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ABSTRACT

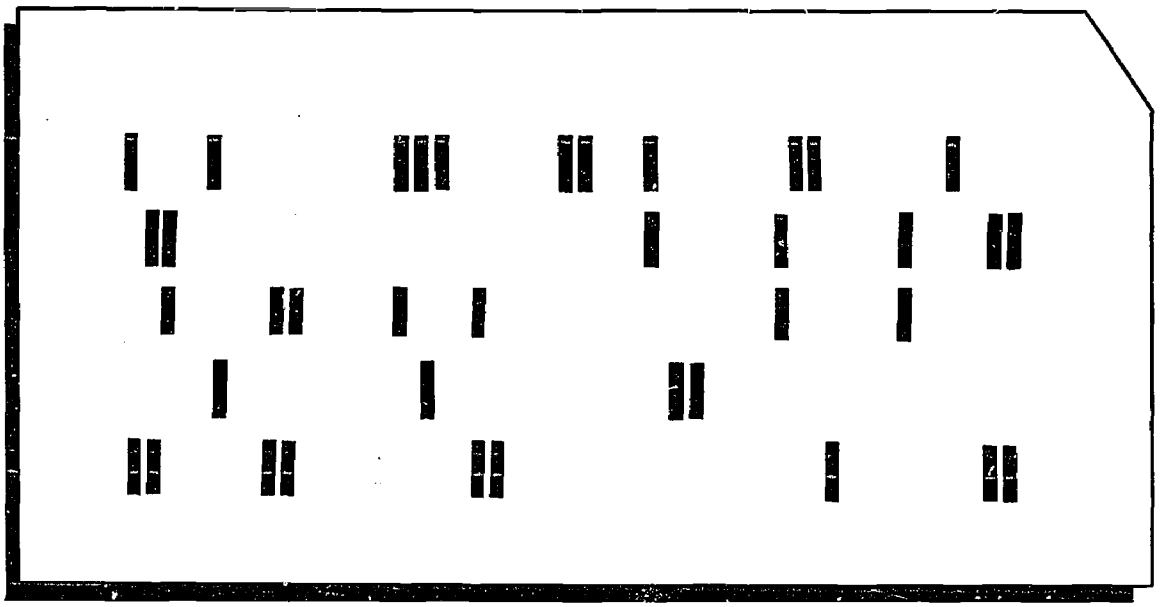
The document contains an outline of a course developed for an adult class meeting five hours per week for 18 weeks. The objectives of the course are to develop: an appreciation of the growing uses of automatic data processing; an entry level job proficiency in the operation of the keypunch machine; work habits conducive to job proficiency; and basic terminology in this field of employment; and to provide an understanding of a total unit record system. (There is a glossary, bibliography, and list of audiovisual aids.) (PT)

KEYPUNCH OPERATION

THE UNIVERSITY OF THE STATE OF NEW YORK/THE STATE EDUCATION DEPARTMENT/BUREAU OF CONTINUING EDUCATION CURRICULUM DEVELOPMENT/ALBANY, NEW YORK/12224

KEYPUNCH MACHINE OPERATION

A Suggested Adult Course Outline



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ALBANY, NEW YORK 12224
1968

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FOREWORD

The volume of information required by business today is so extensive that a rapid and more efficient method of recording, filing, and retrieving facts becomes a necessity. Automatic data handling methods enable business to efficiently and accurately process daily large amounts of information.

A review of the employment section of most city newspapers indicates a need for persons with training in the operation of automatic office equipment. This demand will make the training of competent operators of data processing machines a continuing process for some time to come.

This adult course outline for Keypunch Machine Operation was developed by a committee composed of Ruth Massey, Business Department, Burnt Hills-Ballston Lake High School, Burnt Hills, New York; Sonia Steinberger, Manpower Development Training Program, Poughkeepsie, New York; Donald McDonald, Administrative Assistant, Colonie Central School, Albany, New York; and James Gaffney, Sales Representative, Univac Division, Sperry Rand Corporation, Albany, New York, who served as the adviser on equipment. The course was written by Mrs. Massey under the supervision of Hobart H. Conover, Chief of the Bureau of Business and Distributive Education and coordinated by Eugene Whitney, Associate in the Bureau. Nelson Maurer, Associate in the Bureau of Continuing Education Curriculum Development prepared the manuscript for publication.

The accompanying material will be of assistance to directors of adult education programs and teachers of data processing. As teachers gain experience with this outline, it is hoped they will send their suggestions for improvement to the Bureau of Continuing Education Curriculum Development.

HERBERT BOTHAMLEY, *Chief*
Bureau of Continuing Education
Curriculum Development

WILLIAM E. YOUNG, *Director*
Curriculum Development Center

INTRODUCTION

Punched cards continue to be the most prevalent means of input to automatic business data processing systems. In many respects the keyboard of the keypunch machine is similar to the typewriter. A skillful typist will rapidly make the transition from one machine to the other. For this reason many teachers require typewriting skill as a prerequisite to keypunch machine instruction.

Under ideal circumstances a keypunch machine should always be available to each student in the classroom. Machine costs usually do not permit this luxury, but a sound program may be offered by using simulators to supplement the actual keypunch machines.

The teacher of keypunch machine operation needs to do more for the students than to develop their basic keyboard skills. Speed and accuracy are important but the students must also understand the function of the different data processing machines in a complete system. If a person can plan card formats to make working with source documents easier, if he can plan card fields and program cards to increase operator efficiency, and if he can make minor machine adjustments, he is worth more to his employer which means that he can compete for promotions and higher salaries. Although it might not be possible to develop competency in all of these aspects of keypunch operation, the instructor should plan class activities so that time can be devoted to these broader proficiencies.

A variety of instructional materials is available to the instructor to motivate students and make the instruction meaningful. Students will ordinarily require an exercise manual or practice problems developed by the instructor. Practice sets with actual source documents are particularly valuable as a means of adding realism and for developing materials-handling techniques. Programed textbooks and instructional tape recordings listed in the bibliography can be obtained to supplement classroom instruction.

The instructional outline that follows is based on a suggested class schedule of 5 hours per week for 18 weeks. By the end of that time students should have acquired sufficient skill to accept entry-level positions with many business organizations. It is suggested that 3,000 key strokes per hour be considered the goal for students at the end of the course.

Instructors are urged to report to the Bureau their experience with this outline and make suggestions for subsequent revision.

HOBART H. CONOVER, *Chief*
Bureau of Business and Distributive Education

JOHN E. WHITCRAFT, *Director*
Division of Occupational Education

CONTENTS

Chapter 1

Administrative Considerations

The volume of data to be processed in most large business organizations has grown at such a pace that it is no longer possible to collect, file, and retrieve information by manual and mechanical means. The load of paperwork has increased to the point that more efficient and speedier means of data handling are necessary. Any system that reduces the number of times that information is recorded, that simplifies the recording or the retrieval process, that makes data more readily available to users for multiple purposes, or that accelerates the operation is looked upon with great interest. Unit record and tape input data processing systems have consequently been introduced by many companies as a means for accomplishing, in whole or in part, many of these objectives.

Automatic data processing is not only more effective, it is often more accurate. Furthermore, data can be collected in quantity and used for analytic purposes that would otherwise not have been available because of the expense of processing. Perhaps the greatest contribution of automatic data processing is that data can be made available to management soon enough to be useful in the decision-making process.

Suggested Minimum Equipment

Few school systems will be available to teach keypunch machine operation on the battery plan, making an actual keypunch machine continuously available to each student. Lacking this number of keypunch machines, the minimum equipment should consist of four keypunch simulators to each keypunch machine. Thus, two or three keypunch machines supplemented with eight to 12 keypunch simulators will provide adequate equipment for a class of from 10 to 15 students.

Class Organization

The first task in organizing the class based upon the combination of equipment suggested in the preceding paragraph should be to develop a plan for rotating students from the keypunch machine simulators to the actual keypunch machine. If possible, each student should have the opportunity to work on the keypunch machine for part of each class session. The following time block suggests how this might be achieved with groups of five students.

Student	7:00 7:30	7:30 8:00	8:00 8:30	8:30 9:00	9:00 9:30
A	Simulator	Simulator	Simulator	Simulator	Keypunch
B	Simulator	Simulator	Simulator	Keypunch	Simulator
C	Simulator	Simulator	Keypunch	Simulator	Simulator
D	Simulator	Keypunch	Simulator	Simulator	Simulator
E	Keypunch	Simulator	Simulator	Simulator	Simulator

Time Considerations

The first two topics of the course outline are concerned mainly with an overview of punch card record keeping and punch card characteristics. Before the end of the first class session, however, students should be given a brief opportunity to "get the feel" of the actual machine. Most adults will be anxious to begin keypunching as soon as possible and may feel that any time spent in any other activity is lost time. The filmstrips recommended in the lesson plan may help to make the initial session more interesting and to make this presentation more understandable.

Topic 3 of the course outline deals with the operating features of the keypunch machine. It may also be necessary to spend a short time pointing out some of the unusual features of the keypunch simulator. Many of the features of the keypunch machine and the keypunch simulator can best be understood through small group demonstrations followed by opportunities for questions and discussion. By the end of the second or third class session, students should be well on their way toward independent practice on the machines. It is suggested, however, that considerable time be allowed for simple applications involving numeric keypunching before progressing to Topic 4 of the course outline.

Topic 4 is expected to consume at least two class sessions because there will be some need to review previous topics at the beginning of each session. To avoid confusion, Topics 5, 6, 7, and 8 should be presented at the rate of about one topic per week. Obviously, the ability of the class to absorb the content of the topics must be taken into consideration in carrying out the schedule.

It is immediately apparent from the suggested time schedule that the major portion of the course will be devoted to independent student practice. Topic 9, dealing with broad applications, should be given major consideration.

Student Materials

In addition to a supply of typewriting paper and blank cards, each student station should be supplied with an operator's manual for the keypunch

machine or simulator being used. The following books and pamphlets may be useful if the equipment covered is available in the classroom:

Bux, W. E. Key-punch training course. South-Western Publishing Co. 1966.

Hanson, P. L. Keypunching. Prentice-Hall, Inc. 1967.

International Business Machines. Card punch training on the IBM Selectric typewriter and IBM 26 card punch machine. New York. The Corporation. 1965.

_____Punched card data processing principles — 24-26 card punch and 56 verifier operation text (programed instruction course). New York The Corporation. 1964.

Royal Typewriter Company. Numeric card punch training (with Royal Electric typewriter and key-punch tandem). Athens, Ohio. The Corporation. 1966.

Classroom reference copies of the following text materials are also suggested:

Kahn, Gilbert. Business data processing, basic principles and applications. Gregg Division, McGraw-Hill Book Co. 1966.

Wanous, S. J. and Wanous, E. E. Automation office practice. South-Western Publishing Co. 1964.

Chapter 2

Course Objectives

The content of the course outline presented on the pages that follow was developed for an adult class meeting 2½ hours per session, twice a week, for a total of 18 weeks. Students entering the course should have a basic knowledge of typewriting and be able to type at 25 or more words per minute.

The general objectives of the course are:

1. To develop an appreciation of the growing uses of automatic data processing

2. To develop an appreciation of the importance of rapidly compiling information that is accurate, well organized, and readily accessible

3. To develop entry-level job proficiency in the operation of a key-punch machine

4. To develop work habits conducive to job proficiency as a keypunch machine operator

5. To develop an understanding of some of the basic terminology of this field of employment

6. To provide an understanding of a total unit record system including the functions performed by various electromechanical machines and how data flow throughout the system

Proficiency Standards

No attempt should be made to equate a student's speed at the typewriter with key-stroking speed on the keypunch machine. In this beginning course 3,000 strokes per hour on the keypunch would be considered a very reasonable end-of-course objective. With additional practice and experience, a keypunch operator should reach from 8,000 to 10,000 strokes per hour. Even this objective will be influenced by the type of copy from which the operator must work. If the source documents have been carefully written or are typewritten, the operator will undoubtedly reach much greater proficiency than if he must work from copy that is difficult to read. By the same token if the data to be keypunched follow the order of entries in the source document, the operator will not be required to shift his eyes from one part of the document to the other constantly, thus saving stroking time.

Accuracy should be the primary objective in keypunch machine operation. It is obvious that incorrect data punched into a card and entered into the data processing system can cause no end of trouble. The instructor, therefore, should emphasize accuracy first and speed second.

Verifying one's work should be a part of the training procedure. When students are using the keypunch simulators, the verifying process can be carried out by retyping an exercise directly over the original typing. A strikeover (one letter over a different letter) will then indicate a stroking error.

If the student is using a printing card punch, he may verify by (1) sight-checking the printed line at the top of the card against the original copy, (2) repunching the exercise and comparing the two decks of cards punched, or (3) using a card punch verifier.

Course Enrichment

Learning the operation of the keypunch machine can be a tense experience for some adults, particularly during the initial class sessions. It is important, therefore, that the instructor try to relieve this strain by introducing relaxing class activities. A number of films and filmstrips are available that will not only ease class tension but will provide learning experiences not otherwise possible. Throughout the course outline films and filmstrips are suggested that the instructor will undoubtedly want to use as part of the class learning activities.

A guest speaker or demonstration by an expert keypunch operator may also be a stimulating experience for the class. Local offices of equipment manufacturers are often pleased to assist the instructor in arranging this type of activity.

At least one field trip to a local data processing installation should be planned. This experience will give students the opportunity to observe firsthand data processing machines not available in the school and to get the feeling of how data flow throughout a system. Lacking this opportunity for an actual field visit, the instructor may be able to develop transparencies for use on an overhead projector of some of the hardware encountered in a typical data processing installation.

Excellent programed instructional materials are also listed in the bibliography of the outline; these are recommended for course enrichment. A few copies of these materials might be made available on a loan basis to those class members who find it possible to do some independent study at home.

The important thing is to plan each class session so that periods of intense concentration at the machines are interspersed with moments of relaxation. This is the ideal time for enrichment activities. All work and no relaxation not only makes for a dull class session but may actually produce tension which inhibits skill development.

Chapter 3

Course Outline

CONTENT OUTLINE	TEACHING SUGGESTIONS
I. Introduction (Topic 1)	
A. Overview of punched card accounting	Show the following filmstrip: *This Business of Numbers*, UNIVAC VA U 1201 Rev.I, 35 mm., color, sound.
B. Automation in the office	Emphasize the growing opportunities for keypunch operators. Consult local newspapers for job listings—government employment, industrial opportunities, banks. Discuss the following: 1. Types of entry jobs 2. Promotional opportunities 3. Salary ranges 4. New jobs and job descriptions
C. Desirable characteristics of a keypunch operator	Emphasize that accuracy is of prime importance, followed by speed and attention to detail. Typewriting proficiency usually facilitates the learning of the keypunch machine.
D. Orientation to the keyboard	Point out similarities to the typewriter keyboard. Locate the numeric keys and special characters. Indicate that several signs and characters are not on the keypunch machine that are on many typewriters.
1. Control switches	Indicate the location of the mainline switch. The 24 and 26 punches contain vacuum tube components and require a

CONTENT OUTLINE	TEACHING SUGGESTIONS
	warmup period. The 29 punch is transistorized and is ready for use the instant the mainline switch is turned on.
2. Control keys	Demonstrate the use of the following: 1. Feed key (FEED) 2. Register key (REGISTER) 3. Release key (REL)
E. Orientation to the keypunch simulator	Point out similarities between the simulator and the keypunch machine. Explain the operating features of the simulator. This section is for classes using both the keypunch and simulator. Plan to devote most of the first class session to this introductory phase. Be sure to give each student the opportunity to sit down at both the keypunch and the keypunch simulator for an initial tryout experience. Students may practice running cards through the keypunch machine using the feed, register, and release keys. Devote a few minutes of each class session to the development of vocabulary terms related to the field of data processing. See glossary at end of the outline. Develop the meaning of the following: *automation* *data processing* *input* *unit record* Selected references† Ref. 7, pp. 5-6 Ref. 15, pp. 2-36 Ref. 21, pp. 1-11
II. The Punch Card (Topic 2)	Explain that information from a source document is translated into holes in the punch card.
A. Card characteristics	Describe the card in terms of size and type of paper (3 1/4 by 7 3/8 inches and 0.007 inches thick).

†Reference citations are shown on pages 19-20.

CONTENT OUTLINE	TEACHING SUGGESTIONS
	Discuss color, purpose of card corner cuts, importance of card design, 12-edge, and 9-edge.
1. Columns	Distribute blank cards. Point out that there are usually 80 vertical columns or card columns. Emphasize that each column accommodates a digit, a letter, or a special character.
2. Punching positions	Indicate that there are 12 rows horizontally across the card with 12 punching positions in each column—a total of 960 positions in the entire card. Explain zone punching positions.
B. Entering numeric data	Distribute cards prepunched with numerical data. Instruct students to read the data.
C. Entering alphabetic data	Distribute cards prepunched with letters of the alphabet. Stress that each letter is a combination of a zone punch and a digit punch in the same column.
	Distribute blank cards. Have students mark a card with their name and Social Security number.
D. Special characters	Explain that with all keypunches special characters are recorded in a card by one, two, or three punches. Special characters are used to provide symbol representation, cause certain machine operations, or identify cards for some specific purpose.
E. Card fields	Indicate that a field may consist of one column or up to 80 columns depending on the information to be punched. Explain how codes may be used to save space. Note the use of a "spread card" to save space or to accommodate large numbers.
	Point out that predesigned cards may be obtained with the fields designated. (supply samples.)
	Have students mark out fields of information on a blank card. Enter, for example, name, Social Security number, item code number, and date.

CONTENT OUTLINE	TEACHING SUGGESTIONS
F. Verification of punched information	Discuss forms of verification—manual and machine. Explain briefly how a verifier is used and how verification is indicated on a card.
G. Uses of punched cards	Distribute sample punched cards such as credit cards, utility bills, student registration cards, or sales slips where data have been entered. Indicate that information once recorded cannot be erased, is easily stored, and serves as a permanent document. Stress the reusability of punched cards by many machines—sorter, collator, reproducer, accounting machine.
H. Application	Distribute additional blank punch cards and plan field arrangements to facilitate working from a source document during the remaining time devoted to Topic 2. Develop the meaning of the following: *card column* *coding* *field* *9-edge* *punching position* *source document* *12-edge* *verification* *zone punch* Selected references† Ref. 4, pp. 7-10, 74-80 Ref. 7, pp. 6-13 Ref. 10, pp. 1-14 Ref. 15, pp. 34-36 Ref. 21, pp. 12-23
III. Operating Features of the Keypunch (Topic 3)	Note that the terminology in this section relates primarily to IBM punches; for other punches see operators' reference manuals. Indicate that the difference between the IBM 24 and 26 card punches is the printing mechanism. Data punched on the IBM 26 may be printed on top edge of card. The IBM 29 punch permits punching 64 characters.

†Reference citations are shown on pages 19-20.

CONTENT OUTLINE	TEACHING SUGGESTIONS
	The IBM 29 punch may be either printing or nonprinting.
A. Card hopper	Locate the card hopper and fill with cards. Indicate the capacity. Stress that cards are put in the hopper face forward, with the 9-edge down. Devote a few minutes to proper techniques of card handling including blocking, fanning, and joggling. Demonstrate the feeding of cards from the hopper to the card bed automatically and when the feed key is depressed. On the IBM 29, the feed key, if held depressed, will move two cards from the hopper to the punching station. On the IBM 24 and 26 models, however, the feed key must be depressed once for each card fed.
B. Punching station	Show the punching station and explain that beneath the station are located 12 punch bars for punching a hole or holes depending on which key is depressed. Demonstrate punching. Explain the necessity of registering a card before the punching operation.
C. Reading station	Explain the purpose of the reading station. Demonstrate the duplication and correction of cards.
D. Card stacker	Locate the card stacker and indicate its capacity. Demonstrate the automatic and manual movement of cards from the reading station to the stacker. Point out that cards are in the stacker with the 12-edge down and face of the card toward the operator. Emphasize that on the IBM 24 and 26 punches the machine will shut off when the stacker is full. With the IBM 29 punch, a full card stacker interlocks the card feed mechanism to prevent the overflow of cards but does not turn off the machine as on the IBM 24 and 26 models.

CONTENT OUTLINE	TEACHING SUGGESTIONS
E. Reading board	Explain that the reading board provides working area for the source document or documents.
F. Backspace key	Locate the backspace key and depress so students can observe the position of cards in the punching and reading stations and the position of the column indicator. Point out that on the IBM 24 and 26 models the backspace key releases the keyboard after it has been locked. On the IBM 29 model, the error reset key unlocks the keyboard.
G. Chip box and fuses	Locate the chip box and remove cover to allow students to see how chips from punches accumulate. Also point out the fuses that now are visible on IBM 24 and 26 card punches.
H. Keyboard	This presentation will depend upon the time devoted to the keyboard during the orientation lesson.
1. Shift keys	Point out and explain the use of the alpha and numeric shift keys.
2. Functional control switches	Point out the special switches for controlling auto duplicating and skipping, auto feeding, program selecting, printing, left-zero printing, and clearing.
3. Functional control keys	Point out and explain the use of the functional control keys at this time, but they should be reintroduced at a time just prior to their use in practice exercises. Include the following: 1. Multiple punch (MULT PCH) 2. Duplicate (DUP) 3. Skip (on top row of keys) 4. Alternate program (ALT PROG) 5. Skip (SKIP) 6. Auxiliary duplication (AUX DUP) 7. Numeric Shift (NUM) 8. Alphabetic shift (ALPH) IBM 29 punch only 9. Alternate program (PROG ONE) 10. Alternate program (PROG TWO)

CONTENT OUTLINE	TEACHING SUGGESTIONS
I. Review	Show the following filmstrip: *The Magic Window*, IBM, V20-3027, 35mm., color, sound.
J. Application	Have students practice alpha and numeric punching, using either the keypunch or simulator. Devote considerable time to practice so that students become familiar with the keyboard and the position of the special characters. Remind students that the machine is in alpha shift and to punch numbers the numeric shift must be used. Develop the meaning of the following: *Interpreting* *Punching station* *Reading station* *Reproducing* Selected references† Ref. 3, pp. 9-11 Ref. 4, pp. 28-31 Ref. 6, lessons 1-6 Ref. 7, pp. 41, 43, 45, 47, 48, 50, 53, 54
IV. Program Unit (Topic 4)	Discuss the purpose of the program unit. This part is for IBM punches.
A. Program drum	Mention how the program card is attached to the program drum. Explain the releasing and locking lever for the clamping strip.
B. Alining pin	State that the alining pin is beveled so the drum fits into the correct position on the machine.
C. Starwheels	Show how the starwheels rest against the program card when the program control lever is in the on position.
D. Column indicator	Locate the column indicator and stress that the indicator points to the next column to be punched. Reference is frequently made to the indicator for spacing or backspacing.

†Reference citations are shown on pages 19-20.

CONTENT OUTLINE	TEACHING SUGGESTIONS
E. Pressure-roll release lever	Locate the pressure-roll release lever and demonstrate its use by removing a card from the punching and reading stations.
F. Program control lever	Indicate the purpose of the program control lever and stress that it must be in the on position to control the program unit. Emphasize that the program control lever must be in the off position whenever a program card is not on the drum.
G. Application	Continue the practice exercises suggested under Application, page 12 of the outline. Develop the meaning of the following: *alining pin* *column indicator* *program card* *program drum* *program unit* Selected references† Ref. 4, pp. 13-25 Ref. 7, pp. 77-78
V. Program Card (Topic 5)	Explain purpose of a program card. Distribute prepunched program cards for student inspection. This part is for IBM punches.
A. Coding	Distribute a copy of the code used on IBM punches and explain the code function as follows: Blank - Indicates the beginning of a field to be punched manually 1 - Shifts keyboard to alpha mode for the column in which it appears 0 - Starts automatic duplication 11 - Starts automatic skipping 12 - Defines the length of the field or operation
B. Planning	Define fields and determine method of punching for each field.

†Reference citations are shown on pages 19-20.

CONTENT OUTLINE	TEACHING SUGGESTIONS
1. Field characteristics	Explain coding (above) for each of the following field characteristics: 1. Alpha 2. Numeric 3. Mixed
2. Skipping	Explain the following: 1. An entire field 2. An unpunched portion of a field
3. Duplicating	Explain the following: 1. An entire field or fields 2. An entire card
4. Application	Have students plan a program card for a particular application. Selected reference† Ref. 7, pp. 79-86
VI. Print Control (Topic 6)	
A. Printing and nonprinting punches	Distinguish between printing and non-printing punches and the verification procedures for each.
B. Interpreting from a non-printing punch	Explain function of an interpreter.
C. Insignificant numbers	Demonstrate that on the IBM punch an insignificant number (zero, ampersand, dash) will not print at the beginning of a field.
D. Printing leading zeros	Illustrate with Social Security numbers the need for printing leading zeros. Explain how a program card can be coded for left zero printing on some punches. Contrast this procedure with the use of the L-Z print switch on the IBM 29 punch with print feature.
E. Print supression	Explain the use of print supression and the control punches needed to activate it.
F. Ribbon changing procedure	Explain the method of changing the ribbon.

†Reference citations are shown on pages 19-20.

CONTENT OUTLINE	TEACHING SUGGESTIONS
VII. The Electromechanical Data Processing System (Topic 7)	Explain the basic function of each of the following: 1. Sorter 2. Collator 3. Reproducer 4. Tabulator Emphasize the role of the punched cards as they progress through the various machines. Plan a visit to a place using electromechanical data processing equipment. Develop the meaning of the following: *code* *common language* *flowchart* *grouping* *hardware* *machine language* *merging* *output* *selecting* Selected references† Ref. 1, pp. 138-178 Ref. 2, pp. 61-125 Ref. 7, pp. 13-22 Ref. 15, pp. 39-47 Ref. 20, pp. 34-78 Ref. 21, pp. 45-52
VIII. Error Correction (Topic 8)	Devote at least one class period to various techniques for correcting errors.
IX. Broad Applications (Topic 9)	Explain the following: 1. Planning the program 2. Punching the drum card 3. Punching the unit record cards 4. Verifying the work Have students carry out a program based upon actual source documents. Selected references† Ref. 3, pp. 13-92 Ref. 4, pp. 43-78 Ref. 7, pp. 91-132

†Reference citations are shown on pages 19-20.

GLOSSARY

Alining pin: A pin at the bottom of the program drum for inserting the drum into the socket of the machine.

Automation: A process in which work is done with a minimum of manual effort, usually including feedback and self-control.

Card column: One of the 80 vertical divisions of a card, normally accommodating one letter, digit, or special character.

Card field: Groups of columns to record the punching of specific information on a card.

Code: A short representation of alphabetic or numerical information or instructions.

Coding: Assigning of letters, digits, or both to identify or classify data.

Column indicator: An indicator located at the base of the program drum which indicates the next column to be punched.

Common language: Code language or media that various machines can "interpret."

Data processing: The basic functions of the office: recording, classifying, sorting, manipulating, and transmitting information.

Duplication: The automatic punching of data from one card into the next, normally performed on a keypunch.

Field: A column or columns reserved for the punching of data of a specific nature. (See card field.)

Flowchart: A graphical representation of a sequence of operations, using a set of conventional symbols.

Grouping: The classifying or bringing together of punched cards of a similar variety by a sorting machine.

Hardware: The mechanical, magnetic, electric, and electronic devices used for processing data.

Input: Information which enters a machine for the purpose of being processed or to aid in processing.

Interpreting: Printing on a card data that have been punched into it.

Machine code: A code that a machine can "interpret."

Merging: Interfiling in sequence two sets of cards.

9-edge: The bottom edge of the card parallel with the "nine" punching positions.

Output: The results produced by a data processing system, usually in the form of tape, punched cards, or documents.

Program card: A card which instructs a keypunch machine to perform certain automatic functions.

Program drum: A cylindrical drum upon which the program card is fastened.

Program unit: The complete mechanism on the keypunch which holds the program drum.

Punching position: One of the 12 divisions of a card column into which a hole may be punched.

Punching station: On a keypunch the place where holes are punched into the card.

Reading station: On a keypunch the place where the holes punched into the card may be read.

Reproducing: Punching data from one set of cards into another set of cards.

Selecting: The process of extracting from a stack of cards only those that contain certain desired data.

Sequencing: The process of arranging cards in either alphabetic or numeric order.

Software: Aids supplied by manufacturers to assist the user in efficient operation of electronic computer equipment.

Sorter: A machine that arranges or classifies punched cards according to a definite plan.

Source document: The original paper on which are recorded the details of a transaction.

Summary punching: The automatic process of punching one card containing data summarized from a group of cards.

Tabulating machine: A machine used for the printing of data recorded on punched cards. It is also called an accounting machine.

12-edge: The top edge of a punch card.

Verification: Checking for accuracy what is punched into a card with data on the source document.

Verifier: A machine used to check the accuracy of data punched into cards.

Unit record: A record in which all the data concerning each item in a transaction are punched into one card.

Zone punch: One of the top three punching positions in a card column (12, 11 or X, and 0).

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AUDIOVISUAL AIDS

Card punch audio education. International Business Machines. 3424 Wilshire Boulevard, Los Angeles, California 90005.

An instructional tape, a book of illustrations, and practice exercises for keypunch operation.

IBM 24-26 card punch operation. Audiovision, Inc., 33 Mercer Ave., Buffalo, New York.

A set of nine color filmstrips (35mm.) on keypunch operation with synchronized sound-on-tape. Each filmstrip averages 75 to 85 frames and takes about 17 to 18 minutes covering some aspect of operating the machine.

Operator training course, 24-26 card punch machine. Marsh-Pierce Corp., 301 E. 48th Street, New York, New York.

A set of seven reels of taped instruction, five student manuals, five sets of practice cards, and two instruction manuals providing basic instruction and practice in operating the machine.

This booklet is published primarily for use in the schools of New York State, and free copies are available to New York State school personnel when ordered through a school administrator from the Publications Distribution Unit, State Education Building, Albany, New York 12224.

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