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ABSTRACT

This digest provides a brief explanation of what a database is; explains how a database can be used; identifies important factors that should be considered when choosing database management system software; and provides citations to sources for finding reviews and evaluations of database management software. The digest is concerned primarily with databases and software for handling management-type information. It is noted that databases that are bibliographic in nature are accessed primarily through subject headings and keywords, and require a different approach and generally a different type of software called information retrieval software. This digest contains sections on how databases are organized and used, and software selection considerations. A list of print and online resources that may be helpful in developing a list of possible software programs to meet specific needs is included. (THC)

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ERIC DIGEST

BUILDING DATABASES FOR EDUCATION

The purposes of this digest are:

- To provide a brief explanation of what a database is;
- To explain how a database can be used;
- To identify important factors that should be considered when choosing database management system software; and
- To provide sources for finding reviews and evaluations of database management software.

It should be noted that this digest is concerned primarily with databases and software for handling management-type information. Databases that are bibliographic in nature are accessed primarily through subject headings and keywords. Such databases require a different approach and generally a different type of software called information retrieval software (e.g., MICROsearch, SIRE, Superfile).

How Databases Are Organized:

In order to understand how a database works, we need to know how information is organized and structured. Information can be broken down into several components.

(1) *Database* — the overall collection of related information, e.g., all of the information that is maintained by the Elmwood Elementary School.

(2) *Files* — information of a specific type or on a particular subject is stored in individual files which together make up the database, e.g., a separate file for each classroom, Mrs. Thompson - Room 201.

(3) *Record* — each file contains a separate record for each item in the file, e.g., a record for each student in Mrs. Thompson's class.

(4) *Field* — a collection of related fields makes up a record, e.g., the name, address, birthday, curriculum, attendance record, etc., of each student in Mrs. Thompson's class.

How Databases Are Used:

Computerized databases provide many advantages for the storage and retrieval of information. These programs are referred to as database management systems (DBMS) and their capabilities vary widely. Because data are stored on a magnetic storage medium, updating and changing the data are simplified. Records can easily be retrieved from one centralized place eliminating the necessity for browsing through several filing cabinets. But the most significant advantage is the ability to manipulate the different fields within a record to produce needed information. Using the Elmwood Elementary School database as an example, a DBMS program could generate reports that would provide the following:

(1) a list of the names of all students who had missed 5 or more days of school;

(2) a list of those who had a C or lower grade in three or more classes;

(3) the names of all first graders; and

(4) the total enrollment for the school.

This is accomplished by comparing the value of a particular field (how that field is filled in — e.g., for the field NAME, a possible value would be SMITH, JOE) to some selection criteria. If the values are the same, then the record is selected. Based on the value of the field DAYS ABSENT, a criterion — e.g., equal to 5 or more — can be set up stating that if the following statement is true — e.g., if DAYS ABSENT >= 5 then the information contained in certain fields in the same record such as NAME, TEACHER, DAYS ABSENT, and PHONE NUMBER should be printed. This is just one example of the way data contained in a field can be tested and printed. Depending on the criteria established and the software used, reports can be generated in any variety of combinations and formats.

Software Selection Considerations

Along with the advent and popular use of the microcomputer there has been an increase in the number of available database management system (DBMS) software packages. For any kind of microcomputer, consumers can choose from a wide range of packages which vary in price, capabilities and power.

Before purchasing a DBMS package, users should fully understand what they want the system to do for them. System requirements should not only reflect immediate needs but long range goals as well. The best way to define system requirements is to look at the way information is currently being filed and handled. Look at the information that is being recorded about all transactions. If a totally new enterprise is being started, try to find a similar system that already exists and study the information organization in that context.

Another approach to understanding the information needs of a particular system is to look at where that system obtains its data. A good place to start is to look at the printed forms that are used to collect and record data within the organization. Also look at the organization of the present filing system and the kind of information that is kept in those files. At the same time, examine reporting requirements. Is there an annual report? What kinds of information are being asked for? What is the format?

After analyzing the requirements of the system, make a list of the fields. Each field should have a short name and designate whether it is:

- Numeric or alphanumeric (a combination of alphabetical and/or numeric characters); and

- Fixed length (will contain the same number of characters, e.g., phone number), or variable length (the number of characters in the field will vary, e.g., a person's name).

You must also:

- Determine if the values in the field will be used to make calculations and if there will be fields that will contain values resulting from certain calculations, e.g., SUB-TOTAL; and
- Designate key fields, i.e., a single field or a combination of fields that can be used to retrieve a record. It is important that there be a unique field or combination of fields for each record, e.g., social security number.

It is also important to determine the kinds of equipment available and how much the system will cost. You should include the price of the package, training time, converting old data to the new computerized format, testing, debugging, maintenance, and supplies, and whether it can be used by more than one person at a time.

After the requirements for the proposed DBMS are established, it is necessary to evaluate the different software packages available. Your local library can assist you in developing a list of possible software programs that may meet your needs. A list of print and online resources follows:

PRINT

The software catalog—microcomputer. (1985). New York: Elsevier Science Publishing Co., Inc.

The software encyclopedia 1985/86. (1985). New York: R.R. Bowker Co.

Microcomputer index. (1980-). Santa Clara, CA: Microcomputer Information Services.

ONLINE DATABASES

Microcomputer index. DIALOG, File 233.

.MENU—The international software database. DIALOG, File 232.

OTHER RESOURCES

After narrowing down the list of possibilities, talk to a local software vendor about trying the packages that seem to be appropriate for the situation. Many packages have tutorial programs that can give you an idea of how the system works and how easy or difficult it is to use. It is also a good idea to obtain the names of people who are already using the system. Vendors, microcomputer bulletin boards, and microcomputer clubs are good sources for such information.

Conclusion

The most important consideration when changing from a manual to a computerized system is to understand your equipment and financial constraints and to know exactly what it is you expect the new computerized system to provide.

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