1966 - September, 1967 there was no library. The books were there, but they were absolutely inaccessible. There was a backlog of some 70,000 volumes in the library that had been put on the shelves without cataloging for use. There was no way to tell what or where they were.

From January, 1967 to June, 1968 the University Business Office assumed all acquisition operations except for selection and searching. During this time the processing cycle took six weeks on the average. In addition to excessive time delays, the input data requirements of the business office system were not compatible with the bibliographic nature of the library input. As you can tell, this operation was something less than a success. Actually, total disaster was avoided only through the withdrawal of most of the book budget by the State Board of Regents. In September, 1967, Dr. Axford arrived on the campus and we began the design of a new acquisitions system.

The next thing we are going to talk about is the parameters for the systems design. At FAU our main parameter in all operations is <u>public service</u>. We are being paid to serve the public, and this is what our system is for.

- 1. First of all, we could not afford any additional library systems staff.
- 2. We would collect minimal bibliographic data.
- 3. We insisted on a library system. We were going to take the processing responsibility away from the business office. Their turnaround time was much too slow.



- 4. The system was to be designed to allow for future possible on-line lata collection, eliminating the use of the keypunch.
  - 5. Computer time must be kept to a minimum.
  - 6. There must be a data interface with the business office system.
- 7. The data record for these will contain at least the following items: author, title, vendor identification, estimated price, date ordered, price paid, late received, vendor invoice number, quantity of material, fund accounting number, identification for serial items, ability to account for postage, and shipping charges completely separate of the material.
- 8. The computer system available was an IBM 360 model 40, with 32 K positions of memory, 4 tape drives, I disc drive kept available for data work files, (no permanent disc files were allowed on the system) and a card readerounch and a printer.
- 9. The state required programming language was COBOL. So you can see some pretty stringent program designs criteria.

In addition, we had a psychology on the campus that we had to combat. There was no confidence in the library.

As you will note by the end of this presentation, all design parameters were met and exceeded. In fact, it has become the standard against which other systems are measured.

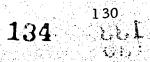
My basic philosophy is that when I install a system, I install the very basic minimum at the outset. We installed July 1, 1968, a system composed of nine programs. The system was absolutely the bare essertials and we have updated it from there. Now we can go into the handout \* I gave you consisting of

- 1) the documentation packet,
- 2) the purchase order breakdown, and
- 3) the Richard Abel approval plan.

Consider this documentation in two ways. One, a document for our use here, and two, an outline of the absolute bare minimum that you need for any operating acquisitions system. I have to admit that the tendency is, when designing systems, to bypass documentation in favor of implementation. Systems people tend not to document. Documentation takes more time than actually writing the program or designing the system. Nine months ago we put a halt to all development of systems that had not been designed up to that date. We are using this time to document in detail everything that has been done up to this date.

The first eleven pages constitute a complete system flow chart of the acquisition system as it exists, including the interface for the acquisitions information system. I have not put in the serials operation into this flowchart intentionally; that is a whole system in itself. Since we are going to have a

\* Note: This was included in the participant's packet of program materials and supplies.





entation on serials, I will presume it can be interfaced. The first three softhis flowchart constitutes the ordering procedure and they are noted ch. Ordering is the simplest part of this procedure. The rest of the eleven sillustrate the receiving operation.

Let me explain how to read a flowchart. Solid lines indicate processing Dotted lines indicate material or information flow. This is my standard his particular flowchart.

The purchase or er has six copies: purchase order copy, yellow LC copy, fund copy (second), shipping, and vendor, and then a green on-order, which is the last one. The green copy card goes into the title catalog to ate that the item is on order. The information contained on the form is ively self-explanatory. On the back of the vendor copy there is a feedback e for vendor use. After you go through this flowchart, you will see these idual copies of the order form used in different places.

Keep in mind that this flowchart is designed to use FAU's resources, am sure, given additional resources and personnel, things could be done rently. In this flow chart you will find unique symbols used. Those symbols defined on page 13. Page 12 has a definition of each of the manual and computer used in this system. For the file symbol, I use a triangle. Each triangle a little number down on the right side of the point. This is the standard symbol manual file.

In the flow chart you will find blocks of typed information. Read these in it. Page 14 is a flowchart of the computer processing as it is done on Thurshight. The next pages, 15, 16, 17, 18 are users! documentation. This is he documentation that a person inputting data into this system needs to run system. The whole last page is a memo indicating the amplification of the em.

Page 15 explains how to create a fund number and assign it a title. Every of our clerks in acquisitions has been run through a training procedure whereney had to do everyone of these steps individually on their own. Pages 16 and indicate how to create a card record for every possible transaction that can be in this system. Obviously, we have two sets of information in this system, including the vendor information from the business office. We have the actual rmation of the items we are ordering and then we have this fund structure rmation, that tells us where our funds are located.

Back to the handout, which we are going to go through rapidly. Page 20 ains some of the information retrieval capability of this system.



- l. Data is divided into groups according to the data chart on the following page. The programs that are provided with this system can select any group of this data. Keep in mind that a systems analyst does not understand some of the things people have requested of him in detail. I could not comprehend what a new title backfile of non-serial item was, but if it was needed, I made provision for it within the system. So you can select the data by its classification of material.
- 2. We have a very elaborate program that does analysis of delivery cycles by vendors. It answers the question, "How long does it take us to get a particular item from the day we ordered it?" Also, we profile materials. Within the approval plan, we go by the LC classification.

This system produces information weekly that is disseminated to each university department—we produce a list that is distributed that tells them exactly what is on order and what has been delivered for them during the past seven—day period, and, in addition, they all get a copy of what has been delivered for them during the past three months.

The next two pages indicate the more than 20 programs that are in the system. This is not a program documentation list. This is just a program description list. The programs in the 50 series are the statistical analysis for the system. The next two pages talk about the development and support of a system. The processing time per title, on a yearly basis, is .075 minutes of computer clock time.

The next page indicates the amount of computer time required for developing and testing new programs. At the bottom of the page, there is a summary of the general development of these systems. The acquisition system incorporates 1,400 man hours approximately. The circulation system amounts to 1360 hours and the documents processing systems amounted to 700 hours.

The acquisitions information system provides two kinds of print-outs: periodic and demand. We have some basic documents we produce weekly, monthly, bi-monthly, and yearly. The print-outs you have here do not represent all the documents the system can produce. This is just a sample. Page 26 is a weekly print-out. The funds are listed by title. The library general fund has six sub-funds: approval plan, standing orders, serials, binding, reference, postage and freight. Then we have the individual college funds and our special external funds. The external funds are those provided by sources other than the state of Florida; they are usually grants or some other gifts. Through our fund structure a major department could have 999 subdivisions within it.

The next page is also a weekly product. This is the invoice list. There are four invoices on this page. You will see the vendor number, invoice number and the items contained on the invoices, the dollar amount plus invoice total,



and the total for the vendor. This is what our bookkeeper uses to check to make sure the paperwork contained with the material from the vendor is correct. A copy of this list goes to the business office.

Page 28 is really the heart of the operation. A copy of this is distributed to each department on campus. All items that are encumbered or have been paid are listed. Items that have been paid for have a slash in the date; items with hyphens are on order. The next print-out is the vendor analysis of discounts.

The next page is the LC class analysis of the acquisitions plan: The bottom of the page includes a summary of the class covered by that page. The system also accounts automatically for credits, and they are carried forward from day to day. They are automatically posted against debits for the same vendor. The listing on page 30 is a new format where we have added the order date, the paid date, and other information. Listings from here back are relatively self-explanatory.

Starting on page 41 are listings of items that are on order. Serials, new serials titles only, serials renewals, serials on order by vendor (we use this as a claim list), non-serials items on order, etc. are all listed.

The next page is the same idea for a particular fund (page 48). Have you ever wondered at the end of the year what you bought? This program produces that information in a few minutes.

This system has brought order out of chaos, speed and efficiency out of mass confusion. Our system now serves the public to the extent that other institutions both in and out of Florida have adopted it for their use. Much work remains to be done, but the system is designed to take additional features with minimum change.

NINTH DAY, June 23

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CATALOGING

Вy

JOHN P. KENNEDY

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#### AUTOMATING LIBRARY CATALOGING

A growing number of libraries are producing their catalogs, either in card or book form, through the use of data processing equipment. The availability of machine processable bibliographic records from the Library of Congress through the MARC Distribution Service has given great impetus to such efforts. I will describe the work at the Georgia Tech Library in this area with emphasis on the changes we are making in our system as a result of our experience with the MARC Pilot Project. Before turning to this prosaic part of the cataloging process, I would like to make a few comments about the intriguing possibilities in the more intellectual tasks of original cataloging.

There has been much interest and research on automatic indexing but so far there has been little production as distinguished from research work. Still the promise of automatic indexing is alluring. In a recent article in which he reviewed the results of work done on automatic indexing, Gerald Salton concluded:

"All the available evidence indicates that the presently known text analysis procedures are at least as effective as more conventional manual indexing methods. Furthermore, a simple indexing process based on the assignment of weighted terms to documents and search requests produces better retrieval results than a more sophisticated content analysis based on syntactic analysis or hierarchical term expansion. Such a simple automatic indexing procedure is easily implemented on present-day computers, and there are no obvious technical reasons why manual document analysis methods should not be replaced by automatic ones."

Louis Kaplan, a library administrator, reacts quite differently to the same research findings:

"From these bits of evidence the relative insignificance of the indexing system and language compared to the indexing itself, and the imaginativeness of the search strategy, rises to haunt us. Furthermore, realizing that automic indexing is not now superior to manual indexing, and guessing at the cost of this kind of indexing, the prospects are anything but bright."

I suspect that in time most indexing will be done by computers rather than by human indexers but this seems to be a distant rather than an immediate prospect. A prerequisite to automatic indexing in order for it to be attractive on a large scale is the availability from publishers of the text or at least an abstract of documents in machine processable form.

During the period in which human catalogers are continuing to do original cataloging there are some ways in which the computer may be of assistance. In the report, Automation and the Library of Congress, a system is projected in which a cataloger works at a console on line to the computer and the various



authority and bibliographic files of the library. As she keys in the title page data, an edit program would normalize the data to the form of a catalog card. If the author's name matched a name already on the authority file, the computer could supply the established form of the entry. Otherwise the entry would have to be established by the cataloger and the established entry and its variants keyed in and placed on the authority file. Cataloging rules and schedules would be available and could be displayed as needed. When the displayed record was completed to her satisfaction, the record could be released for automatic addition to the bibliographic files. Thus the entire cataloging operation would be completed without retyping or creation of any paper documents.

So far only a few preliminary steps have been taken along these lines. For example, at the Library of Congress and at Harvard University, subject authority files are being maintained on magnetic tape and updated by computer processing. At Harvard a computer updated subject heading list is kept at each cataloger's desk. At many libraries, including the Georgia Tech Library, bibliographic data is typed in a relatively unformatted form and a computer program formats it for printing catalog cards or book catalogs.

Key word indexing by computer is widely known through a number of published indexes. Several libraries, including the Florida Atlantic University Library which you heard about yesterday, are using key word indexing for special types of materials for which they cannot afford to do full traditional cataloging. Key word indexing has proved to be an effective technique for many types of materials, especially with manual enrichment of titles. It often provides an attractive compromise between full cataloging and no cataloging.

Having considered very briefly a few of the possibilities for atuomation of cataloging proper, I would like to proceed to consider that part of the cataloging operation that is currently being automated at numerous libraries. This is the production of the catalog record which the patron will use in the form of a file of catalog cards or in book form. The Georgia y has utilized data processing equipment for the production of most or us catalog cards for the past three years and is experimenting with the production of book catalogs. The original catalog production system at Georgia Tech has been described in a paper which has been available for you to read in the dormitory. I will therefore emphasize some of the changes we have made, and the reasons for them.

In systems design one usually begins by considering the desired outputs of the system. I will begin this description of the Tech Library catalog production system by describing the outputs. The primary output of the system to date has been catalog cards. Over 400,000 cards have been produced by the system and filed into the various catalogs maintained by the Library. In order to save space on the catalog cards and thus prevent the creation of numerous extension cards

we made several modifications to the traditional unit card format. We have had no problems or complaints resulting from these changes and the number of extension cards has not been excessive. Figure 1 is part of a set of cards printed on our computer line printer. It should, perhaps, be emphasized that the variations from the traditional card format were made by choice and that a library could write its programs so that catalog cards are printed in the traditional card format.

Book catalogs were the other primary product in the system design. Our objective has been to produce the book catalogs as a part of the same operation which produces the catalog cards, in order that we might evaluate the usefulness and production costs of the book catalog without committing ourselves to discontinuance of the card catalog. We have not yet been able to evaluate the usefulness of book catalogs in our situation since we have been unable to obtain funds for their printing and distribution. We have been able, however, to develop a system for the production of the book catalogs from the same machine records that are used in producing our catalog cards. We have printed out two editions of the book catalog in a single copy and have been producing one-copy monthly supplements. A proposal for funding a project to print and distribute this catalog on microfiche is currently being reviewed.

The system is also designed to produce several secondary products. First of these is a monthly new book list. This list records all titles cataloged for the collection during the previous month and is arranged in call number order. We reproduced the list for distribution to faculty and staff for two years. Reproduction of the list has currently been suspended as an economy measure but a copy of the current list is kept at the reference desk where it may be consulted by patrons. The system was also designed to produce book cards, book pockets and spine labels. This part of the system has been tested but has not been used in regular production because of the difficulty and delays involved in matching these products with the books. We are planning, however, to try this again in the future.

Various management statistics are produced by the system. Statistical reports showing volumes, times and costs for all computer runs are produced. Reports show the hours spent in typing input records, the number of titles completed, the average number of records typed per hour, and the number of computer detected errors, for each typist. The distribution of titles cataloged is reported by such characteristics as language, subject class, location, cataloger, and method of acquisition.

The final product of the system is of a different nature from those mentioned so far since it is a means of providing other useful outputs rather than a product that is directly useful. This is the development of a machine processable file of bibliographic descriptions of our holdings. This file now contains about 44,000

## SET OF MARC CARDS

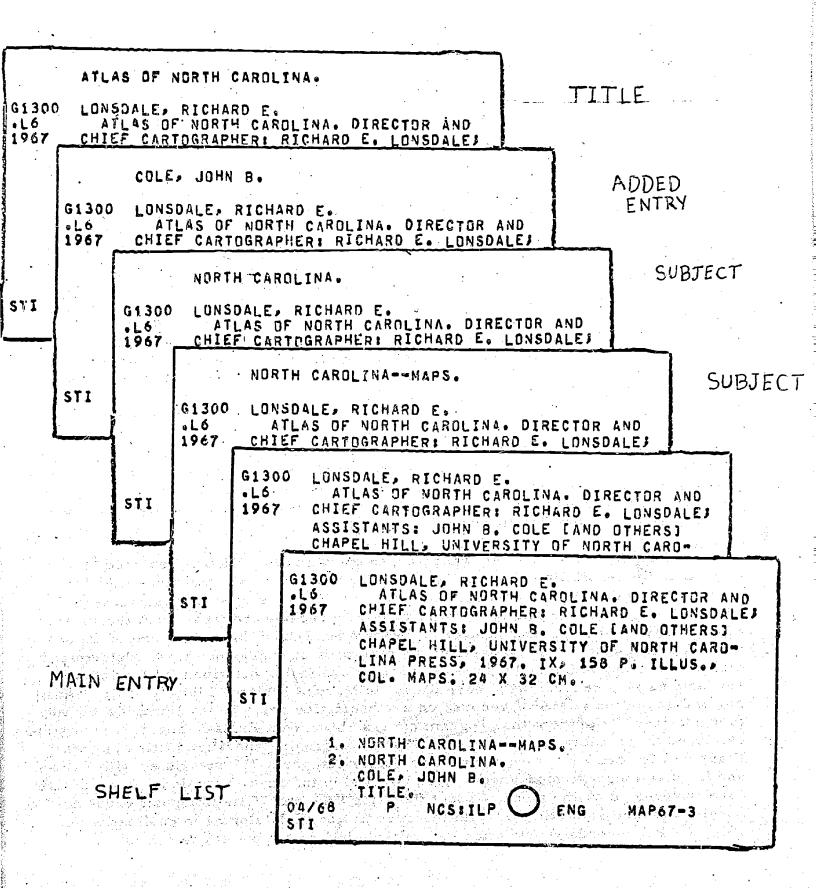


FIGURE 1

ERIC Full Toxit Provided by ERIC

GEORGIA TECH

records for titles cataloged since January, 1966. Records for about 6,000 titles which were cataloged in 1966, before the mechanized system was operational, have now been punched and are being proofread and corrected. When this task is completed the file will be complete for all monographs in the collection which are classified by the Library of Congress classification, or for all monographs added to the collection since 1966 when we changed from the Dewey to the Library of Congress classification. The availability of this file opens many options for the future. As new output devices become available we will be able to take advantage of them by changing only the output module of the system, just as we are now planning to go to a Computer Out it Microfilm (COM) device for output. As real time processing and mass storage devices with direct access capability become more economical, we will have the data base for providing access to the catalog from remote terminals. When we are ready to automate our circulation system, we will be able to automatically produce book cards for all books acquired since 1966, which will account for most of those with the heaviest circulation. If we need statistics not now provided by the system, on the characteristics of the monographs added to the collection, we can obtain these by running a special program to analyse the records in this file. Special purpose bibliographies may be generated with relatively little effort. All of these projected benefits depend on adequate identification of the data elements in the bibliographic record. We believe this to be provided for by the use of the MARC format. In the long run, the development of this file may be the most important benefit to the Library from the operation of the system.

Going from outputs to inputs, there are two sources of input records for the system. First, there are the MARC records obtained on the weekly tapes from the Library of Congress. At this point I think it advisable to digress in order to review the main characteristics of the MARC program for those of you who have not had a opportunity to become familiar with it.

The MARC Pilot Project which began operation in 1966 was designed "to determine the feasibility of centrally producing a standardized machine-readable record for application by local installations serve their specific requirements!". Sixteen libraries of varying types were chosen to receive the tapes from the Library of Congress during the pilot project. The Georgia Tech Library was one of these sixteen participants. On the basis of the pilot project experience it was determined that the program was feasible, and plans for a continuing distribution of machine readable catalog records were developed. In March, 1969 the Library of Congress began distribution of MARC records on a subscription basis to any libraries wishing to subscribe. At present the program covers all current English language monographs cataloged at the Library of Congress. This is averaging about 1200 titles per week. Plans call for gradual expansion to cover other categories of materials, with French and German language monographs to be covered in the first expansion. Records are usually received on the tapes at about the same time that Title II deposit cards are received for the same titles. With the introduction of cataloging in publication in 1971, MARC records should often be available before the books are published.

One of the major achievements of the MARC program at the Library of Congress has been the development of the MARC II record format which has been widely accepted as a standard. Acceptance of this format as a standardized communications format means that libraries and other organizations will be able to exchange bibliographic data without each organization having to write a special conversion program for the data from each source. If an organization has a unique format for processing and storing records, it may still exchange data with other organizations accepting the standard by writing only two conversion programs. One program is required to convert records from the MARC II format to the organization's own format and another program is required to convert from the organization's format to the MARC II format. In addition to the advantages of standardization for exchanging records, the MARC II format can provide valuable guidance to libraries in developing their own internal formats. Many libraries will wish to simplify or otherwise modify the MARC II format but knowledge of the format can save much design effort and prevent many errors and oversights in design.

We will not have time to examine the MARC II format in detail this morning but I would like to emphasize its flexibility. Flexibility was one of the prime specifications in the development of the format. There are several different types of flexibility involved. First, the basic structure is designed to be hospitable to all types of bibliographic records. It is suitable for records for such types of materials as serials, maps, and technical reports, as well as for monographs. It is suitable for index and abstract records, and for authority file records as well as for records of Library of Congress cataloging. This flexibility is achieved in part through the use of a fixed length leader field which specifies the type of material described in the record and which specifies other variable characteristics of the record. Most of the non-control information in the record is carried in variable length fields. There may be any number of these " 1 s and the record structure provides for up to 1990 & Gerent types of variable fields. A record directory identifies the type of data in each variable field and gives its relative starting position and length. The content and coding of the variable fields can vary for different types of materials but the basic record structure remains constant.

A second type of floxibility provided by the formatics flexibility in use. The necords may be used for printing catalog cards, book catalogs, and special purpose bibliographies. They may be used in selective dissemination of information systems, in the selection or ordering or materials or for other purposes that may be devised to serve libraries of all types and sizes. The format is therefore designed to facilitate filing or sorting of the records according to various rules, for the printing of records in various formats, and for retrieval of records can the basis of various characteristics.

The format of the record is also flexible in its suitability for processing on a wide variety of computing systems. In a compatibility study conducted by the



Information Systems Office at the Library of Congress, "It was found that the majority of the tape units on the market are able to handle magnetic takes conforming to the Library of Congress' standards, and that most computers are able to use at least one compatible tape unit as a standard I/O device." This report may be consulted to determine whether a computing system which may be available for use by your library is capable of processing the MARC tapes.

The tremendous flexibility of the MARC format is achieved, of course, at some cost. This cost is in the complexity of the record. A simpler record could have been designed for any single use such as printing catalog cards. This would simplify programming and make processing more efficient for that particular use. Likewise, a record could be designed which would allow more efficient processing by a particular computing system. For this reason many libraries that can anticipate what equipment will be available to them and what uses they will be making of the MARC records may wish to modify the format and perhaps eliminate some data fields in order to make processing more efficient in their own situations.

The basic document describing the MARC format is The MARC II FORMAT:

A Communications Format For Bibliographic Data. There have been some changes since that report was issued. The briefer Books: A MARC Format gives the most up to date account of the format as it is being applied for monographs. There have been a number of articles about the MARC program in the Journal of Library Automation, and the summer 1968 issue of Library Resources: Technical Services contains several articles on the MARC program. And have been sponsoring the use of MARC records in your libraries, the Library of Congress and the Information Science and Automation Division of ALA have been sponsoring a series of two day institutes, held in major cities throughout the U.S., on the use of MARC records.

Returning from this review of the MARC program to consideration of the system at the Georgia Tech Library, I said that we use the MARC record as our input record whenever possible. Currently there are MARC II records available for about 60 per cent of the monographs which we are cataloging. This figure has gradually increased as the MARC data base has grown larger. We are hoping that it will continue to increase to 70 or 80 per cent. For those titles for which no MARC record is available, we key the cataloging record ourselves on a Flexowriter. The paper tape containing these records is input to a computer program which edits the data, prints a prooflisting and formats the records in a slightly modified MARC II format. Thus we get a MARC format record for all our monographs, either from the MARC tapes or by keying the record locally.

All computer processing for our system is done at the Rich Electronic Computer Center on campus. The Center has two powerful computing systems, the Burroughs B 5500 and the UNIVAC 1108. The UNIVAC 1108 was not available when

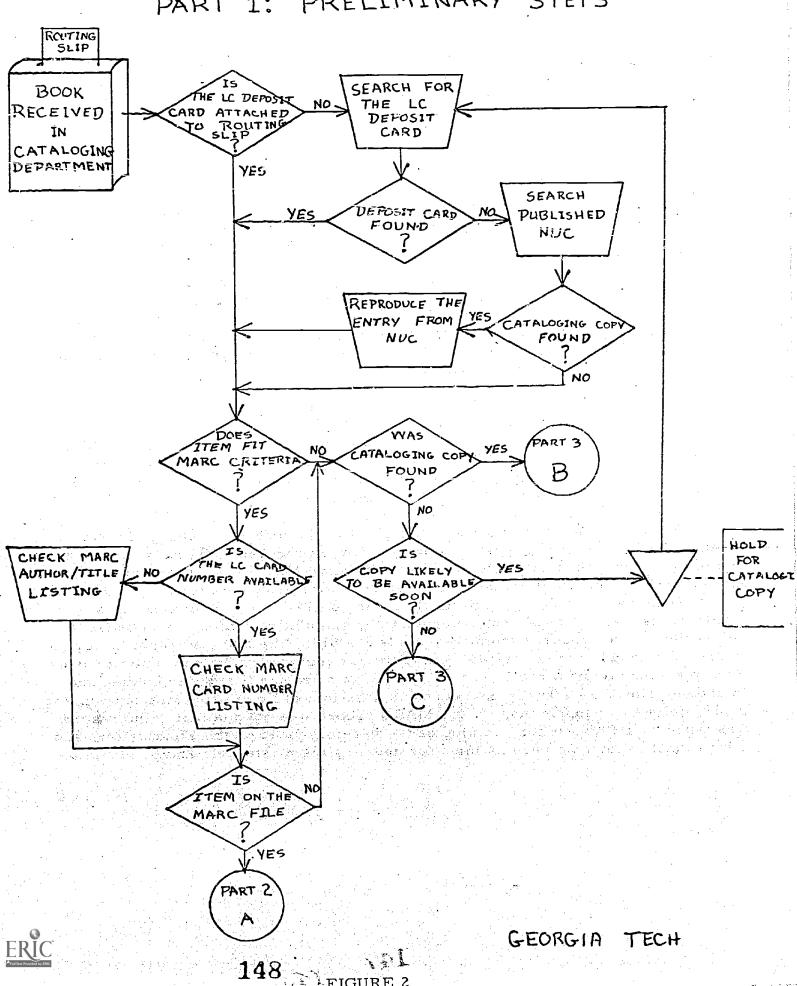


our system was initially designed and the original system ran entirely on the B 5500. Our B 5500 has two central processing units, 32,000 forty-eight bit words of core storage, 28.8 million characters of disc storage and ten 7-level magnetic tape drives. Our programs are multi-processed with other jobs and the Library is billed \$140.00 per hour for processor time and \$46.67 per hour for I/O channel time. The Computer Center has advised us that jobs like ours will run more efficiently on the UNIVAC 1108, and as we modify and improve the system it is being programmed for the 1108. Currently, the input programs are running on the 1108. The records are then converted to the B 5500 character set and the edit and output programs run on the B 5500. The UNIVAC 1108 has one central processing unit, 65,000 thirty-six bit words of core memory, 12 I/O channels, two high speed drums, two Fastrand drums and four 7-channel tape drives. It is being upgraded by the addition of a second central processor, 65,000 additional words of memory, and additional high speed drums and tape The Library is charged \$400 per hour for processor time on the 1108. Even though the MARC tapes are originally prepared on an IBM System 360 in a modified ASCII character code, we have had only minor difficulties in processing them on either the Burroughs or UNIVAC systems.

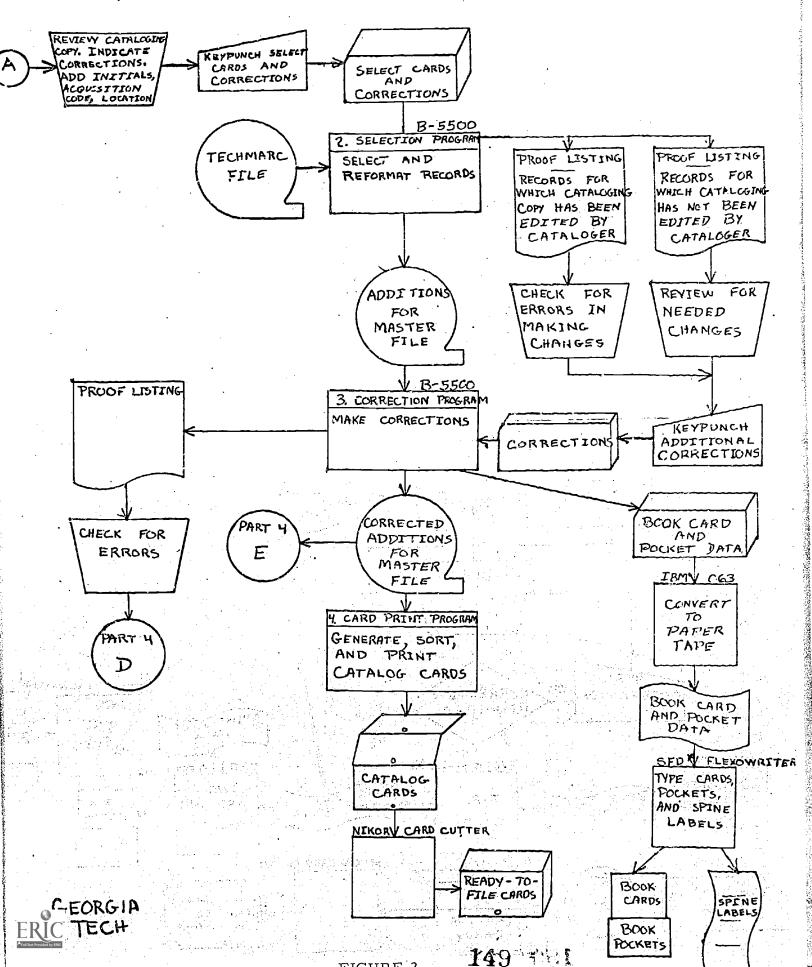
All programs for the Library system have been written in COBOL. Although COBOL has often seemed cumbersome for processing the variable length data, it does have all of the essential capabilities. We have found it more efficient to use assembly language or FORTRAN subroutines for a few operations. On the 1108, the assembly language subroutines permit the writing of true variable length records and give greater flexibility when I/O errors occur.

Figure 2, in four parts, is a flow chart of the original system. In this original system, a clerk in the Catalog Department checked a listing of LC card numbers of those records available on a cumulative MARC file to determine whether MARC records were available for the books being cataloged. If a MARC record was available the LC card number was punched into a selection cards. These cards were batched and run against the cumulative MARC file in order to select the desired records from the cumulative file. The selected records were listed, proofread, and corrected or modified as required. The corrected records were then used to print catalog cards, to update a master file of our holding and to update print files. The print files were used in a cycle of programs for printing book catalogs and supplements. If a MARC record was not available, the record was typed on a Flexowriter, catalog cards were produced on the Flexowriter, and a byproduct paper tape used as input for updating the master file and print files.

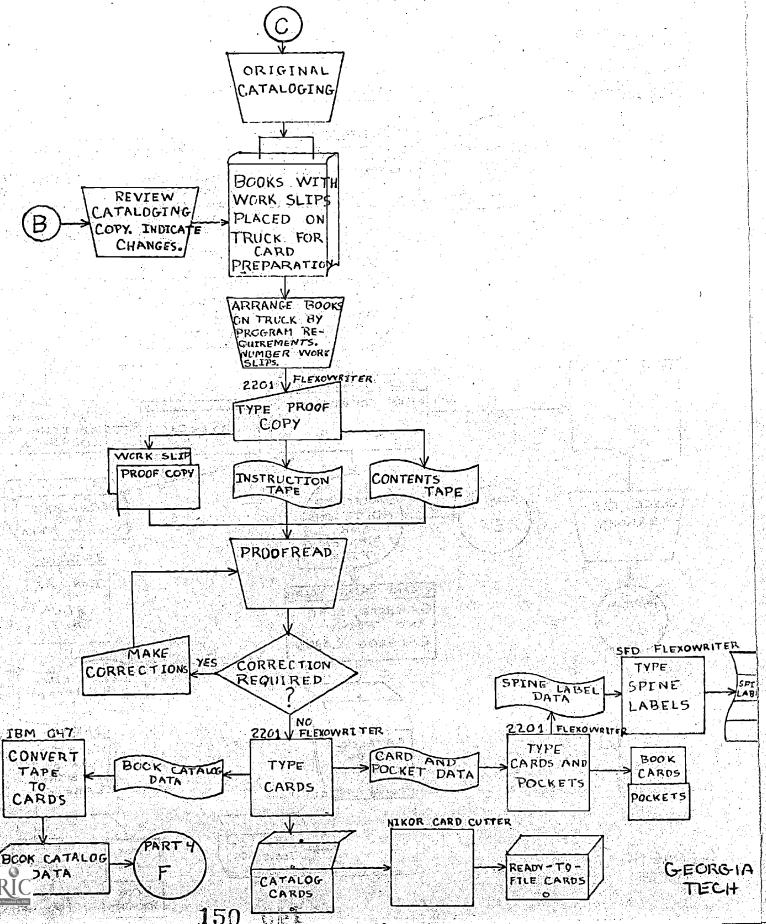
### CATALOG PRODUCTION SYSTEM PART 1: PRELIMINARY STEPS



## CATALOG PRODUCTION SYSTEM PART 2: MARC CARD PRODUCTION



# CATALOG PRODUCTION SYSTEM PART 3: FLEXOWRITER CARD PRODUCTION



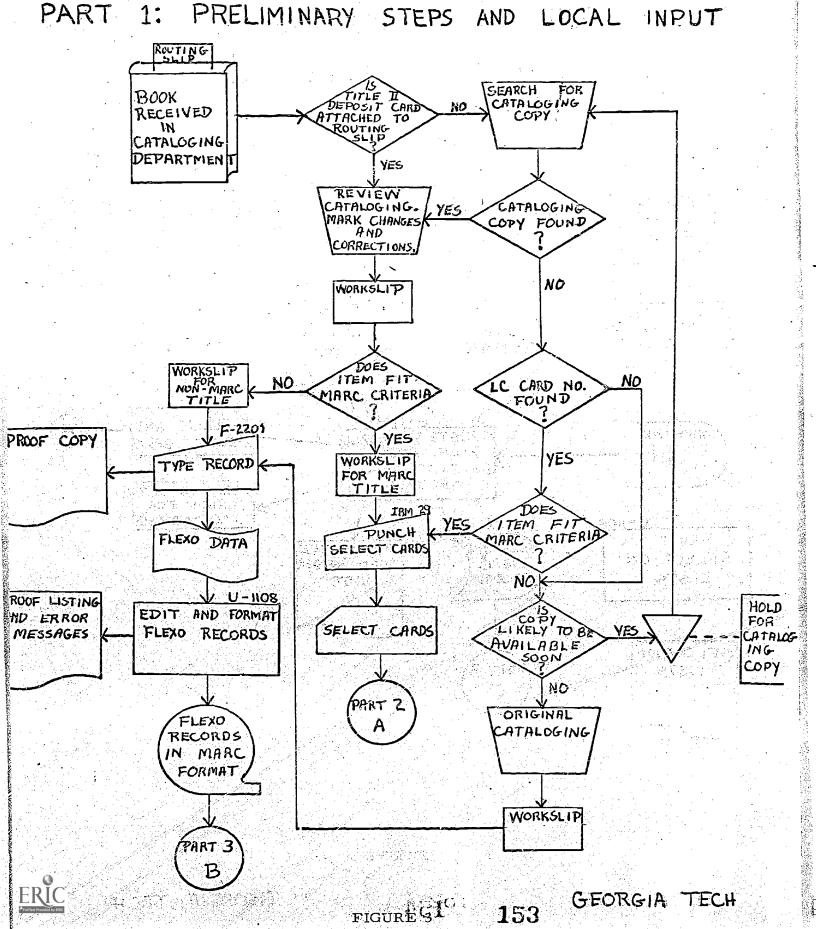
CATALOG PRODUCTION SYSTEM BOOK CATALOG PART 4: PRODUCTION NOTICE KEYPUNCH OF BOOK CATALOG APPLITIONS FROM FILEXOWRITER, PLUS CORRECTIONS CORRECTION ERROR . V B-5500 5. FLEXOWRITER PROGRAM PROOF LIST AND ERROR CREATE UPDATE MESSAGES RECORDS FOR FILE MASTER CHANGES ADDITIONS DELETION: FILE / addition s OLD FOR MASTER MASTER FILE . FROM MARC SUB-FILE 1 B. 5100 SY, TEM G. LINDATE-GENERALE TREMM UPDATE MASTER FILE GENERATE ENTRIES FOR PRINT FILES. STATISTICAL NEW REPORT MASTER FILE ENTRIES FOR PRINT FILES OLD MONTHLY V B-5500 NEW BOOK LIST PRINT WEEKLY PRINT PROGRAM PRODUCED FILES AUTHOR SUTPLEMENT PRINT WEEKLY WEEKLY. TITLE SUPPLEMENT CATALOG CUMULATIVE SUPPLEMENTS FOR THE SUBJECT MONTH. SUPPLEMENT SUBJECT FITLE NEW AUTHER MONTHLY OLD PRINT PRINT FILES FILES Book of Belli Boly. NEW BOOK LIST . B-5500 PRODUCED 8. MONTHLY PRINT PROGRAM AUTHOR SUPPLEMEN MONTHLY. PRINT MONTHLY UBIECT TITLE SUPPLEMENT CUMULATIVE CATALOG SUPPLE -FITLE SINCE LAST SUBJECT MENTS AND UPDATE PRINTING OF UTHOR SUPPLEMENT PRINT FILES. THE COMPLETE NEW PKINT FILES GEORGIA 151 TECH FIGURE 2

Figure 3, in four parts, is a flow chart of the improved MARC II system for the 1108, which we are in the process of implementing. This improved system, using records in a slightly modified MARC II format is now partly operational. We are implementing the new system step by step in combination with the original system in order that production will not be halted while the new system is developed. This makes implementation much slower than it would be if we could discontinue operation of the B 5500 system, since articulation of the two systems is time consuming. When MARC II records were first received, we immediately converted them to the MARC I format and processed them entirely through the old system on the B 5500. At present, the preliminary steps and input operations of the new system shown in parts 1 and 2 of the flowchart are in operation. Our cumulative MARC file is maintained on the 1108 and records are selected and prooflisted on the 1108. Local input via the Flexowriters is also edited and formatted on the 1108. The records are then converted to our version of the MARC I format and the Burroughs character set, and all corrections and output steps are done under the B 5500 system.

Rather than going through the flow chart of the new system step by step, I will point out some of the changes from the original system and the reasons for them. You may have noticed that in these charts we refer to the system as a Technical Processing System rather than as a Catalog Production System. It is designed with the intention of including acquisitions procedures in the same system, as phase 2. The heart of the new system is an on-line process file. In phase 1, records will be entered on the process file at the time the titles are cataloged. In phase 2, records will be entered on the process file at the time the title is selected for ordering. Initially, access to the file will be by LC card number only. Unique pseudo card numbers are generated for local input records where we do not have an LC card number. Indexes by short titles and entries will be printed. If the abbreviated author or title is not sufficient to identify the item, the complete record can be displayed on a terminal. The control file associated with the process file will carry a status word for each record which will indicate what operations have been performed and remain to be performed for that record. In phase I the status word will show such conditions as verified, cards printed, added to master file. In phase 2 the status word will also show such conditions as order printed, claim printed, reports received from vendor, book received, invoice received, and invoice processed.

The primary advantage of the on-line process file is that it permits immediate updating or inquiry regarding the status of a record, from a terminal in the Library. Any single record may be displayed or revised at any time without having to wait for the entire file to be printed or for a batch of changes to be punched and processed. This capability will decrease the volume and frequency of printed lists required.

MARC I TECHNICAL PROCESSING SYSTEM (PHASE 1)



#### MARC II TECHNICAL PROCESSING SYSTEM (PHASE 1) PART 2: MARC INPUT

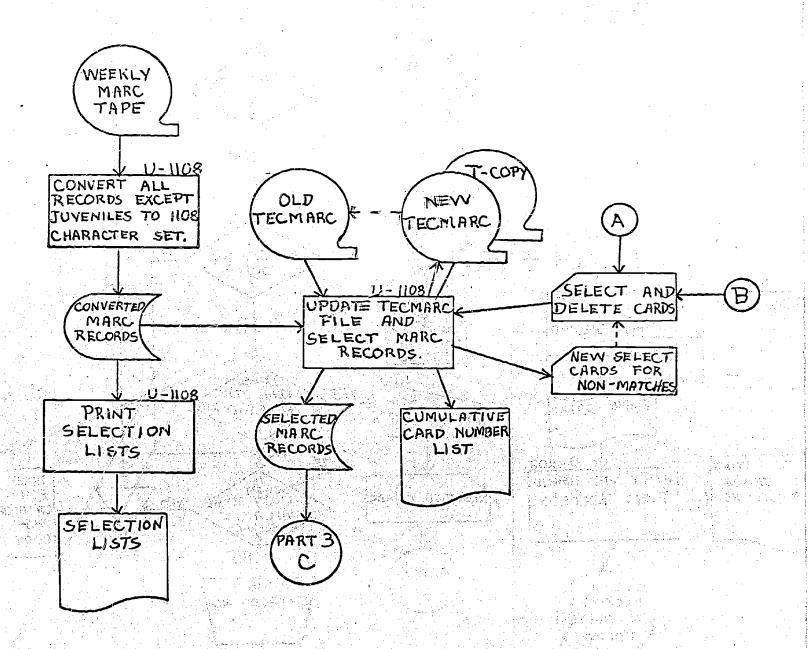
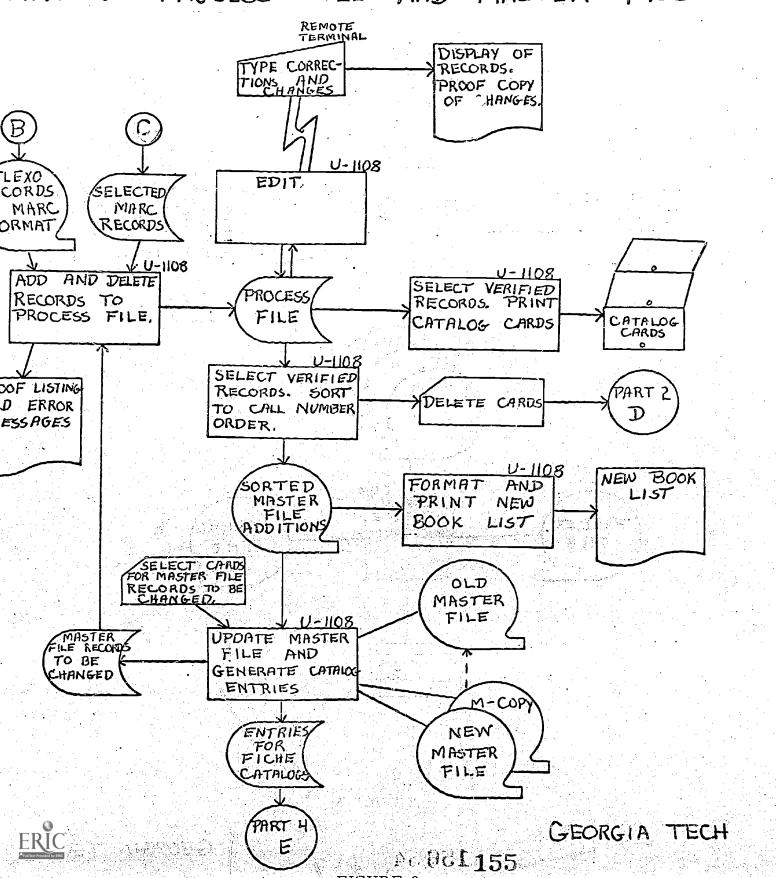


FIGURE 3

# MARC II TECHNICAL PROCESSING SYSTEM (PHASE 1) PART 3: PROCESS FILE AND MASTER FILE



# MARC II TECHNICAL PROCESSING SYSTEM (PHASE 1) PART 4: MICROFICHE CATALOG PRODUCTION

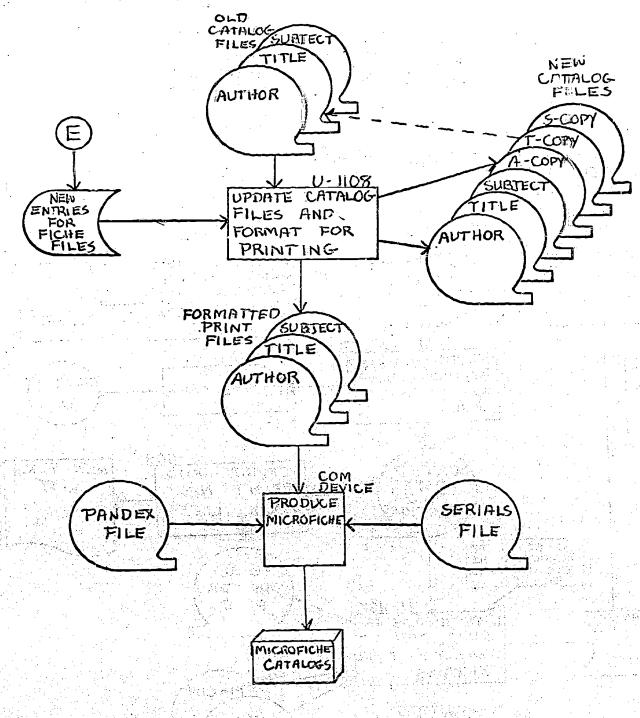


FIGURE 3



One of the most severe limitations of the original system has been that it is entirely a batch system. Records are input in batches and remain in these same batches until all processing is completed. This has extended the throughput time much beyond that which we had expected. The system was designed for a weekly cycle. We expected to pick up records from the Catalog Department once a week and to select or key these records, proofread them, make the required corrections, print the catalog cards, and update the menter file before picking up the next weekly batch. This has proved to be unrealistic. The greatest delay comes in the proofreading and correction steps. We never succeed in getting all records correct on the first run of the correction program. Consequently, the prooflisting from this run must be checked and admitted corrections punched before rerunning the correction program. This cycle must often be repeated several times before all records in the batch are correct and processing of the batch can be completed. In the new system, processing of a single record can continue as soon as that one record receives the verified status.

In working toward the new system, we have modified the original B 5500 system to permit display and correction of records from a terminal for corrections for about 18 months. This capability has improved throughput time and is a great convenience. When a large number of corrections are to be made, however, it is several times more expensive to do them from the terminal than by batch processing. For this reason, the initial corrections of local imput records are still done in batch mode, but MARC records, with fewer changes to be made, are corrected entirely from the remote terminal. In the new system we are planning to make all changes via the terminal. The remote update program is being written so that less typing is required to make changes and we hope that it will be more efficient and more economical. Provision will also be made, however, for making corrections by batch processing if this proves to be necessary.

The only noteworthy difference between the two systems in the preliminary procedures is that the card number listing is no longer checked to determine whether a record is on the MARC file. If the book is an English language monograph with a recent imprint and is not in one of the subject classes which we delete from our MARC file, we assume that it will be on the MARC file and attempt to select it. In recent weeks 80 per cent of the records have been on the file the first time we attempted to select them. If the record for a title is not on the MARC file when we attempt to select it, the select program punches a new select card for it. These cards are combined with the new select cards on the next selection run. The program punches in the new select cards the number of unsuccessful attempts to select that record. After the ninth unsuccessful attempt a new select card is not punched but a message is printed that the title should be processed through the local input system. This means that we will ordinarily wait about nine weeks for a record to turn up on the MARC into before keying it ourselves. I do not yet have accurate statistics on the frequency with which this occurs.

The procedures for keying local input records proved to be the least satisfactory part of the original system. Initially, catalog cards for titles that were not represented in the MARC file were produced on Flexowriters and a by-product paper tape was used for adding these records to our master catalog file and print files. Use of the Flexowriters for printing catalog cards provided a larger character set including lower case and the common diacriticals, and also permitted printing 12 characters to the inch rather than 10. There proved to be several disadvantages. The Flexowriters were slower and had much more time out of service for repairs than we had anticipated. The instructions for typing records were quite complex and it usually required about two months before a new typist became proficient. Some typists were never able to follow the instructions consistently and continued to make frequent mistakes. These difficulties were compounded by a high turnover rate for typists. On the other hand, we experienced no complaints or problems from the use of the limited character set on the computer printed catalog cards. Therefore, we decided to print all catalog cards on the computer and to use the Flexowriters strictly as an input device. Used in this manner, the Flexowriters have proved to be quite reliable and seldom in need of repair. Since program codes to control the automatic typing operations on the Flexowriter are no longer required, the typing procedures and instructions have been simplified. The data may be input in a relatively unformatted form as long as each data item is identified with the correct MARC tags. Corrections can be made much more conveniently since the incorrect codes may be left in the paper tape and additional codes punched to cause the data to be corrected by the computer under control of the editing program. The input of local records takes only about half as long under the improved system.

Our experience has shown that the major machine costs for operating the system do not result from the processing of records required for character conversion, editing, formatting entries, sorting and printing but from the reading and writing of several large files. The large magnetic tape files required by the system are the master catalog file, the catalog print files, and the cumulative file of MARC records (referred to on the flowcharts as the TECMARC file). All of these files are multi-reel files, presently requiring three to five tape reels each. Not only are the runs that update these files expensive but occasionally in such large files there are records on the tapes that cannot be read. This has occurred more frequently on the B 5500 than on the 1108. Nevertheless, it has been enough of a problem on both computers that we are now maintaining duplicate copies of each of these files. This adds to the cost of update runs for these files but it has been effective in preventing the necessity of reconstructing the files from older backup tapes.

In the original design, the complete print files were updated only once a month but the master file was updated weekly. We have found it more economical to merge several of the tapes for updating the master file and to run the update program only twice a month rather than weekly. In the new system the programs which update the master file and catalog print files, will be run only

once a month. This will limit the cost of these runs. Also we plan to segment these files in five year volumes so that they do not continue to grow indefinitely. This will lead to the production of catalogs divided chronologically into five year sections as is the printed National Union Catalog.

Maintenance of the TECMARC file and selection of records from the TECMARC file are still done weekly in order to avoid unnecessary delay in producing catalog cards. During the MARC Pilot Project we did not find it necessary to update the TECMARC file weekly since the Library of Congress provided cumulative tapes. In the original system, therefore, selection of records was done in a separate program. These functions have been combined in the same program in the new system so that it is necessary to read the TECMARC file only once a week. We have found that it costs us approximately \$ .00068 per record to read or write a file of MARC records. Our TECMARC file currently contains 54, 400 records so it costs about \$37 to read this file and \$74 to read it and write an updated version of it. Table I shows our calculated cost per title for reading the TECMARC file, selecting records from it and formatting these records for printing. cost per record depends on both the number of records in the TECMARC file and the number of records selected in each batch. Table II shows the calculated cost per title when file maintenance is included in the same run. Obviously, it is important to keep this file as small as possible and to avoid any unnecessary passes of the file. We are averaging about 250 titles in the weekly select batches and the TECMARC file contains about 54, 400 records. Table II indicates a cost per title of about \$ .37 at these volumes. If the cost of these functions goes much higher, the system becomes uneconomical. We cannot increase the size of batches at our current acquisitions rate without delaying cataloging. Therefore, we have been working on techniques for limiting the size of the TECMARC file. Analysis by subject class of records received in the MARC Pilot Project and of records which we selected for use showed that we used more than 50 per cent of the records in some classes and less than 1 per cent in other classes. We determined that it would be more economical for us to eliminate from the TECMARC file, records in those classes in which we use a small percentage of the MARC records. The local input system via the Flexowriters can be used for the relatively few titles we catalog in those classes. The new program for updating the TECMARC file permits the specification of classes that will not be added to the file. Twenty-nine subject classes, such as BV (Practical Theology), CS (Genealogy), RD (Surgery), SF (Veterinary Medicine), and TX (Domestic Science), are currently being omitted from the TECMARC file.

We also analyzed the records which were selected from the file to determine how long they remained on the file before being selected. The distributions of times showed significant variation from one subject class to another. Generally, it appeared the in those subject classes in which we selected a small proportion

### RELATIONSHIP OF FILE SIZE AND BATCH SIZE TO COST PER TITLE

 $C_T = \left(\frac{FS}{ES}\right) C_R + C_P$ 

 $0_{\mathrm{T}}$  - Cost per title

FS - File size

BS - Batch size (number of records selected from the file)

C<sub>R</sub> - Cost per record read = \$.00068

Cp - Cost per record processed = \$.073

FSRS	50	100	150	200	250	300	400	500	750	1000
10,000	-209	.141	.118	-107	.100	.095	.090	.087	.082	.080
20,000	•345	•209	.164	.141	.127	.118	.107	.100	•091	.087
30,000	.481	.277	.209	.175	.155	.141	.124	.114	.100	.093
40,000	<b>.</b> 617	.345	.254	-209	<b>.</b> 182	.164	.141	.127	.109	.100
50,000	<sub>3</sub> 75 <b>3</b>	.413	.300	.243	.209	.186	.158	.141	.118	.107
60,000	.889	.481	.345	.277	.236	.209	.175	.155	.127	.114
70,000	1.025	.549	. 390	.311	.263	.232	.192	<b>.</b> 168	.137	.121
80,000	1.161	,617	<b>.43</b> 6	-345	,29 <u>1</u>	.254	-209	.182	.146	.127
90,000	1.297	<b>.</b> 68 <b>5</b>	.481	.379	<b>.31</b> 8	.277	.226	.194	.155	.134
100,000	1.433	<b>.</b> 753	.526	.413	.345	-300	.243	.209	.164	.141
110,000	1.569	.821	.572	.447	.372	.322	.260	.223	.173	.148
120,000	1.705	.889	<b>.617</b>	.481	.399	.345	.277	.236	<b>.1</b> 82	-155

TABLE I

RELATIONSHIP OF FILE SIZE AND BATCH SIZE TO COST PER TITLE - FILE UPDATE AND RECORD SELECTION FUNCTIONS COMBINED IN SAME PROGRAM

$$c_{T} = \left(\frac{FS_O + FS_A + FS_D + FS_N}{BS}\right) c_{IO} + c_P$$

Cm - Cost per title

FS<sub>O</sub> - File size, old file

FSA - Fils size, add records = 1200

FSn - File size, delete records = 1200

 $FS_N$  - File size, new file

BS - Batch size (number of records selected from file)

C<sub>10</sub> - Cost per record read or written = \$.00068

p - Cost per record processed = \$\( \frac{\pi}{073} \)

FSO BS	50	100	7.50	200	250	300	400	500	750	1000
10,000	.378	-225	.175	.149	.134	.124	.111	.104	.093	-088
20,000	<b>.</b> 650	.361	<b>.</b> 265	.217	.188	.169	.145	.131	.1111	.102
30,000	.922	.497	<b>.</b> 356	.285	.243	.214	.179	.158	.130	.115
40,000	1.194	•633	.447	<b>.</b> 353	.297	.260	.213	.185	.148	.129
50,000	1.466	.769	.537	.421	.852	•305	.247	.212	.166	.143
60,000	1.738	_905	<b>.</b> 628	<b>.</b> 489	<b>.4</b> 06	<b>.</b> 350	.281	,240	.184	.156
70,000	2.010	1.041	.719	.557	.461	. 396	.315	.267	.202	.170
80,000	2.282	1.177	.809	,625	.615	.441	.349	.294	.220	.183
90,000	2.554	1,313	.900	.693	.569	<b>.4</b> 86	,383	.321	.238	.197
100,000	2.826	1.449	-991	<b>.</b> 761	•624	<b>.</b> 532	.417	<b>.34</b> 8	.257	.211
110,000	3.098	1.585	1.081	<b>.</b> 829	.678	.577	.451	.376	.275	.224
120,000	3.370	1.721	1.172	.897	.732	.622	.485	<b>/403</b>	.293	/238

TABLE II

of the records on the file, we tended to acquire those books more rapidly. This indicates that unselected records in those subject classes might be purged from the file after a relatively short time, perhaps six months. Unselected records in the subject classes in which we eventually select a large proportion of the records might profitably remain on the file for a longer period, perhaps a year or eighteen months. The new program for updating the TECMARC file will purge from the file those records which have been on the file longer than a period which can be specified for each subject class. We have not yet purged the file on this basis. fall the oldest MARC II records will have been on the file for eighteen months and we will do another analysis to determine whether our findings on the use of the MARC Pilot Project records also hold true for the MARC Distribution Service records. Since the coverage of the MARC Distribution Service is broader than that of the Pilot Project and since more of our books are now being received automatically on approval plans, the patterns may be significantly altered. Through this analysis we will attept to determine the optimal time for unselected records in each class to remain on the file, and we will then begin purging the file on this basis.

Obviously, the time that records need to remain on the file, and therefore the size of the cumulative file, are related to the acquisitions policies and procedures of the library. At the University of Chicago Library, the MARC tapes are used for the selection and ordering of monographs as well as for a source of cataloging data. Since they are considering records for use soon after they are received they have found it unnecessary to retain records on their cumulative MARC file for more than three months. Our new system provides for the printing of selection lists from the weekly MARC tapes. These lists will be distributed to staff members and faculty having responsibility or interest in book selection in various subject areas. The checked lists will be used for initiating orders and the orders will be printed from the records in the TECMARC file. Hopefully, this will help to insure the early selection of books to be acquired, and unselected records may then be purged from the TECMARC file after a shorter period.

In the output module of our system the major change is in the media in which the catalog will be produced. I mentioned earlier that we have been producing book catalogs and supplements on the computer printer but have not had funds to reproduce and distribute these catalogs for use. We have considered three reproduction methods for the book catalogs. One method is to print the catalog on the computer printer, photographically reduce each page and print by offset printing. A second method is to produce a magnetic tape which can control a photocomposition device to produce the formatted pages and again print on an offset press. This method permits the use of a larger character set with various type styles and sizes, produces a more visually attractive page and permits much greater density of entries on the page. We estimate that using unreduced computer output we average 14 entries per page, with photo-reduced computer output we average 25 entries per page and that with photocomposition we might get up to 65 entries per page.



Until quite recently price quotations we had received for photocomposition would have made it significantly more expensive than the use of reduced computer output even though the number of pages to be printed and collated would be decreased by more than half. Prices for photocomposition work have been decreasing, however, as more firms enter this field. A recent estimate we received would produce a lower overall cost using this method.

A third method which we have considered for producing our book catalogs is the use of Computer Output Microfilming (COM). In this method, a computer tape drives a COM device which creates page images on microfilm. In our case we would use the microfilm to produce multiple sets of microfiche. Of course, strictly speaking, the product will not be a book catalog. Nevertheless, the catalog will contain exactly the same data in the same arrangement as our book catalog would have. It would even be possible to use the same tapes to drive either the computer printer or the COM device, producing entries in exactly the same format. We will actually revise our print program to take advantage of special features of the COM device selected. Various reduction ratios may be obtained in the film output of the COM devices. A reduction of 42X permits up to 208 page images containing about 3,000 catalog entries on a single fiche. A reduction of 28X permits 96 page images containing about 1400 entries per fiche, and a reduction of 24X permits 80 page images with about 1150 entries per fiche. Duplicate fiche in the projected quantity cost about \$ .10 to \$ .12 each. Production of the original costs about \$20 per thousand page images and is not affected by the reduction ratio selected. Table III presents a comparison of the catalog size and costs for these three production methods using our projected volumes. It shows a cost ratio of at least 9 to 1 in favor of the microform catalog. By using a higher reduction ratio a greater saving could be achieved but with a loss of compatibility among the various microfiche in use in the Library.

The proposal which we have submitted for the funding of our microfiche catalog calls for other files to be distributed on microfiche as well. The existing card catalog will be filmed and reproduced on microfiche to form the basic fiche catalog which will be updated monthly by the COM produced supplements. Our serials holdings file will also be distributed on COM produced microfiche. These three sets of fiche will give a record of the monographic and serial holdings of the Library. The PANDEX Current Index to Scientific and Technical Literature which we are receiving on magnetic tape will also be used to produce COM microfiche for distribution. This set of fiche will provide indexing of about 1900 of the most important journals, 35,000 government technical reports and 6,000 books in scientific and technical fields annually. These fiche would also be distributed monthly and would cumulate for one year. The proposal calls for distribution of 46 readers and complete sets of fiche on campus and 6 sets without the PANDEX fiche off campus. Telephone and campus delivery service would be provided as well as free copying of articles, for faculty members.

GEORGIA TECH LIBRARY
ESTIMATED VOLUMES AND COSTS FOR CATALOGS IN BOOK FORM AND MICROFORM

DATE NUMB	NUMBER PHOTO		LINE		MICROFICHE			COST	COST FOR 100 COPIES	PIES		
OF TITLES	COM-		PRINTER PAGES	42X (208	28X (96)	24X (80	PHOTO	OFFSET	МОО	COM MICROFICHES	C语S	
		(3)	(25 ENTRIES)	imaces, 2912 Entries)	images, 1344 ENTRIES)	IMAGES, 1120 ENTRIES)	AND OFFSET PRINTING	FRINIING FROM REDUCED LINE PRINTER COPY,	COST OF ORIGINAL	42X	28X	24X
43000		2647	6880	09	128	154	\$13235	\$17200	\$246	\$ 906	\$1654 \$1940	\$1940
52600		3237	8416	2	157	188	16185	21040	301	1104	2028	2369
62200		3828	9952	88	186	223	19140	24880	356	1302	2402	2809
72400		4456	11584	100	316	269	22280	28960	474	1514	2790	3263

1. Photocomposition and offset printing estimated at \$5.00 per page.

2. Offset printing from reduced line printer copy estimated at \$2.50 per page.

3. Cost of microfiche estimated at \$20.00 per thousand pages for production of master copy plus \$.11 per fiche for duplicates.

TABLE III

I will conclude with a brief evaluation of the system. We have had no problems or complaints from patrons or service librarians resulting from the use of the computer produced catalog cards. The proposed distribution of the book catalog on microfiche and the related services offer the promise of a convenience to users that has not previously been offered in large academic libraries. Although we have temporarily had to discontinue distribution of the new book list, it was a service that some but not all of our faculty found helpful. Our catalogers have had some difficulties and objections to the frequent changes in procedures that have accompanied the development of the system but are generally pleased with its operation.

We do not have good current cost figures because of the frequent changes and the inefficiencies involved in converting from one system to another. Table IV summarizes the costs of producing catalog cards on the B 5500 system during the spring and summer of 1968. The \$ .11 per card cost compares favorably with the \$ .17 per card which an earlier study showed that it had been costing us to use Library of Congress printed cards. Perhaps more significant is the increase in number of titles cataloged without a corresponding increase in staff. In 1965-66 8,000 titles were cataloged with cards purchased from the Library of Congress, when available, and prepared on Flexowriters when not available from L. C. In 1969-70 almost 20,000 titles were cataloged, with cards for all monographs produced by the computer. This was done with no increase in the number of clerical employees in the Catalog Department although two additional catalogers have been employed. The equivalent time of one full time position is required in the Data Processing Department for operation of the catalog production system.

On the other hand, development of the system has been expensive. Computer time and salaries for development of the original system totalled about \$35,000. Modifications to the original system and work on the improved system have required about \$60,000 to date. The design and programming effort for the book catalog has been much greater than that required for catalog cards. A system designed to produce catalog cards only could be developed at much less expense and could be operated more economically. Also, now that the MARC II format has been developed and well documented and a number of libraries have experience with its use, a catalog production system might be developed at less expense. Nevertheless, I think that these figures indicate that it will be uneconomical for small and medium size libraries to develop their own systems. The figures in Table II showing the relationship of the cost per title for maintaining a cumulative MARC file and processing records from it to the size of the file and the number of records selected from it in a batch, lead to the same conclusion. It will not be economical for the small or medium size general library to use MARC records in a system requiring maintenance of a cumulative MARC file. Unit costs may be quite attractive, however, when the costs of maintaining the file can be apportioned to a large number of records used. This would indicate that the very large library may benefit directly through the use of MARC records in an automated system but that the small and medium size libraries are likely to benefit only through processing centers serving a number of libraries.

#### SUMMARY OF CARD PRODUCTION COSTS

	•		•	AVERAGE COST PER TITLE
LA BOR				\$ .30
SUPPLIES AND EQUIPMENT		•	-	3.4
				•14
COMPUTER TIME FILE MAINTENANCE RUNS SELECT RUN CORRECTION RUNS		<b>\$.</b> 04 •28 •02		i de la companya de La companya de la co
CARD PRINT RUN TOTAL COMPUTER RUNS		.07		<u>. 41</u>
rotal cost				<b>\$</b> .85
Average number of cards pe	r title	8		
AVERAGE COST PER CARD	(\$	.85/8)		<b>3.1</b>

TABLE IV

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AUTOMATED CIRCULATION SYSTEM

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#### AUTOMATED CIRCULATION SYSTEM

#### INTRODUCTION

This discussion will cover four separate subjects. First, there will be a preliminary discussion of the steps in development of the Library Circulation System. Some of these steps have been covered in an earlier session but I will try to show unique problems that we encountered in the development of the Ohio State University Circulation System. Secondly, we will talk about the four general types of automated circulation systems that are operating in the United States today. Thirdly, we will go into detail on a sample batchmode system describing the various computer runs that compose the system. Fourthly, I will describe very briefly the Ohio State University Circulation System and general innovative developments in library automation. Very little time will be spent on the O. S. U. system as it would only be appropriate to the large institutions.

I have various illustrative materials which I will pass around the class; of particular importance are the bibliographies.

#### PROBLEMS ENCOUNTERED IN THE DEVELOPMENT OF AUTOMATED SYSTEMS

Starting with the first step in the development of the circulation system we have the determination of objectives. The institutional objectives must be taken into consideration and coordinated with the library objectives. It is sometimes difficult to get a clear cut definition of the objectives of library automation. At O. S. U. the library administration determined that an automated approach to a circulation system would provide the greatest user benefit. Thus, our system is primarily user oriented and is not merely an improvement of internal library operations which would benefit primarily librarians.

Objectives may also be considered in terms of long term and short term benefits. Our long term objective is to develop a totally integrated library system, while our short term objective is to develop the automated circulation segment.

One problem rarely discussed is the difficulty of getting administrative support for a program in automation. Perhaps this problem is unique to a large institution, but I think not. In any automation project you are normally going to need some new funds. It is very difficult to arrange for development of a system out of an existing library budget without having ongoing operations suffer.



The first step in the actual development of a system is a detailed analysis of the existing manual operation. In a small library and for a matricely unsophisticated automated system this may not be necessary, but the more complicated the activity, the more necessary this becomes. A systems enalysis includes procedures, files used, personnel organization, and forms. One discovery in our analysis was the number of small files which had developed over the years in the Circulation Department. These files were normally stored in all shoe boxes and were used for a wide variety of purposes. Typical of these "shoe box" files were snag files, lost book files, problem files, etc.

Figure of these "shoe box" files served some specific purpose however, and we generally had to accommodate the activity in our eventual design.

The actual design of an automated system should be preceded by visits milar sized institutions with operating automated systems. This should be accompanied by a thorough review of the literature on existing systems design. When real meat of the systems design is the development of a top level systems flow chart and the writing of detailed program specifications. At O. S. U. we seement very little time looking at the various problems associated with computer hardware. We were told what hardware we had available and considered it an environmental parameter in which we had to work. Once the design is complete, you can then establish detailed work schedules.

In the time scheduled for the actual writing of the computer programs your smould accommodate time for coding, testing individual programs, and testing the entire system. The amount of time spent on the latter step, systems testing, will be reflected in the smoothness of your conversion to an automated system.

The first step in the implementation of an automated circulation system is file conversion. This can be an exceedingly complex problem. At O. S. U. we converted our entire shelf list of over 700,000 titles with the average of 88 characters per title. The actual conversion to machine readable form was performed by an outside vendor. The vendor, a computer service bureau, specialized in library file conversions. The vendor supplied us with edit listings which were then proofread by library personnel. Corrections were then posted to the vendor tapes and the final corrected tape was then delivered to the library. The vendor, with a staff of 20 typists, spent three months in the conversion of the file. Our total expenses will be close to \$100,000.00; or roughly 14.3¢ per title.

At this point I will have to stop as at O. S. U. we have just completed our file conversion and I can no longer speak from first hand experience.

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#### TYPES OF CIRCULATION SYSTEMS

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The four types of circulation systems that I will be discussing are the unit record system, the batch-mode system, the on-line data collection system, and the on-line catalog access system.

The unit record system uses, as do most library circulation systems, a data collection device. The data collector typically has a place where you can insert a punched card and a punched identification badge. Information on the book is entered from the punched card and information on the patron is taken from the punched badge. In addition, there are a number of keys on the data collector which can be used to enter variable data such as the date due.

In a unit record system there are two common sub-types: the one-card system and the two-card system. In the one-card system there is a punched card in a book pocket in the back of each book which contains the identification number for the book. When the book is checked out this card is inserted in the data collector along with the patron identification badge. The date due is entered on the keyboard and release key is hit. The data collection device then punches a card which contains book information, patron information and the date due. The book card is replaced in the book and the identification badge is returned to the patron. The transaction cards are batched at the end of the day and merged with the accumulative transaction file which is then used to produce a listing of books in circulation. When discharging the book, the book card is removed from the book and placed in the data collector and the date discharged is entered on the keyboard. This discharge transaction is then used to sort out on unit record equipment the circulation transaction record. These cards can then be used to produce a listing of books discharged that day.

In the two-card system, you perform the same activities, however, the data collection device will produce two transaction cards. One card will go with the book along with the book pocket card, the other card will be used in the circulation file. When discharging a book under the two-card system, you need only pull the card that was punched for the original transaction and the book is ready to be shelved at that time. These cards are then used to pull the circulation record from the circulation file. In the two-card system the data collection device is not needed at the point of discharge.

In the batch-mode off-line system both the one-card and the two-card systems are used. The basic difference is the use of a computer instead of unit record equipment for the processing.

The state of the state of

"Batch-mode" means that transactions are accumulated during the day and then processed by the computer all at one time. "Off-line" refers to the status of the computer at the time the transaction takes place. Where transactions are batched and processed at later times the computer is obviously off-line. In on-line systems the computer actually processes the transaction the instant that it takes place.



It appears that the batch mode off-line circulation system is the most prevalent in use today. Arkansas State University and Florida Atlantic University are both operating on a batch-mode off-line circulation system. The sample system that I will discuss later came from Wright State University, Dayton, Ohio.

The on-line data collection system is very similar to the off-line system. In this type of system the data collector is connected on-line to the computer as the transaction takes place, the information is transmitted directly to the computer and is logged on a transaction tape. At the end of the day, or at periodic periods during the day, the log tape is processed in a batch-mode. These systems are usually used when the large computer is available where the library system can accumulate transactions in a time-shared environment. In a time-shared system, the computer is only busy when it is actually processing a transaction. The computer time is shared with various other users who may be performing a great variety of tasks.

Sample systems of the on-line data collection type are Northwestern University and Midwestern University in Texas.

The fourth type of system is the on-line catalog access circulation system. Notice that I introduce the term catalog at this point. What distinguishes the online catalog access system from the on-line data collection system is the presence of a master file (catalog). With the on-line catalog access system you have on-line inquiry capability which is not present in any of the previous systems discussed. Typical inquiry questions are as follows: Do we have the book? Is the book available? When will the book be returned? In this type of system all transactions affecting the circulation status of a book are processed on-line.

There is only one system that is presently operating in this country-the BELREL system. This is an on-line system which connects three libraries of the Bell Telephone Corporation over long distance telephone lines. Their system is limited in that they can only inquire about books in circulation, and not the entire file. The Ohio State University Circulation System will provide full file inquiry.

### A TYPICAL AUTOMATED LIBRARY CIRCULATION SYSTEM

The system that we will talk about is a typical off-line batch mode system. The system uses an identification badge in conjunction with a data collector. To perform a check-out transaction you insert the patron's identification badge and a book pocket card into the data collector, and the data collector will then punch a card recording the transaction (Exhibit 1). The transaction card may be punched by the data collector itself or by a keypunch which is located separately from the data collector. Some systems may use punched paper tape instead of punched cards.



Some data collectors are available now which can write directly to magnetic tape. These charged transactions are accumulated during the day and are sent to the Computer Center where they will be entered into the Circulation System. When the books are returned, the book pocket cards are removed from the book and are inserted into the data collector (Exhibit 2). This creates a discharge transaction which is batched and sent to the Computer Center for processing.

In the match and edit run there are basically two activities (Exhibit 3). First, a check is made on all transactions for valid patron identification numbers. This is done by checking the transaction identification number against a user name and address file. The name and address file contains the borrower's identification number, name, and address. All erroneous ID numbers are printed on the error listing. Secondly, this run checks all transactions and performs basic editing functions. The program will check that fields from the transaction cards are correctly aligned, that codes used are valid, and that all dates are valid. Again, errors detected will appear on the error list. Transactions which appear on the error list will be corrected and reentered during the next batch processing cycle. The output of the match and edit run is a file of valid current transactions.

The current transactions are then sorted in a computer sort by call number. These sorted current transactions are then used in various computer programs which will be discussed, shortly.

The sorted current transactions file is then processed by the update circulation file run (Exhibit 4). This run will process the transactions and add them to the current circulation file, or, in the case of discharges, will remove the record from the circulation file. The output of this run is an updated circulation file and a fine file. The fine file is created by comparing the date discharged with the date due on the circulation file. Fines that were paid at the time of discharge are indicated on the discharge transaction and a record is not sent forward. The fine file is then sorted by patron identification number.

The fine print run will lead the sorted fine file and pull from the name and address file the name and address of those patrons which have fines due. The run will then print a fine notice which contains information on the material borrowed, the date due, the date discharged, and the amount of the fine. The patron's name and address will appear on the fine notice. These notices can be printed on post card stock and taken directly from the printer, separated, and mailed.

The updated circulation file is passed through the print circulation is to program which will print the books in circulation report (Exhibit 5). This report is the basic source document for the circulation system and contains the book identification number, author and title information (if available), patron identification number, date due, and various indicators. Indicators can be used to identify items overdue or items with holds.

To process overdue items the circulation file is passed through the extract overdue run (Exhibit 6). The date due for items in the circulation file is compared to today's date and those items which are overdue are passed to the overdue file. The overdue items are then sorted by user identification number.

The sorted overdue records are then passed against a name and address file to print the overdue notices. The overdue notices are printed in a similar fashion to the fine notices and are mailed to the patrons.

The sorted current transactions are input to an analysis run (Exhibit 7). This run will analyze the transactions and print a daily analysis report. There are various types of reports that are possible with the information available on the transaction file. Some samples would be: An analysis of charge transactions by call number class, an analysis of transactions summarized by the hour of the day, an analysis of the books discharged by length of time in circulation, etc. The summary file may be written during this run which would compress the transactions into broader categories and retain them for detailed analysis weekly, monthly, or quarterly.

To process holds in the circulation system the request for hold is keypunched (Exhibit 8). The hold request transaction will contain the patron identification number, the identification number of the book, and the date the hold was placed. The hold transactions are then sorted by call number. to light to the light has been a started to be seen a great factor of

The new hold requests are then added to the hold master file which contains the records of all outstanding holds in the system. This updated hold file is then compared against the daily transaction list and those items discharged which match a hold record are printed out on the holds returned report. From this report notices can be sent to the patron notifying him that the material is available.

Cost Estimate for a Typical System: 

#### 1. Conversion (non-recurring)

Prepare book cards for all present books 60 characters per title times 100,000

volumes of six million characters.

Conversion at 70¢ per thousand characters \$	4200.00
Book cards and master book cards:	200.00
Slip cards in books:	1000.00
Glue pockets into books:	800.00
Book pockets, \$6.05 per thousand	480.00
alog the despending were a server like the literature of \$	6680.00
Balance to the graph commence that are a first the affiliation	$(x_{n+1}, 1)^{n+1} \ldots (x_{n+1}, 2)^{n+1} \leq 2n$





2.	System design and testing (non-recurring) Programmer one half time for three months Programmer full time for three months Machine time for testing and debugging		\$	1000.00 2000.00 300.00
	TOT	'AL	· \$	3300.00
3.	System Maintenance (annual) Prepare book cards for 36,000 new volumes per year broken down into the items as follo			
	<del>-</del> •		\$	1500.00
	Cards:		•	35.00
	Forms:			200.00
	Machine rental broken down in the following Annual cost	iten	ıs:	
	Data Collection system:		\$ -	6000.00
	Computer at 30 hours per month			
	at \$30 per hour:			10,800.00
	TOT	AL	\$	18,525.00

#### INNOVATION AND TECHNOLOGY

Most automated circulation systems in use today essentially ignore the tremendous advances in computer technology. As you can see from the circulation system that we previously discussed, the systems perform the same activities that are being done in a manual system. When a book is checked out, a record is added to the circulation system; when a book is discharged, a record is deleted from the file, if a book is overdue, a message is sent to the user, etc. What you have is a very sophisticated computer system replicating an archaic manual system.

Libraries should not make the same mistake as the railroad industry. Railroads felt that their business was "trains" - not "transportation". The recent bankruptcy of Penn Central Railroad should point out the fallacy of this reasoning. The real business of libraries is "information" - not "books".

One example of an innovative computer system, is the Ohio College Library Center (OCLC). The OCLC has a membership of 57 colleges and institutions in the state of Ohio. This project is headed by Fred Kilgour, a noted authority in the field of library automation. The OCLC is planning a total library system tied together by a communications network which will encompass acquisitions, cataloging, circulation, serials control, and information retrieval. Although this sounds like pretty blue sky activity, the initial on-line shared cataloging segment is planned for implementation in July, 1971. A cataloger anywhere in the state of Ohio can

sit down at a CRT terminal and request a book by author and title or LC Card Number. If the book has been cataloged by the Library of Congress or by any member in the OCLC system, that cataloging will be displayed on the screen. The cataloger need only make local changes to the cataloging record by using a keyboard. This information will be transported back to the central computer, the changes will be made, and a complete set of catalog cards will be produced and mailed back to the catalogical library. Local holdings information will be added to the master file and eventually the entire catalog for the state of Ohio will be available for inquiry to any member.

The Ohio State University remote catalog access and circulation system provides another example of the innovative use of computer technology. The OSU library system contains 2.4 million volumes, 700,000 separate titles, 26 department libraries, and 60 separate collections. One large Main Library contains approximately 56% of the titles.

To check out a book in this system, the user will pick up a telephone and call a telephone operator stationed in the Main Library. The telephone operator, seated at a CRT terminal, will enter the author and title of the material requested by use of a shortened key. The key is composed of the first four letters of the author's last name and the first five letters of the first significant word of the title. Items matching this key will be displayed on the CRT screen; the operator will translate this information to the user. If the user requests the material, the operator will enter the user's identification number and the book will be charged to the user at that time. The computer will then send a message to the holding library where the book is located which will print on a typewriter terminal. The holding library will then page the book and place it on the hold shelf. We are studying an additional service for the user which would include delivery. With this system we have provided known-item access to the catalog for anyone who can use a telephone.

For local check outs, the call number of the book and the patron identification number are entered on a typewriter terminal and the book is checked out at that time. The system uses an IBM \$360/50 with 512,000 byte core memory, a 2314 disk storage unit for the master file, ten 2260 CRT terminals, and thirty-three typewriter terminals.

QUESTIONS AND ANSWERS: Discussion

Did you convert a MARC II record?

The state of the state of

No, what we converted was a short record containing only that information needed for circulation purposes. As we add additional segments to the system, we can expand the record size. All records are variable length and contain a record directory. We do have a field which contains the Library of Congress card number which we

may use at a later date to pull a full catalog record from the Library of Congress files when they become available.

- Will we have as many problems as you encountered?

  Some of the problems at O. S. U. are unique to high volume situations.

  For example, on our file conversion we had to proofread 63 million characters of information.
- What about users who read books it the library?

  Any books that leave the stacks without being checked out exist outside the computer system. You will have less problems with the system if you tighten up the control of the book stacks and make sure that all items that leave the stacks are checked out.
- How do you get fines off the file?

  When the fine is paid you create a transaction which wipes the fine record off the file.
- How can you tell if a book has a hold on it at the time of discharge?

  The hold master file could be printed daily and kept at the discharge desk. Perhaps, a copy of the circulation file, indicating items in circulation with holds, could be kept at the discharge desk.
- In the OCLC system, once a record was cataloged, when does it become available?

Instantly.

- What about local changes to the OCLC record?

  These changes are kept on a local record and will be part of each institutions file. Local changes can then be displayed upon request.
- In the O. S. U. system how are books kept on the hold shelf?

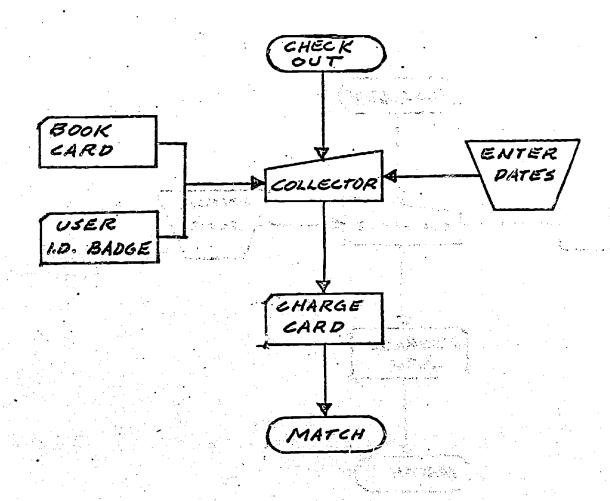
  Books are placed on the hold shelf in the user identification number sequence. To pick up the material the user must present his ID card to the check out clerk and thereby, provides a measure of security.
- In the O. S. U. system what happens if you get more telephone inquiries than you have telephone operators?

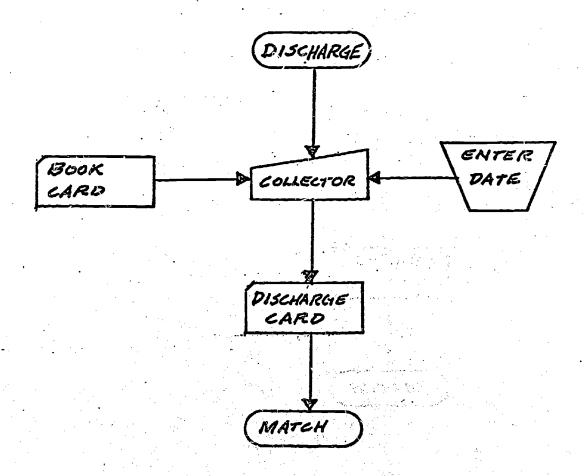
The telephone center has a recorded message which will instruct the user to call back again or call back at a less busy time of the day.

Why didn't you use book pocket cards?

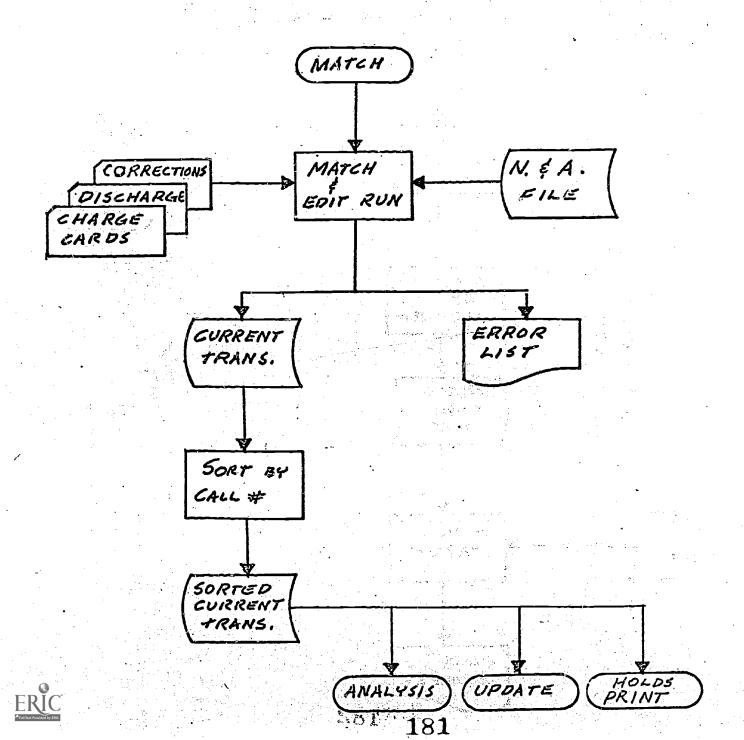
We did a quick study and found that we didn't have enough shelf space to add 2.4 million book pocket cards and book pockets to the collection. This is a good example of our high volume problem. Experience in the BELREL system has shown that there is no appreciable difference in time between keying the information for a charge transaction and entering the same information into a data collector.











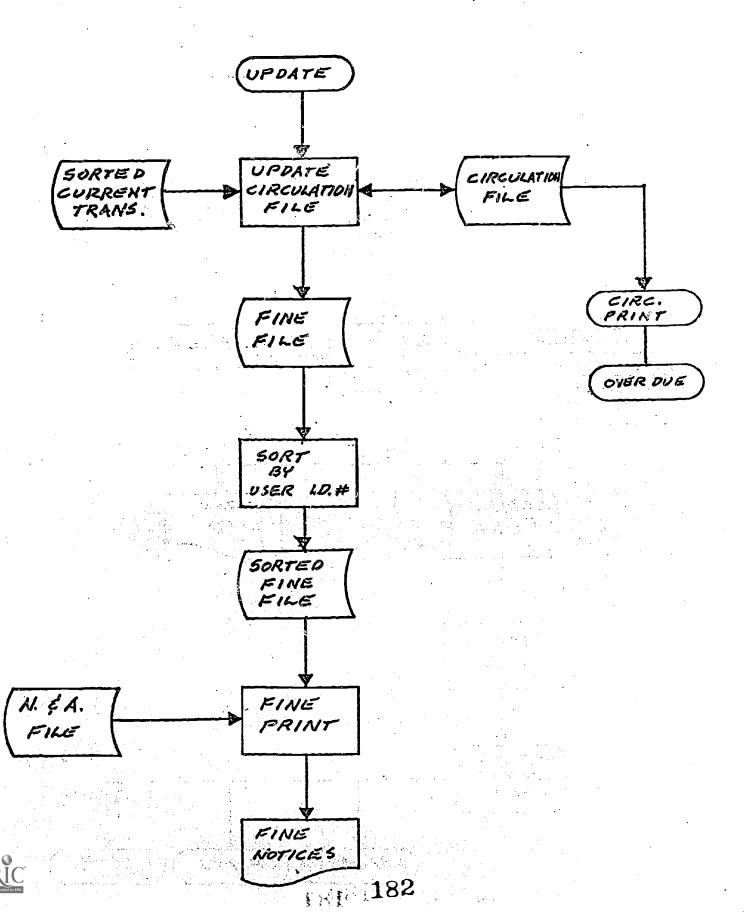
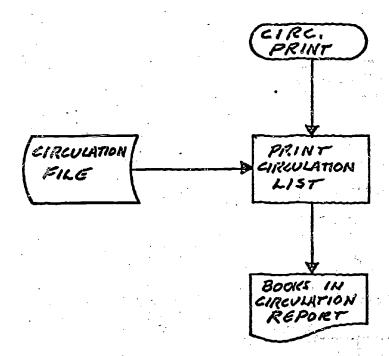
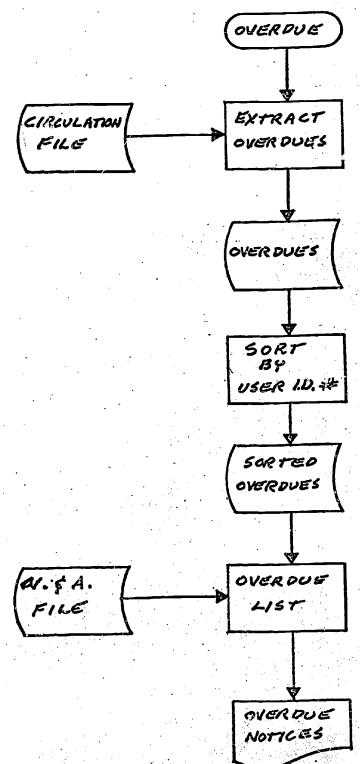
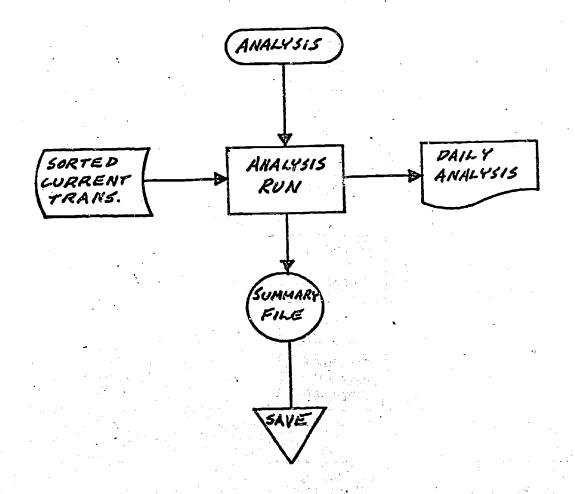
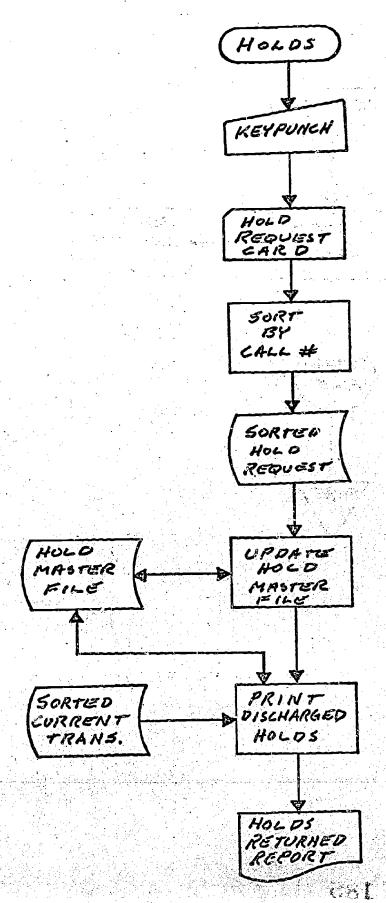


EXHIBIT 5.









ERIC

02-15-70 WSU LIBRARY WICHITA, KANSAS 67208 THE FOLLOWING ITEM WILL BE HELD AT THE CIRCULATION DESK FOR FIVE DAYS FROM THE ABOVE DATE 289449376 CALL NO. AMBLER ME L133M45GC288 AUTHOR. 1415 LANE AVE BROWN WILLIAM TITLE. CCLUMBUS, GA. THE LOVE OF LIFE

HCLD

SAMPLE HOLD NOTICE
PREPARED BY STUDENT
DURING LIBRARY AUTOMATION
INSTITUTE WORK SESSION

WILLIAMS LIBRARY BELMONT COLLEGE NASHVILLE, TENNESSEE

# PLEASE RETURN OVERDUE LIBRARY ITEM

CALL-NO: L133M45G0041

AUTHOR: CONFERENCE OF M

CALL-NO: L133M45G0041

HOLDINGS:

DATE DUE: 011970

FINES ARE COMPUTED FROM DATE DUE

REGULAR CIRCULATION 10 CENTS PER DAY

OVER-NIGHT CIRCULATION 50 CENTS PER DAY

SAMPLE OVEROUE MOTICE
PREPARED BY STUDENT
DURING LIBRARY AUTOMATION
INSTITUTE WORK SESSION

ERIC

ELEVENTH DAY, June 25



AUTOMATING SERIALS

By.

SAM A. DYSON



### AUTOMATING SERIALS

#### SAM A. DYSON

This morning we are going to consider serials automation. I don't know how the other members of the faculty feel, but I feel like serials lend themselves least to automation, primarily because there are so many variables. I would like to give you a brief background first of all of Louisiana Tech's experience in automation techniques, and, of course, the primary presentation will be on our serials project.

I think fundamental to the background of our consideration has been the planning in the last 2 1/2 years of the new addition to the library. You have been told something about it since you have been here. We will have a nine-story addition to our present structure, which means that in cataloging and materials organization we were faced with the terrible prospect of having multiple card catalogs. So we began to think in terms of computer output, book catalogs, and computer lists, rather than a separate card catalog on each floor. With that kind of horror facing us, we began to cast around and look for possibilities of using computers to help us with our problems.

We had already been given assurance by the computer center and by our computer advisory board on the campus that library procedures would receive high priority. I had done my homework and told them that if we ever went to a computer and were depending upon it, we <u>had</u> to have the time, whether it was two o'clock in the morning or twelve noon; otherwise, we could not go into any of these automated programs.

We have several programs in progress, but we have none that are operating. We began very timidly. Several years ago, we tried to eliminate a bottleneck in overdue notices at the end of the quarter. On an experimental basis, we keypunched all the student campus addresses in machine readable cards and used that file for sending overdue notices. It was very successful. We discontinued that then, in order to do some planning on the new building so that this program would be possible when the thing was built.

We now have a shelf list project going. Our shelf list has been relectively coded, and computing center personnel are presently punching cards. I have thirty-five boxes of computer cards in my office as back up in case somebody blows my tapes. I'm going to keep those cards until they finish the punching. project. And then we'll use tape back-up instead of card back-up. That project is about two-thirds finished as far as keypunching is concerned.

بالسرامية فالمستخلفي أنها المستعرف



You might be interested to know how we coded that. We had fourteen of our full-time personnel agree to spend the first hour they were on duty in the morning coding code sheets using the shelf list as a source document. Of course, I had already outlined to them the format of a card and the format of a coding sheet. We got fourteen man hours of coding done every day, and no one really suffered for it. They all learned a great deal about accuracy, and about writing legibly. There still remains a chore that nobody enjoys -- correcting the mistakes. I've pretty well taken this job upon myself at this point, but I may get some help later on. That is going to be a real formidable task, but I have two years to do it.

We are also currently cooperating with twelve other institutions in the state in a Library of Congress card number Union List project. Each participating library submits to the University of Southwestern Louisiana their LC card numbers from the books they have recently acquired. We are punching the card number and our library code into cards and sending them to U.S.L. Others are just sending process slips containing the card numbers after their catalog departments finish with them. We are cooperating in this for several reasons:

Because of a previous federally funded project of the State Library, our State Library resources have been surveyed by the Humphrey brothers of New York. They made certain recommendations concerning systems of libraries in the state. As we studied their recommendations, we realized that in order to be most efficient, we were going to have to find out what everybody else in The academic librarians, having felt this need many times bethe state had. fore, and having a new librarian in the state (Bill McGrath, USL, who fathered this brain-child), began to search for an economical way to have a union list of materials held in the academic libraries. We are using LC card numbers to produce that list. We also wanted to ascertain whether or not there was much duplication or multiplication of titles among our various libraries in the state. The project has now been going since last January, I believe. We have been contributing monthly (others have been contributing weekly) to this store of LC card numbers. Bill McGrath and his people down at USL have written programs to analyze these things statistically and the figures thus far are showing that there is less than 10% duplication in all our libraries, which came as quite a shock. We thought that when LSU-Shreveport began they would be duplicating everybody's collection. Thus far, this has not been the case. This project has several limitations: (1) It does not include our retrospective collection -- only current acquisitions. (2) It is also limited to LC printed cards, so all the material we do from "scratch" is not in the list. That is a vast area that the program does not include. If we ever get to book numbers maybe we can include those, too.

The statistics produced have been extremely interesting. There is very little duplication, and when you have more than three copies of a title in the state it is a very rare occasion. And these statistics, as I remember, include very close to 30,000 titles. Less than 10% are duplicated titles.



Now the most recent project we undertook is the serials project. I will be quick to admit that we did not do it like I told you the other day we were supposed to do it. We were backed into a crack if you will accept that expression. Right at the time I was finishing and having final approval on the budget for this institute, a faculty member whom I had secured for the serials group phoned me and said there was absolutely no way he could get here. He had been transferred out of the library into the computer center and had a whole line of new duties, and he just couldn't make it. Consequently, I lost my funds for support of that faculty member. I had to have names saying they would be with us to get the money. So, being the director, as many of you know the "buck" stopped on me.

I had already had Roland Gatlin pour some machine language, SPS and FORTRAN down me, and so I decided that I had better look at a language, COBOL or PL/1, more compatible to bibliographic data. I took some courses here in PL/1 and COBOL from our Colleges of Business and Engineering. I got a little insight into what I was faced with. Then when the faculty, over a conference telephone call and also by virtue of the questionnaires they filled out, indicated that COBOL was the most common language used, we decided upon COBOL for the institute. So I began to really concentrate on COBOL. I went to our serials librarian and told her what was going to happen.

I have done this in very simple steps. I highly recommend this type of process to you for doing any automation in your library. Just take one bite at a time to chew on and when you can handle it, go to the next step. This has been so far a very successful method. Nothing I have done defies the compatibility rule. In other words, everything I have done is in harmony with the total system I envision for Prescott Library.

I really thought we would do circulation first, since everybody else does, but when circumstances dictated, we switched. That is why we went through the drill of coding the shelf list - this was preliminary to our circulation program. But we are continuing that coding and keypunching job. We have gone off on that serials tangent, and we hope that it will fit together somewhere along the way.

From what we call our master holdings file, again which was recently renovated pursuant to yet another project we are working on, which may or may not have computer applications, we selected at random ten titles from each of nineteen letters of the alphabet. We keypunched all the information we wanted on our serials holdings file and built a data base for the testing and debuggins of our programs.

In order that you may have a clear picture, and I have told some of our serials group this, our first step after flowcharting the procedure was actually to sit down at the master files in the library and code coding sheets



in a predetermined format. After we coded the coding sheets, we punched cards, based upon our coding, on the 029 keypunch. That gave us a machine readable data base, and that data base has been used to build a holdings file. Now with this serials holdings file, as we call it, constructed, we have proceeded and built several different kinds of programs. We will go into those in just a few minutes.

I have in this sort of homemade volume a print-out of all our serials programs to date. I will go through each of these and tell you what each one does and then if you have any questions, don't be bashful. If I can't answer them, I will just say, "I don't know!".

Our first program is what we called SERIALSA because it was the beginning program. This was our first effect toward automating the library serials records. This is the program that builds the holdings file from cards and puts it out on tape. Its purpose was to build a master file with test data, and, of course, it will eventually become the master holdings file. Right now, all it contains is test data - 192 titles which were input in sets of seven cards and the output is 192 records, each 452 characters long. So I had the problem of reading seven separate cards which would contain the data for one single record. This wasn't such a bad problem, but it caused quite a bit of writing. I think the program had 153 punched card statements. Now with our holdings file on the cape record, we have the following fields:

- (1) We have a sequence number. This is to facilitate alphabetic arrangement by title. Instead of trying to alphabetize a 124 character field, I simply put that six-digit number in order and my titles are automatically in alphabetic order. It is a lot better than trying to put a field of 124 characters in alphabetic order. So the first thing in that record is a sequence number.
  - (2) The second thing is the first part of a title field which is 62 gits.
  - (3) Then there is a Dewey classification umber.
  - (4) Next there is the second part of the title which is 62 digits.
- (5) There is an author number which, for the sake of library science, we call the second line of the call number. It really is not an author number with serials. The machine doesn't know that so I don't tell it any different.
- (6) Following that I have a 124 character holdings field. Obviously, I can't get all our detailed holdings statements in 124 characters. It just can't be done. So, in this list I have abbreviated to some extent a holdings statement. In other words, if we have Volume 1 through 10, 1942 to 1952 complete, I put there "Volume 1-10, 1942 to 1952 complete". If volume 11-13 are incomplete, I put the statement "Volume 11-13, 1953 to 1955, Incomplete". In 1954 if our holdings are complete to the present time, I wrote "Volume 14, 1954 to date". In some respects this will not indicate which individual issues are missing, like our serials record does in the serials department. Maybe someday I might expand this record to take all this. At this time I don't feel a need to handle it that detailed.



- (7) Then I have each journal coded with up to four subjects. The first subject is determined by the College which pays for it. The first question they ask is, "How many journals do we take in our College?" Then we can give them a list. The second subject is what I call the "primary" subject of the journal which may harmonize with the College that is taking it. Now in all institutions, journals have more than one area of interest. For example, in Arts and Sciences, we have a lot of journals which are useful to engineering students. These are journals that would be interesting to engineering students or teachers. So that second field is set aside for what I would call the primary subject of the journal. The third and fourth subjects are of secondary and tertiary interest. This is especially important in the journals in the College of Business. They are interested in many things and some of the journals they like are over in the Humanities. So, in those two subject fields, I try to isolate possible areas of interest. So again we are limited to four subject areas. We are using words to describe subjects of journals. You could use codes and convert them to words, but we are using words in the records.
- (8) Now the next fields are floor location. You have a high-rise complex here and I anticipated some of our moves. I've actually got 5th floor, 7th floor, and 9th floor written in the records. We can't use that now, but we will by the time this is implemented.
- (9) Then I have a source of acquisition, that is, where we get the journal. That is coded with four digits. I indicate in that code whether the journal is domestic or fereign, direct or jobber, and two digits for the initials of the jobber, dealer or publisher. So that is coded. In one of the programs I convert those codes to names and addresses.
- (10) Then I have subscription status; whether it's ceased, dropped, or current. If it is "ceased", the magazine has ceased to exist. If it's dropped, we once took it but no longer take it. Once we've started taking a journal-- (barring a financial crisis in Baton Rouge)--we won't stop taking it. If it's current, that means we still take it.
- (11) The primary language of the journal is ind ed next. This isn't too important to us right now, but with the advent of all these Ph.D. programs we will need this code later. We do have 100 or so foreign language journals now. The primary language of the journal is noted.
- (12) The physical form of the journal is coded next, whether it is in Braille or microprint. It is a simple thing to write a program to convert these codes to the full written out word, like "braille", "microcard", etc.
- (13) Then we have noted frequency received: monthly, daily, annually irregular, etc. This is a good spot to mention the fact that what we're trying to do here is to take care of the majority of the cases. We're not trying to write programs that will take re of every little exception. If you want to kill yourself, you can try that. The trying to take care of 85 per cent of our serials acquisitions. We feel if we can reach that point of automation, we have done pretty well. There is still going to be 15 per cent of the titles which will remain as manual programs, and there is no way around it.



- (14) Then I have an expiration date written in here, and I think you can understand why we do that. We can take soon to-expire titles and have them renewed before they run out.
- (15) The fund that pays for the journal is divided by college, sometimes even by school within the college.
  - (16) And the subscription cost.

There are other things that we will add to the record later. We will add a binding schedule -- so we'll know when to collect the material for binding. Our binding program is running very well right now. We have a monthly schedule (when we have money), and we send them out regularly. Every month we send a group of periodicals to be bound, and every two weeks we send books that are worn out to be bound. So that is the holdings record that we have built on a tape file.

Question: Have you considered converting all your journals to a common expiration date?

Answer: We have considered it, begged for it, and plead for it, and thus far have been unsuccessful. However, we have quite a number of our titles now expiring on December 30.

Question: Is this because of state regulations?

Answer: No, it is because we can't get much cooperation out of the jobber. We use Moore-Cottrell, and Stechert-Hafner. But we are gradually getting them on a uniform expiration schedule.

Our second program was called SERIALSB. There were two reasons for building this program:

- (1) Outside of a tape dump, I could not ascertain whether or not we got our information off cards and on to tape. I have a deep rooted faith, but not that deep rooted, and so I wrote another program that would read the tape and print it on the printer. Very simple.
- (2) But, there is a reason for doing that on a regular schedule. You want to put out a printed list of your journals, alphabetically by title. We are going to put one of these bound volumes on each floor of the new building. One listed alphabetically by title, one listed by location, and one listed by subject. Each floor will have a separate listing of everything that is in the holdings file. The second program was built primarily to print out what we had on the holdings tape and print it out in a logical order. There are 100 places between each sequence number where we can put new titles in alphabetical order.

Here is an example of how the list is read. The title is <u>Nation</u>, Vol. 14, 1872, incomplete, Vol. 16, 1873 to present. It's bought with general periodical funds; it's primarily political science. It will be located on the first floor; it is a domestic publication; it's bought from a jobber, Moore-Cottrell; it is current; it is English; paper form, weekly; it expires on January 1, 1971. General budget pays for it, \$20.00.



Now, the student is not going to need all that information. So we may, at a later date, pick out the portion of the record necessary to the patron if our volume gets too big. For example, we will just print out the sequence number, title, and the holdings, and maybe the subject headings, and leave all the rest of it off. For the time being we take about 1,970 titles, and it didn't present too big a problem.

Question: Did you consider the Union List of Serials as title authority for listings?

Answer: No. Since the student is going to use this list, we took our titles directly from our visible file. We have a visible file on each floor now, and the students use them all the time. On second thought, our serials librarian in building the visible file from which we took this probably used the Union List be her title authority.

The next program that we did was one that I think is going to be one of the first ones needed, and that was a program to sort these in subject arrangement. So again, using the same holdings file tape, (it is in the computing center labeled "DYSON1",, we pull selected information from it, sort it, and print it out in alphabetical order by subject. The information we take off that master tape is subject, sequence number, location, and full call number. It is read from the tape, put on a disc, sorted, run off on to another tape, and printed from that second tape. The operat looks like this: first, the subject, title of magazine, sequence number, location, call number. So you don't have to use all your information on your record. (452 characters). You can just pull off 133 of those characters and print what you need.

The next program in sequence that we did was to sort by location. I wanted a list on each floor which contains all the journals housed on that floor, plus the journals housed on other floors. Again, we selected information off the holdings file tape. I really didn't think about this until the print-cut came, but I wasn't through anyway, so I didn't worry about it; the floor location is in alphabetic order, so it doesn't necessarily mean you are going to read from the first floor to the ninth in sequence. You're going to read alphabetically as the floor numbers are spelled cut. What I'm going to do is write a few more statements in there, and every time we get to a different floor, I'm going to skip to the top of the next page. We'll have a separate volume for each floor.

Anytime you're considering a file like this, there is always the problem of how you get new information. Serials are notorious for changing titles. They change particles, format, everything. In serials more than anything else, you are going to have to have an update program. In my original file, I left out a lot of information. Also, I left out three author numbers. So, I have written a program that will insert any one of the items in that list. There are nineteen fields in this record, and it will pick out any one of those fields and

put new information in it. I went back and checked the spots where I had put in the information and it put it exactly where I wanted it. Of course, this was a thrill to me, not being an old time programmer.

There is one nice thing about these tape dumps here, on our configuration, it counts the record for you and tells you what the length of it is. If one is too long or too short, it sticks out like a sore thumb.

In conjunction with the receipt of periodicals, we were thinking about producing anticipated receipt cards. We'll say weekly, using our master file, keying off of frequency, we will produce cards which represent journals that need to come in this next week. Everytime a journal comes in, the card for it will be put inside the journal. We'll be able to use those cards later on in another program in an SDI context; that is, to disseminate information to interested faculty, according to a faculty profile sheet. But, for the time being, we're using them strictly for anticipated receipt cards and for claim letters. Every card that is left over at the end of the week represents a magazine issue that has not arrived. We take those same cards and they become part of a basic record to produce a claim letter to the jobber, dealer, or publisher and tell them we didn't receive that issue. In order to do this business of sending claim letters to jobbers, we had to build and keypunch a program which holds the addresses of jobbers and publishers with which we do business. Everyone of the codes we have put in (last two digits on our acquisition source field) had to be filed in a list that contains the full name and address of the firm. So, this is what we did.

We built in this program an address file of vendors that we use in our serials department. It has the added feature, which is necessary when you are building sequential files, that if you run into a code that is not covered in your address file, you'll have to do something with it or your program will blow. So, it has the feature of display. If you run into a code that is not included in your code list, it will print out the code and the sequence number of the title, so that you can pinpoint exactly which journal caused the malfunction. It gives the machine something to do besides blow up in your face. This came off the console typewriter—DDGI, which means domestic, direct, gift. Of course, in my address file, there was no record of DDGI, so it says, "no record found", and went on to the next card. Then there was FJSH—foreign, jobber, Stechert-Hafner—somehow I left that out of the address file, too.

The address letters themselves can be output in many, many ways. There are as many different ways as there are people in this room, I guess. You can have a pre-printed message on a postcard, and you can put in just the name and address and the issue that you are claiming. You can put these on data mailers, which are expensive. For the sake of our experiment, I wrote the whole message on the output sheet

Prescott Library Louisiana Tech University Ruston, Louisiana 71270

I didn't put the date--no problem. "The latest issue of the following title has not at this writing been received by this library. Please check your records and send us a copy by return mail." That message could be anything.

Title is VIROLOGY, expected receipt date, June 1, 1970. You probably would give it about a month to come in late. Then the agency is addressed. This will fit on an IBM card, or you can make it fit on a postcard, 8 1/2" x 11" paper, etc. If we were to adopt some form like that, we would probably have a pre-printed message.

This is the point at which I quit. I think the most important part of this presentation is that you can, hopefully, see how we went one simple step at a time. We have actually done nothing more than build and manipulate information from a single, data tape. All this is manipulated information off a single tape. Everything we've done so far is compatible with the systems we have dreamed of for the future in our library.

Are there any questions?

Alright, you have in your packets this monster (68 pages of stuff). This goes into more detail about what I have just told you. I have not proofed it. Also, you'll find in there the actual programs. Don't try to keypunch these without some debugging. Every program I've written for serials is in here.

Answer: Time wise I would imagine it is faster to do it by anticipated receipt cards. Because you've got on your visible file at the present, and you're not going to enter anything on the present file until something isn't there. So, it will be nothing more than taking this anticipated receipt card file alphabetically and pulling the title and sticking it in the magazine and sending it on. I can't give you any cost figures on this at this time because it is run only on an experimental basis. We have presently a binding schedule for journals. What we're going to do is code that schedule in this master record. We have plenty of extra space in our holdings file for coding in a binding schedule. We do this monthly, so it will probably take the form of a two-digit numeric number in the form of 01 for January, 02 for February, etc. We'll ask the computing center to print out a list of titles to be bound in January.

No, I say it is going to do away with that readex file. The only time you make an entry is when the magazine does not come, and that won't be until after you have given up. That card keeps showing up in the anticipated receipt cards. Give yourself room for expanding the files.

Let's take a coffee break.



TWELFTH DAY, June 26

(Note: Activities not available for publication)

THIRTEENTH DAY, June 27

(Note: Critique not available for publication)

APPENDICES

# LIST OF PARTICIPANTS

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## APPENDIX B

# CLASS SCHEDULE

G 1 T 14 107	
Sunday, June 14, 1976	·
8:00 - 12:00 1:00 - 5:00	Arrival and assignment of living quarters (Kidd Hall)
<del>-</del> ·	Thereing minds got aggreinted
6:00 p.m.	Evening meal; get acquainted
Monday, June 15	(Note: All class meetings will be held in Rm. 302 Keeny
initially, o dance in	unless otherwise informed)
9:00 - 12:00	
	fneory, terminology and tour of Computing Center
	with hardware description and capability
12:00 - 1:00	
1:00 - 5:00	
	System analysis and preparation of flow charts
Tuesday, June 16	3.6 D 3.3.63.43.
8:00 - 12:00	
12.00 1.00	Programming Language
12:00 ~ 1:00	
1:00 - 5:00	Programming Language Communed
Wednesday, June 17	
8:00 - 12:00	Mr. Gatlin
• • • • • • • • • • • • • • • • • • • •	Programming Language continued
12:00 - 1:00	<del>-</del>
1:00 - 5:00	
	·
Thursday, June 18	
8:00 - 12:00	
	Programming Language continued
12:00 - 1:00	
1:00 - 5:00	Programming Language
Friday, June 19	But Govern Buchlance (Ben 201 Koony Hall)
8:00 - 12:00	Faculty, Group Problems (Rm. 301 Keeny Hall)
	Cataloging Problem: Mr. John Kennedy (#20) Circulation Problem: Mr. Gerry Guthrie (Rm 302)
	Acquisitions Problem: Mr. Gerry Guthrie (Km 302)  Acquisitions Problem: Mr. Bruce Alper (#23)
	Serials Problem: Mr. Sam Dyson (#24)
13.00 1.00	
12:00 - 1:00 1:00 - 5:00	
1:00 - 5:00	racutty, Group Frontense



Saturday, June 20 Faculty, Group Problems 8:00 - 12:00 Lunch 12:00 - 1:00 Lake D'Arbonne recreation 1:00 - 'til Tech Forestry Camp #2 Sunday, June 21 Recess Monday, June 22 Dr. William Axford 8:00 - 12:00 Automating Library Budgets Lunch 12:00 - 1:00 1:00 -5:00 Mr. Alper Automating Library Acquisitions Tuesday, June 23 Mr. Kennedy 8:00 - 12:00 Automating Library Cataloging Lunch 12:00 - 1:00 5:00 Faculty, Group Problems Wednesday, June 24 Mr. Guthrie 8:00 - 12:00 Automating Circulation Lunch 12:00 -1:00 Faculty, Group Problems 1:00 - 5:00 Thursday, June 25 8:00 - 10:00 Mr. Dyson Automating Serials Faculty, Group Problems 10:00 - 12:00 Lunch 12:00 - 1:00 Faculty, Complete Group Problems 1:00 - 5:00 Friday, June 26 Mr. McKee and Computer Industry Representatives 8:00 - 12:00Lunch 12:00 - 1:00 Mr. Alper and Mr. Kennedy, Computer Output Microfilmers 1:00 -3:00 Mr. McKee, continued 3:00 -5:00 Evaluation by participants 7:00 -9:00 Saturday, June 27 Mr. Dyson 8:00 - 12:00 Critique of Institute by Faculty Lunch 12:00 -1:00 Departure of participants 1:00



### APPENDIX C

### AGENDA FACULTY SESSIONS

- I. Thursday, June 11, 1:00 p.m., Room 302 Keeny Hall
  - A. Introductions
    Travel expense statements submitted here
  - B. Packets
  - C. Tour
    - 1. Of Classrooms
    - 2. Of Computing Center McKee
- II. Friday, June 12, 9:00 a.m., Room 302 Keeny Hall
  - A. Class Schedule
  - B. Formal Presentations
  - C. Informal Schedule

Noon Meal

- D. Parameters for group problems
- III. Saturday, June 13, 10:00 a.m., Tech Forestry Camp #2
  - A. System Control McKee
  - B. Syllabus
  - C. Proceedings
    - D. Evaluation Questionnaire

#### APPENDIX D

### LOUISIANA TECH COMPUTING CENTER

March 16, 1970

PROCEDURE FOR PROCESSING PROGRAMS ON THE LA. TECH IBM 360

I. GENERAL CLOSED SHOP PROCEDURE FOR PROCESSING INSTRUCTIONAL AND RESEARCH PROGRAMS.

All coding sheets that are to be keypunched by Computing Center keypunch operators will be processed through the dispatching system. That is, a coding sheet to be keypunched is left at the dispatching window and picked up from the dispatching window in room KH 106.

A program ready for computer run will be presented at the dispatching window in room KH 106. Such a program must be complete with all control cards and data necessary for processing by the 360 computer. Under normal conditions the first card of an input deck will be the JOB card. The JOB card must contain the job name, department number, project number, the user's name, and the computer time required by the program in minutes (see Dispatching Station Physical Description for exact format). This information is stored by the computer and used at the end of the month to prepare the Computing Center Users Accounting System reports. If special instructions are necessary for the processing of a program, such as mounting special tapes, disks, forms, etc., use one of the old Utilization Record cards that are available on the table by the dispatching window to point out these special instructions and place it first in the input deck.

The machine operator will process programs on a first-in first-out basis. One exception to this procedure will be that long execution time (in excess of 30 minutes) programs will generally be processed during the closed shop run at 5:00 p.m.

Programs will be processed during the normal work day by the machine operator during times that he is not busy with administrative runs. All programs that do not get processed during this time will be processed in an "after hours" closed shop run. This closed shop shift will be from 5:00 p.m. to 8:30 p.m. Programs still remaining to be processed at the end of this operator attended shift will be batched into the system and the program decks and associated output distributed at 7:15 a.m. the next morning. Between terms and during vacation periods the "after hours" closed shop run will not be scheduled.



Any person who feels it necessary to be present in the machine room at the time his program is processed (to add or remove data cards, etc. -- not to correct errors in logic, coding, data, etc.) must submit his program to be processed during the "after hours" closed shop run. The shift operator will have the authority to judge the legitimacy of this need. In order to maintain operating efficiency it will be necessary to keep machine room congestion to a minimum. This is to be accomplished by limiting access to the machine room to Computing Center personnel only. Any classes, laboratories, etc. that wish to use the facility as a group with the instructor should make arrangements with the Director of the Computing Center in advance.

Programs that have been processed may be picked up from the dispatching window. If corrections are necessary, they may be made in room KH 105 and the program resubmitted to be processed again using the above procedure. The honor system will be used to maintain the integrity of this Closed Shop procedure. Everyone should use the utmost caution in picking up processed program decks and output sheets to assure that only his materials and not someone elses are removed.

### II. GENERAL INFORMATION

All communication, user-center, will be via Room 102, Keeny Hall.

# A. Keypunch In

Source programs will be written on coding sheets (available at the bookstore) and left at the dispatching window in KH 106. Only material submitted on these forms will be processed. All other will be rejected. These programs will be keypunched on a first-in first-out basis.

Corrections to previously punched programs will also be written on coding sheets and submitted as though they were separate programs. No cards should be submitted for keypunch correction. The user is responsible for inserting corrected cards into a program or data deck.

All new programs should be coded including the proper control cards. The JOB card must contain, in addition to the program name the following information: (1) User's department and project number (2) User's name (3) Computer time required in minutes.

Input data will be coded on the reverse side of the coding sheets beginning with the back of the last page used for the source program.

The user's name, department number, project number, course number and problem number should be written in the upper left corner of <u>ALL</u> coding sheets used. Write "360" in large numerals at the top of each coding sheet to distinguish these programs from those to be keypunched for IBM 1620. This is important because the keypunch coding is different.



# B. Keypunch Out

After programs are keypunched, the decks will be wrapped with the coding sheet, banded, and will be available at the dispatching window in Room 106 KH. Users should check by this room frequently to avoid an accumulation of programs.

After picking up the keypunched decks, the user should compare this deck <u>carefully</u> against the coding sheet to assure himself that there are no keypunch errors before submitting the program to the computer. If keypunch errors are present, he should write the corrected statement on a coding sheet and resubmit it to keypunch.

# C. Computer In

When the user is satisfied that the program is free of keypunch errors, he may submit the deck to the computer. The program deck containing the appropriate control cards, source program, and data should be rubber banded and presented at the dispatch window according to instructions contained in the memorandum on the dispatching system. No unbanded programs will be accepted. Coding sheets and old program listings are NOT to be included with the decks.

# D. Computer Out

Upon completion of a run, the computer operator will return the program deck with a listing of the program and a listing of the output (if any) and/or any error diagnostics to the dispatching station. Again programs should be picked up promptly to avoid accumulation. Program materials left more than 72 hours will be thrown away.

# E. Program Restart

Programs that require more than 4 hours for execution should include an interrupt-restart routine in order that the program can be restarted without significant loss of execution time if it becomes necessary to interrupt its execution. Users needing assistance in including such a routine in their program can readily get this assistance from Computing Center personnel.

# SPECIAL POINTS TO REMEMBER

- 1. DO hand in all programs for closed-shop processing on coding sheets (available at the bookstore).
- 2. DO identify each coding sheet by writing name, department number, project number, course number, and problem number in the space provided at the top of the sheet used.



- 3. DO write "360" in large numerals at the top of each coding sheet.
- 4. DO clip all coding sheets for one program together.
- 5. DO eneck all cards for keypunch errors before submitting program to computer.
- 6. DO use CALL EXIT statement. (FORTRAN users only)
- 7. DO observe the following coding conventions.

CODING CONVENTIONS: The following standard coding conventions should be followed in lettering program coding sheets for Closed Shop keypunching.

Neatness is of prime importance All lettering will be in upper case

Ø - letter 0

0 - numeral 0

Z - letter Z

2 - numeral 2

I - letter I

1 - numeral 1

🗗 - blank space

distinguish (from the letters C and L distinguish G from numeral 6 distinguish H from N distinguish S from the numeral 5

8. <u>DO NOT</u> resubmit decks for keypunch corrections; submit a coding sheet containing only the statements to be re-keypunched. Write "corrections" at the top of the page.

### DISPATCHING STATION PHYSICAL DESCRIPTION

The Tech Computing Center is now using a dispatching procedure designed to effectively control and protect User's programs that are submitted for keypunching and processing on the IBM 360.

The IBM 360 Closed Shop dispatching station is located at room door number 106 Keeny Hall. A window and counter have been installed in this door for the purpose of receiving keypunching jobs and input programs and dispersing program decks and associated output. Inside the door is a cabinet with fortynine compartments for the storage of computer output by code number and trays for the storage of program decks that have been processed.



#### TIME SCHEDULE

The dispatching station will be staffed during the following times:

Monday through Friday

7:15	-	7:45 a.m	•
8:45	-	9:15 a.m	
10:15	-	10:45 a.m	
11:45	-	1:45 p. m	
2:45	-	8:30 p.m	

Saturd	lay			Sunday			
8:20	_	9:15 a.m.		2:00	-	3:00 p.m.	
10:15	_	11:45 a.m. (G.	C, R,)	5:00	=	8:00 p.m.	(G.C.R.)
2:00	-	3:00 p.m.					•
5:00	_	6:00 p.m. (G.	C.R.)			-	

NOTE: Above times are subject to change as dictated by usage.

During the time not covered by the above dispatching schedule a user, at his discretion and risk, may leave an input program in the tray on the table These programs will be put into process at the beginning of the next scheduled dispatching time and after they are processed the decks and their associated output will be placed back on the table for pickup by the user.

G.C.R. - Guaranteed computer runs at these times. Other week-end times are listed for dispatching activities and, if volume dictates, computer runs.

### PROCEDURE FOR USE

- 1. Prepare jobs in usual manner with all necessary job control cards.
- // JOB card must contain the JOB name, the USER'S Department Number, the USER'S Project Number, the USER'S Name, and the total time required by the program in minutes in the following format:

- The job name may consist of eight characters or less.
- b) The user name may contain any character between the quotation marks except another quote. The length of the user name cannot exceed 20 characters including spaces.



c) The mmm in TIME=mmm is the estimated time in minutes the program will run. The time estimate must include compilation time.

It is important that the estimated time in minutes have no leading blanks and that the time estimate be as accurate as possible. A time estimate that is too small will cause the program execution to terminate before completion (when the time estimate is exceeded by 15 seconds the job is terminated) whereas an estimate that is too large will cause the program to receive a lower run priority and lengthen the turn-around time for its execution (longer programs are run after the shorter programs have been processed).

- 3. Only if special instructions (such as mounting tapes, special disks, output in excess of 1500 lines of print, etc.) are necessary for the processing of a program will it be necessary to fill in the Special Instructions section of the yellow Utilization Record card found on the table by the dispatching window.
- 4. Present the input program deck to the dispatcher at the window.
- 5. The dispatcher will give the user a Receipt Card containing a four-digit number and put a // NUMBER card containing the same four-digit number on the front of the user's input program deck.
- 6. When the user returns to pick up his program deck and computer output he must present his RECEIPT CARD in order to receive his work.

Any suggestions for the improvement of this procedure will be appreciated.

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# APPENDIX E

# EVALUATION

Please give us the benefit of your honest opinion on the following points. You may enter comments or not as you wish. Check the most appropriate answer.

I.		OMMODATIONS: Housing Comments:	Good 15	Fair 4	Poor 0	
	В.	Meals Comments:	19	<b>0</b>	0 .	
	c.	Classrooms Comments:	14	4 .	1	N.C.
	D.	Recreation Comments:	11	6	1	1
	E.	Computing Center Comments:	18	1	<b>o</b> \	
II.	-	CULTY  Knowledge of Material  Comments:	19	0	0	,
	в.	Formal Presentations Comments:	15	4	0	
	c.	Group Leadership Comments:	18	<b>1</b>		
	D.		19	0	Ö	
	E.	Informal Presentations Comments:	19	0	O	
III.		OGRAM General Impression		0	0	
		Where should we have sper	A Prince of Control			



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- D. Strongest part of the institute program:
- E. Weakest part of the institute program:
- F. Has the institute been worth your time, expense, and effort?

  Yes 19 No 0

  Comments:
- G. As a result of this institute, do you feel more confident about your ability to use electronic computers in your library?

  Yes 19 No 0

  Comments:
- H. Did you complete the programmed learning course prior to your arrival on campus?

  Yes 9 No 10

Comments:

- I. Was the institute program practical enough?
   Ye 17 No 2
   Comments:
- J. Based on this experience, do you feel you can proceed intelligently in introducing automation in your library?

Yes 18 No Comments:

- K. How would you rate the technicality of the program?
  - 1 Too technical
  - 18 About right
  - 0 Not technical enough

Comments:

L. Please rate the following aspects of the institute program:

		Very		of Little
		Helpful	ricipiui	Help
1.	Programmed Course	8 -	8	2
2.	Tour of Computing			
	Center	8		5
3.	Flowcharting	12	7	0
4.	Programming Language	13	5	1

Comments:

### APPENDIX E continued

L.	con	tinued	Very Helpful	Helpful	of Little Help
	5.	Group Problems	13	4	2
	6.	Automating Acquisitions	13	3	1
	7,	Automating Cataloging	. 8	8	1
	8.	Automating Circulation	9	6	2
	9.	Automating Serials	10	6	1
	10.	Industry Representative	s	4	15
	11.	Computer Output Microfilmers	7	 9	3
	12.	Informal Evenings Sessions	8	11	0 .

# 13. Special Comments:

# **FVALUATION - COMMENTS**

# I. ACCOMMODATIONS:

- A. Housing Comments:
  - (1) Beds should be made every day and clean towels provided.
  - (2) Telephone preferred.
  - (3) Very good.
  - B. Meals comments:
    - (1) Best college food ever eaten.
    - (2) Excellent.
    - (3) Excellent.
    - (4) Consistently fine.
    - (5) Some of the best institutional food that I have ever eaten.
    - (6) For the price you can't beat it.



#### APPENDIX E continued

- C. Classrooms comments:
  - (1) More room to allow faculty members to circulate unrestricted to help participants.
  - (2) A larger room would have been more acceptable.
  - (3) A little overcrowded.
- D. Recreation comments:
  - (1) Enjoyed the ice cream social.
  - (2) Good when we had time.
  - (3) Thoroughly enjoyed the day at D'Arbonne.
  - (4) Ruston is the same as always! But Forestry Camp #2 was great.
- E. Computing Center Comments:
  - (1) Very courteous personnel.
  - (2) Several of the assistants very helpful and accommodating.

### II. FACULTY:

- A. Knowledge of material comments:
  - (1) Faculty had thorough knowledge of their specialty.
  - (2) Excellent.
  - (3) Very knowledgable.
  - (4) Excellent.
- B. Formal Presentations comments:
  - (1) Good, but not a learning process.
  - (2) All presentations were not equally strong—for the most part I would rate the group "good".
  - (3) Excellent.
  - (4) Not very helpful, except programming (Gatlin).
- C. Group Leadership comments:
  - (1) Excellent.
- D. General Helpfulness comments:
  - (1) Hampered by the physical facilities; couldn't move about the room easily.
  - (2) Excellent.
  - (3) Couldn't have been better.
  - (4) Very helpful and patient.
- E. Informal Presentations comments:
  - (1) These comments were extremely valuable.
  - (2) Excellent.
  - (3) Very valuable.

#### III. PROGRAM

- A. General Impression comments:
  - (1) Institute was very helpful.
  - (2) Obviously favorable.



### APPENDIX E continued

- B. Where should we have spent More time?
  - (1) On programming.
  - (2) Rationale behind programming format.
  - (3) Writing more programs with individual help.
  - (4) Going over the basics of COBOL.
  - (5) Flowcharting.
  - (6) Group.
  - (7) Group problems.
  - (8) Elementary programming. Before I understood one concept of COBOL, we were off to another.
  - (9) On own library ideas and possibilities.
  - (10) Group work.
  - (11) Flowcharts.
  - (12) Individually working on a program.
  - (13) In formal Cobol presentations -- more leisurely explanation.
  - (14) In group sessions.
  - (15) Running more programs.
  - (16) Correlating flowchart with writing programs.
  - (17) Flowcharting and a little more on systems analysis.
  - (18) Flowcharting; individual problems.
- C. Where should we have spent less time?
  - (1) Faculty presentations on their institutions.
  - (2) I probably needed more.
  - (3) The minute details of Cobol. These could have been better handled at the small group level.
  - (4) It would have been difficult to cut any phases shorter.
  - (5) Computer tours.
  - (6) Formal presentations.
  - (7) Being entertained by RCA.
  - (8) On committee work where a greater knowledge of other areas would have been more helpful.
  - (9) Formal presentations.
  - (10) With vendors.
  - (11) It seems that we didn't have enough time all the way around, so it is hard to decide where less time should have been spent.
  - (12) No place, that I can think of.
  - (13) Walking to and from the dining hall.
  - (14) Actual programming.
- (14) Actual programming.

  D. Strongest part of the program:
  - (1) Classroom presentations by faculty.
  - (2) The faculty. (3) The demonstration of careful pre-planning and selection of faculty.
  - (4) Low student/faculty ratio; intensive and well-coordinated instruction.
  - (5) The programming section under Mr. Gatlin.



- (6) The group sessions as it helped me understand the information.
- (7) It is extremely difficult to say now but it was likely the Fla. Atlantic Acquis. Info Syst.
- (8) Cobol Language lectures.
- (9) Class sessions.
- (10) The teaching and understanding of program principles.
- (11) Strong and excellent faculty members.
- (12) The faculty. Twas the greatest gathering of minds since Thomas Jefferson dined alone.
- (13) Student programming.
- (14) Programming.
- (15) Group sections. (However, full class sessions were valuable)
- (16) The small group instruction.
- (17) Faculty.
- (18) Exposure to the jargon and possible effectiveness of computer utilization.
- (19) First three days.
- E. Weakest part of the institute program:
  - (1) Last day of institute.
  - (2) Too speedy presentation of programming language.
  - (3) The computer company's representatives presentations. They were poor.
  - (4) Observed none.
  - (5) ?
  - (6) Manufacturers' Representatives Day. By the last day of the institute, they knew less than we did.
  - (7) Too much time in committee work without knowledge transmitted generally.
  - (8) The time in which we had to achieve what we did.
  - (9) No part of the program was weak.
  - (10) Mornings of second week.
  - (11) Vendor visits.
  - (12) All day listening to the computer industry salesmen.
  - (13) The computer industry representatives.
  - (14) Amount of time allotted for the amount of material to be mastered.
  - (15) I am not sure about the length and amount of material covered. Could it have been longer and not such an intense pace. But no doubt, it would have lost some of its force, and that was good.
  - (16) The time could have been expanded to 2 1/2 weeks.
- F. Has the institute been worth your time, expense, and effort?
  - (1) The institute was well worth everything.
  - (2) Definitely!
  - (3) Worked hard, considered result beneficial.
  - (4) Yes, I would repeat the institute, if possible.
  - (5) I feel I have gained in knowledge and ability and will therefore be able to communicate with my computer center.



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- (6) I think I am just about ready for the beginning of a program.
- G. As a result of this institute, do you feel more confident about your ability to use electronic computers in your library?
  - (1) More confident, but plan to continue studying.
  - (2) Already confident.
  - (3) I feel that I can now discuss library problems with the computer center personnel as I understand their terms and language.
  - (4) I feel that now I am able to take a formal course in computer science or program language.
- H. Did you complete the programmed learning course prior to your arrival on campus? Comments:
  - (1) The books were well chosen, but I simply did not allow myself enough time to finish the second book.
  - (2) End of fiscal year business and library work load preliminary to a three-week absence made this impossible.
  - (3) A very cursory examination of the text.
  - (4) It wasn't of great help.
  - (5) Old excuse: didn't have time.
  - (6) Thoroughly.
  - (7) But merely rushed through due to busy schedule.
  - (8) The second volume was too much.
  - (9) Much too technical to complete!
- I. Was the institute program practical enough? Comments:
  - (1) As a whole it was, but there were a couple of weak spots.
  - (2) Although some concepts were covered that most of us will never have use for.
  - (3) Not quite.
  - (4) Decidedly!!
  - (5) Although I would have liked to have discussed my individual problems more with the faculty.
- J. Based on this experience, do you feel that you can proceed intelligently in introducing automation in your library? Comments:
  - (1) If I cannot, it is not the fault of those giving the Institute.
  - (2) I will still need some advice.
  - (3) With some help.
  - (4) Already done.
  - (5) I will seek advice.
  - (6) With the help of the computer personnel.
  - (7) Only after further efforts at familiarizing myself with the subject.
- K. How would you rate the technicality of the program? Comments:
  - (1) I am well pleased and surprised at the amount of general knowledge assimilated.
  - (2) More time to grasp concepts of programming.
  - (3) Not too technical for purposes of the institute, but too technical for amount of time available.



- L. Rating of different aspects of the institute program. Comments:
  - 2. Tour of Computing Center
    - (1) A more thorough explanation of the hardware would have been helpful.
    - (2) Hurried--he wanted us out of there.
  - 3. Flowcharting
    - (1) Decision table construction lacking. They are helpful.
  - 5. Group Problems
    - (1) Our problems should have been more clearly designed.
    - (2) More time needed.
  - 6. Automating Acquisitions
    - (1) Hit the nail on the head, very useful.
  - 10. Industry Representatives
    - (1) Industry representatives presentations were of use in the sense that they gave us an opportunity to make some evaluation of the salesman's credibility.
    - (2) Of little help, though, as Bruce said, it was a good lesson in what to expect of salesmen.
    - (3) Value of representative's presentations, nil; as specimens of <u>caveat emptor</u>, interesting and valuable.
    - (4) I would have liked to have been given written information about their products and possibly have seen the actual equipment.
  - 12. Informal Evening Sessions
    - (1) The evening sessions would have been more helpful to me if they had been operated as individual tutorial sessions rather than as a group.
    - (2) These sessions good not only for computer discussion, but general library discussions.
  - 13. Special Comments:
    - (1) This institute showed what can be done by those who plan carefully beforehand what is to be done, and by a group who are truly interested in the program. It was interesting to see the diversity of the participants as to age and interest in various aspects of library work. If all institutes were like this one, the educational world would be better off.

      The pace of the institute was rapid, and perhaps hard, but it was a good work-out.
    - (2) A very well organized institute, well planned to the smallest detail. The director's kindness and attention was way beyond the call of duty. In one word--excellent.

(3) I think the institute was well planned, all details had been taken care of, the faculty were dedicated and could take all of our problems without losing their sense of humor. I learned a lot from the institute that will help me in my future plans in library work. The Director and faculty are to be congratulated for an outstanding job.

Enjoyed it and profited from it--You are always second-guessed

concerning the content of a short program.

(4) I came to this institute with the feeling that I might be able to follow what was being discussed to some degree but I never expected to acquire as much information of a general nature which promises to be of great help in working with computer personnel.

I would have liked to have been able to attend two of the group

studies but of course this wasn't possible.

(5) Intelligent, hard-working, knowledgable, congenial faculty--and myself excluded, would say that students were congenial, cooperative, helpful, intelligent, interested.

Faculty provided sound leadership.

(6) The institute was extremely valuable for me. (I would regroup ones with prior training and formal classes in one group so slow learners could take more time.)

Well organized.

(7) The crowded classroom was a problem. The instructors were unable to move freely about the room.

I did not expect to learn to program but I feel that I accomplished a good deal.

All in all, I feel the institute was well planned and very helpful.

(8) More interest has been created to use automation in a library system.

(9) For the most part, the institute was an extremely worthwhile

experience for this participant.

(10) The institute was extremely helpful for me, and I feel that my time and money has been well spent. So many institutes of this type turn into social occasions only, but I must say that this has not been the case here. It is always a pleasure to work in order to attain this goal.

(11) Too much attempted in too little time, but all of it well worth

doing and learning.

Extreme variation in various capabilities and effectiveness of of the instructors.

End of June is a bad time to schedule an institute such as this. All other comments which could be made would be very, very favorable. An excellent institute.

- (12) In the interest of women's liberation--and other things--I think there should have been a more equitable proportion of women to men, particularly young women.
- (13) All things considered, an excellent institute.
- (14) A longer lunch hour with time to nap would have helped.
- (15) Begin institute; Open ideas; Don't stop.



### APPENDIX F

### COMPUTER INDUSTRY REPRESENTATIVE'S SCHEDULE

## Friday, June 26, 1970

8:00 - 9:00	General Electric, Mr. John Linden
9:00 - 10:00	International Business Machines, Mr. Hines Vaughn
10:00 - 11:00	Honeywell, Mr. Kenneth Imman
11:00 - 12:00	National Cash Register, Mr. Tom Brown
12:00 - 1:00	Lunch
1:00 - 3:00	Computer Output Microfilmer, Mr. Bruce Alper and Mr. John Kennedy
3:00 - 4:00	Radio Corporation of America, Mr. Richard R. Knauf and Mr. W. Richard Moore
4:00 - 5:00	Xerox Data Systems, Mr. William E. Cartwright