DOCUMENT RESUME

ED 299 426 CE 051 055

AUTHOR	O'Neil, Sharon Lund; Everett, Donna R.
TITLE	Database Systems. Course Three. Information Systems Curriculum.
INSTITUTION	Association of Information Systems Professionals, Deerfield, IL.; Houston Univ., Tex. Coll. of Technolcgy.
SPONS AGENCY	Texas Higher Education Coordinating Board, Austin.
PUB DATE	88
NOTE	128p.; For related documents, see CE 051 053-059.
PUB TYPE	Guides - Classroom Use - Guides (For Teachers) (052)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Automation; Behavioral Objectives; *Business Education; Computer Oriented Programs; *Computer Science Education; Computer Software; Curriculum Guides; *Database Management Systems; Higher Education; *Information Processing; *Information Science; *Information Systems; Learning Activities; Word Processing

ABSTRACT

This course is the third of seven in the Information Systems curriculum. The purpose of the course is to familiarize students with database management concepts and standard database management software. Databases and their roles, advantages, and limitations are explained. An overview of the course sets forth the condition and performance standard for each of the five task areas in the course. These components are provided for each task area: behavioral objective, suggested teaching strategies, content, and summary. Topics covered include database management terms, concepts, vocabulary, and principles; hands-on operational knowledge of database management software; factors to consider in comparison and evaluation, selection, modification, and utilization of database management software; gathering information to design, create, set up, utilize, and integrate a database in an automated environment; and implementation of a database management system and written documentation. A glossary of database management management terminology follows task area 1. Appendixes include visuals (transparencies and other teacher materials), student materials (student handouts, work sheets, and exercise materials), evaluation (end-of-task and end-of-unit questions, test items, etc.), and references (including an eight-page bibliography, articles, and resources). (YLB)

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ED299426

Database Systems

course three

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Developed by
Dr. Sharon Lund O'Neil, Principal Investigator
Dr. Donna R. Everett, Project Director
UNIVERSITY OF HOUSTON, COLLEGE OF TECHNOLOGY
TECHNICAL EDUCATION DEPARTMENT

In Cooperation with
ASSOCIATION OF INFORMATION SYSTEMS PROFESSIONALS
(AISP)

This project was funded by the Texas Higher Education Coordinating Board through a grant utilizing funds from the Carl D. Perkins Vocational Education Act, Project No. 88103024, Project Year 1988.

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Acknowledgements

Development of this Information Systems curriculum took place during the 1987-1988 school year, culminating in June, 1988. Much time, talent, dedication, and expertise were invested in this project by the following individuals who participated in the Information Systems Curriculum Advisory Committee--our sincere "thanks" to each of you:

Gary Baldwin, Datapoint Corporation, San Antonio
Mary Ann Beach, MBank, Dallas
Claudia Bryan, Fluor Daniel, Sugar Land, TX
Charlie T. Cochran, Xerox Corporation, Arlington, VA
Susie Coon, DISC, Inc., Houston
Robert Day, Texas Higher Education Coordinating Board, Austin
Camille Hatfield, North Harris County College, Houston
Allan J. Krueger, Hanscom AFB, MA
Leo Lefkowits, The ELTU Corporation, Houston
Melody Locke, Texaco, Inc., Houston
Linda Mercer, Information Network, Houston
Gay Sweet-Harris, Thomas Jefferson High School, San Antonio

Also, appreciation is extended to all Association of Information Systems Professionals members who participated in various phases of the study and especially to the hundreds of individuals who responded to both rounds of the 300+ item questionnaire which formed the basis of the curriculum. The support of AISP has been wonderful mainly because of three dedicated individuals:

Glen R. Anderson, AISP Executive Director, Deerfield, IL
Claudia Bryan, AISP National President, Sugar Land, TX
Allan J. Krueger, AISP National Director, Acton, MA

Very special recognition is due Allan Krueger who has been a strong link between the project and AISP and who has given so generously of his time and expertise to assure quality products and to promote the project.

Recognition and gratitude also are expressed to Jim Bauser, Valerie Brantley, Bernard Chin, Cappi McNeill, and Donna Siegel, University of Houston, College of Technology, for their time, talents, and skills in the vital areas of administrative support, materials development, graphics layout, research, and writing in bringing this project to completion.

DATABASE SYSTEMS

The overall purpose of this course in the Information Systems curriculum is to familiarize students with database management concepts and standard database management software. Databases, their roles, advantages, and limitations are explained. Microcomputer usage and standard database management software, such as dBase, should be utilized to provide hands-applications experience with creating, designing, setting up, utilizing, and integrating databases. Knowledge of various databanks and database services is included in this course.

Critical to this course is a focus on providing the right information to the right people at the right time for effective decision making.

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STUDENT MATERIALS

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EVALUATION

Includes end-of-task and end-of-unit questions, test items, etc.

REFERENCES

Includes bibliography, articles, resources, etc.

INSTRUCTOR NOTES

DATABASE SYSTEMS

CONDITION	PERFORMANCE/STANDARD
TASK AREA 1: Given a list of database vocabulary, concepts, terminology, and principles,	the student will be able to define the terms, identify the structures and formats, and become familiar with the principles and vocabulary pertaining to database systems to the satisfaction of the instructor.
TASK AREA 2: Given a microcomputer, dedicated system, host, or other configuration in the classroom and database management software,	the student will be able to produce database documents which include utilization of the common features and the more advanced features of the software with 90% accuracy (or to the level of mastery).
TASK AREA 3: Given a list of database management systems software,	the student will be able to develop factors to be considered in comparison and evaluation of, selection of, modification of, and utilization of database management systems in an automated environment to the satisfaction of the instructor.
TASK AREA 4: Given a list of factors developed for the comparison and evaluation, selection, modification, and utilization of database management software,	the student will be able to gather information, design, create, set up, utilize, and integrate the selected database into the automated environment and demonstrate a knowledge of the process of database development through an oral presentation to the satisfaction of the instructor.

CONDITION	PERFORMANCE/STANDARD
TASK AREA 5: Given a specific database management environment,	the student will be able to set up, disseminate, and revise written guidelines and documentation for database users in the specified automated environment to the satisfaction of the instructor.

DATABASE SYSTEMS

Task Area 1

Given a list of database vocabulary, concepts, terminology, and principles, the student will be able to define the terms, identify the structures and formats, and become familiar with the principles and vocabulary pertaining to database systems to the satisfaction of the instructor.

This course is designed to familiarize students with database management concepts and standard database management software. Critical to this course is a focus on providing the right information to the right people at the right time for effective decision making.

Suggested teaching strategies: Introductory lecture utilizing questioning techniques with transparencies which stimulate group discussions; oral presentations by students on aspects of the subject; review methods using a game and t am approach.

Data (all of the components of information) are assets. The value of data to an organization is in achieving its goals, being able to continue its operations, and making mid-course adjustments to enhance productivity and its ability to compete. The challenge of accessing, manipulating, and processing data into usable information for effective decision making will become even more critical as the amount and availability of data increase.

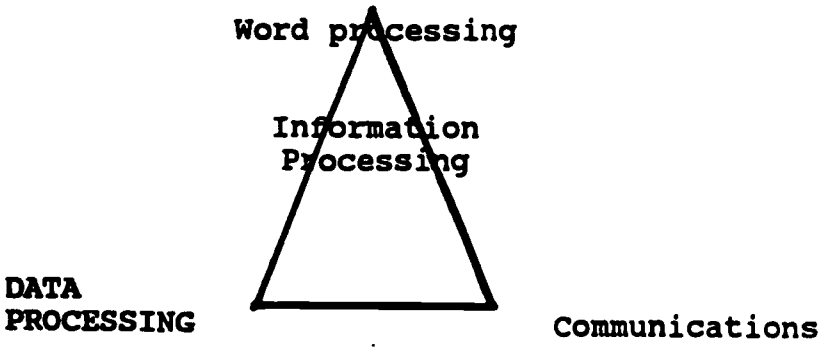
Alvin Toffler (The Third Wave) and John Naisbitt (Megatrends) address the shift from an industrial society to an information society as one of the major transformations that has taken place in the twentieth century. The shift from the focus on manufacturing to the processing of information is having an effect on the organizational structure. Peter Drucker (The Frontiers of Management) describes the change in the structure of the organization as one in which "information serves as the axis and as the central structural support".

The attention and emphasis given to the emergence of an information society has focused on the fact that larger percentages of the work force are involved with manipulating information--facts, figures, and speculations--not objects. Information is becoming the organizing energy with the capital resource being knowledge.

White-collar workers, which include managerial, professional and technical, secretarial and clerical, and sales workers, are now being referred to as "information

workers" by the Bureau of Labor Statistics, and make up the majority of the work force which exceeded 55 million in 1985. This category is expected to grow by another 5 million in 1990 and top 65 million in 1995.

The element of the information processing triangle (displayed below) focused on in this course is data processing, not from a programmer's perspective, but from that of the end-user. NOTE: Information processing is defined as the manipulation of data and text into final format and/or movement to its final destination.



Data Processing

The traditional definition is the processing of raw data or facts (numbers, letters, or symbols) into usable written information. Data processing is the oldest of the three elements in the information processing cycle and is generated for in-house consumption to be accessed at any time.

Generally, the data that are processed are in what is thought of as a database. This is a term which has evolved with the invention of computers. A database is a structured collection of information--such as a library card catalog, an encyclopedia, or a company's inventory of computer equipment, etc.--which has been systematically accumulated and organized for future reference. The computer database is replacing file cabinets; and it offers many more advantages over the manual filing system. The computer acts as the database manager.

Database Systems

Database management systems (DBMS) are electronic files that have been set up to structure raw data into files which can be stored, retrieved, protected, shared, and disseminated for decision making. Database management systems impact the profitability of an organization by increasing user

productivity and providing ready access to available data. The features of a sound database management system include the capability (1) to set up relationships among the data within the database, (2) to load the data into the database, (3) to maintain and update the data, (4) to interface with and use the data, and (5) to establish data security, integrity, and control.

The distinct advantages of a database management system over a manual file system include (1) elimination of data redundancy, (2) elimination of duplication of effort and files, (3) increased reliability, (4) elimination of need to manually update multiple files, (5) ability to use it with any system and program, and (6) authorized access to common files which enhance data sharing capabilities.

Ultimately, an organization is interested on the impact of computerization on its bottom line: profitability and/or results delivered in relation to expenditures. Database management systems do impact end user productivity in that data are presented in forms and formats which match work patterns and information needs. Ease of use, convenience, fewer demands and less strain, and self sufficiency are advantages derived by users from database systems.

From the organization's standpoint, database management enhances the ability of an organization to develop and/or modify new applications, to increase the scope of information for performance evaluation, and to enhance customer relations with readily available information.

The format and structure of the database depend on the purpose and user. Retrieval from a database can be accomplished by fields, such as person, room number, computer serial number, monitor serial number, printer model, and other criteria, depending upon the organization of the file.

Certain basic terms are used to describe the manner in which a DBMS organizes a particular database. The <u>database file</u> is the full collection of data about a specific subject, such as the company's computer inventory. Each of these files would contain a different entry for each of the company's computers. Each entry into the database file is a <u>record</u>: the basic units of file information, much like sheets of paper in a folder in a filing cabinet or like a card in a typical card file that contains information on each person. Each of the records is further broken down into categories, such as person, room number, date installed, computer serial number, printer model, etc. called <u>fields</u>. The information in each field is called an <u>entry</u>. The most basic units in the entry are <u>bytes</u> or the

string of characters within the fields.

Figure 1 illustrates these terms. Note that this company's computer inventory database can be easily manipulated into a list by "person", "computer serial number", or by "printer model".

ILLUSTRATION OF BASIC DATABASE TERMINOLOGY

File: Equipment Inventory — File of all records

Report: Equipment Inventory Report - June, 19xx

Record 1 of 22

Computer:	IBM-XT
Monitor:	IBM
Printers:	C.-ITOH F-10
Ser # Comp:	6105588
Ser # Mon:	0078044
Ser # Print:	BJ19BU
Ser # Keyb:	
Room Number:	F-203
Person:	Computer Center
Printer Model:	Starwriter
Comp Model:	089 w/AST
Date Installed:	Feb 4 86

Field — Entry

One record in the file named Equipment Inventory as shown above.

Figure 1.

Moreover, a database management system can duplicate the work of large general filing departments; i.e., one database can hold information on a company's sales figures, correspondence, accounts, personnel documents, production figures, billings, etc. Certain directories allow access to these files, depending on the department, office, and information needed.

Database Management Software

Hundreds of off-the-shelf software packages are available which are capable of organizing and manipulating data into many different output formats. The proliferation of DBMS software may be the direct result of the fact that there are no federal or international standards that direct the evolution of database management systems and software. Efforts have been made by the Conference on Data Systems Languages (CODASYL) to establish appropriate designs and specifications that can be used widely by software manufacturers.

Creating and accessing databases is possible with database management software. Generally, entering information in a database is no more difficult than creating a word processing document. When creating a database, the information is entered by fields--person, room number, computer serial number, etc. in list format. Each field can be a standard length--25 characters long--or the software may require shorter field names in order to save memory. Some DBMS software allows the option of entering fields in boxes which can be rearranged on the screen to create forms. Figure 2 illustrates both, using the computer inventory example from Figure 1:

CREATING A DATABASE

```
Record 1 of 22
Computer:  IBM-XT
Monitors:  IBM
Printers:  C-ITOH F-10
Room Number:  F-203
Date Installed: ■■
```

OR

```
Computers:        Monitors:        Printers:
IBM-XT            IBM              C-ITOH-F-10

Room No.:
F-203
```

etc.

Figure 2.

Depending on the software, after the fields have been determined and set up, the data itself are entered in the appropriate fields--the kind of computer, kind of printer, kind of monitor, and room number for each record. Usually, the RETURN/ENTER key or TAB key is used on the keyboard to move between or within fields.

Once the database has been created, it can be used in a variety of ways: a particular record can be accessed, much like one would do in a manual file for a particular manila folder. However, this process is much faster and easier. A file can be printed in total or manipulated into a certain configuration, depending on the user's need or the type of report that is required. Records also can be added, deleted, changed, sorted, or modified to serve a particular purpose. Each DBMS software package will have its own commands, capabilities, and file structures.

Schema or Structures of Databases

The differences between DBMS software programs may be more drastic than the differences between word processing software packages. The same features may not be offered and the speeds at which the software works may be dramatically different. Many of these programs differ due to the organization of the file structures. Basically, there are four fundamental structures used in database management software programs. The schema or structures of databases present a logical picture of the relationships among files and records in the database and how the data can be retrieved for information and decision-making purposes. The concepts, terminology, and features characteristic of these four systems are discussed below:

(1) A LIST OR FILE STRUCTURE is a simple database--a single list with different records each containing several fields. If a lot of data are included in each file, searching through them may be slow because they have been stored in a sequential order. These kinds of structures are referred to by the terms file handlers, file management, or list processing. The main difference between these and the other systems discussed here is that these records cannot be linked together with other files and related to other database files. In a simple database, the user can only operate on one file at a time.

(2) A HIERARCHICAL database is one in which it is assumed that the data are organized in a top to bottom relationship between a collection of sets (a set being the fundamental collection of records under one branch of a tree-like DBMS structure), much like the members of a family on a family tree. In fact, this kind of database is sometimes referred to as a parent-child relationship. This form of database structure also is recognizable in traditional governmental and organizational structures.

In general, these databases appear natural to use; they certainly build on familiar structures. However, the difficulty lies in the fact that data can be accessed only through the hierarchy which has been established at the time the data are entered and stored. The person designing the database must indicate the hierarchical relationship at the time the data are stored; access to the database must be made through the links established when the database is created. Each element in the hierarchy can have only one relationship.

Hierarchical databases are the oldest of the conceptual databases; better designs are more useful now. Figure 3 illustrates a hierarchical database structure:

ILLUSTRATION OF A HIERARCHICAL DATABASE

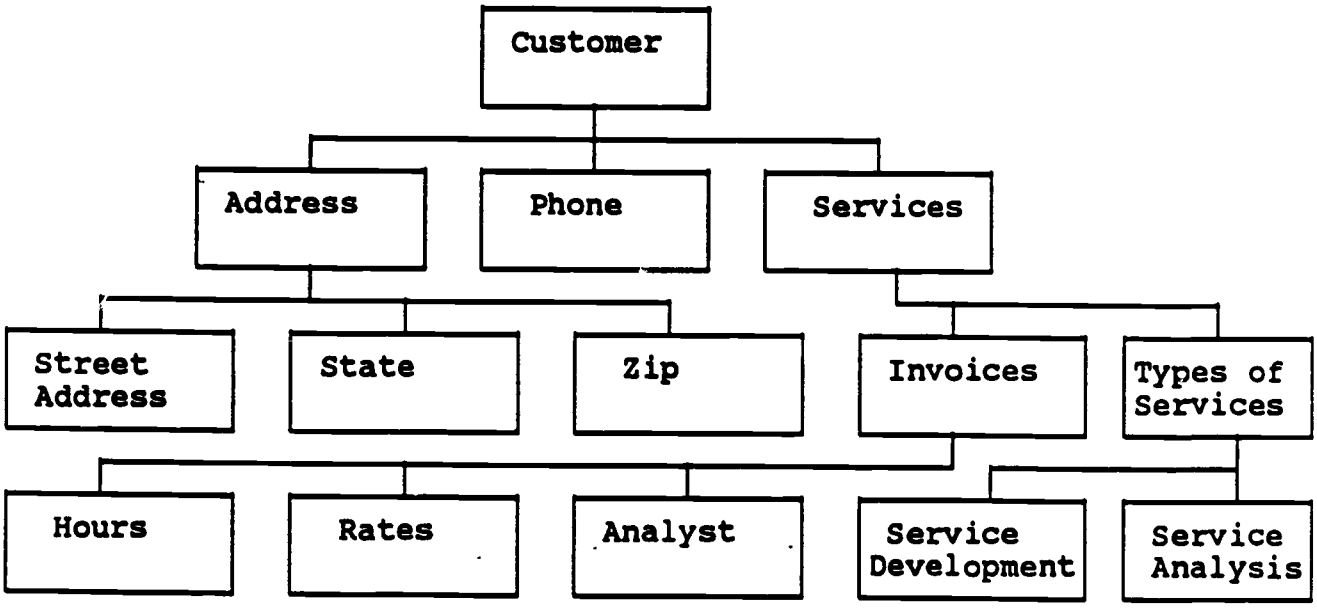


Figure 3.

(3) A NETWORK database acts in much the same way as a hierarchical database, i.e., data are entered in a top to bottom structure. Elements within the database can have more than one relationship. These relationships are sometimes referred to as owner and member. These databases include conceptual files which consist of entries and fields, and owner-coupled sets which consist of records. As in hierarchical databases, the relationships of data must be specified at the time the database is created and certain paths must be followed to retrieve the data. These are the most difficult to design, but they are capable of the greatest power.

Although there is more flexibility with this type of database, it still has the limitation that the relationships must be defined as the database is created and retrieval is based solely on the specified relationship.

Using the example in Figure 3 above, a network database may set up relationships based on a 1:n relationship, such as the following only if they have been specified ahead of time:

Analyst:types of services Address:types of services (geographical) Invoices:types of services

(4) A RELATIONAL database determines the relationships between data at the time the data are accessed. Data stored in a relational database are kept in tables, with each record having the same number and type of fields and must be unique. The record in a relational database is sometimes referred to as a tuple. The lists or files are related through certain fields that are mutually shared. A search in a relational database may involve searches through several files, but the result is usually faster than searching through a file system. Figure 4 illustrates the relational database concept with the related fields outlined in asterisks:

ILLUSTRATION OF A RELATIONAL DATABASE

Service File

Job#	Client	Service	Days
88-1	Co. C	analysis	20
88-2	Co. E	program.	25
88-3	Co. A	training	15
88-4	Co. B	dvelopmt	25
88-5	Co. D	analysis	22

Rate File

Type of Service	Rate
analysis	550
development	600
programming	500
training	475

Customer File

Address	City	Zip
Co. A		
Co. B		
Co. C		
Co. D		
Co. E		

Figure 4.

Relational databases share common fields. In this illustration, one file contains services for a customer; one file contains information on the organization's rates for those services; and the third file contains demographic information about its customers. For Company D, the DBMS can calculate the amount payable for the services (analysis) proffered and supply the customer's mailing address.

When a request (query for information in a database) from the relational database is made, one or more of the three relational operations (also called relational algebra) is performed:

(a) selection: the request may be to "find and list parts in inventory which have a quantity greater than 40". This creates a new "relation" containing these records.

(b) projection: the request may be to "display the part number and vendor number for any part that has been ordered in a quantity greater than five on a single order". This creates another "relation" containing this information.

(c) join: the request may be to join two different relations through the use of common fields. (Figure 4 illustrates this type of request.) A request may be to "display all parts in inventory and include the part description". The common field is the part number. This request creates a new "relation" based upon the request for information.

Requests for information from a relational database can be more complex than these illustrations. The same relational operations are performed on the data, however. The strength of relational databases is that the operations are performed at the time the request is made without predetermined schema such as are required with hierarchy and network databases.

A relational database is much more user-oriented because the user can ask virtually any question and the relational database management system will perform the necessary relational operations to create the relation that contains the data requested. Most off-the-shelf database management software supports the relational databases. These software applications support the objective to make data available to users when they need it and in the form they need it.

Making choices from the four models. Choosing among the four different database schema may be confusing and difficult for the end user. One may be preferred because of the planning time and loading time. Another may be chosen because access to the data may be faster and easier. The third consideration may be that changes and alterations to the database structure and plan are faster. Still, a fourth may have a larger data storage capacity. All of these factors must be taken into consideration.

Before purchasing database management software, the user must define the purposes and needs of the software. Cost, documentation, and vendor support also must be added to the equation.

DBMS Vocabularies

The general vocabularies of a DBMS are discussed and defined below:

data dictionary is a special file containing the names, types, and widths of all fields in the files maintained by the DBMS. New files can be created by adding a new entry into the data dictionary. Many systems use the mnemonic method; i.e., they use common names for fields, such as "name", "address", "zip", "room number", etc.

query facility gives nonprogrammers (end-users) a way to process and update information stored in the database. Many programs use near-English commands, such as:

> for each part supplied, find PNO (part number) and the names of all LOCATIONS supplying the part; or
>
> find SNO (supplier number) and STATUS for suppliers in London.

Natural language inquiries such as "Find", "How many", and "What" are common in many relational DBMS programs. However, command language and interfaces that use pictures and diagrams are the most prevalent methods of giving commands to a DBMS. Important features to consider are: clarity, simplicity, and power of the query language.

report generator is a special kind of query facility. Instead of processing files for the purpose of updating another file, a report generator processes files for the purpose of printing the results on paper. A good report generator allows the selection of one or more fields from one or more files. Figure 5 illustrates the results of generating two reports using the computer inventory example. This report has combined information about the computers and printers in inventory with room numbers and persons using the equipment. The same kind of report could be generated for printers and monitors, etc.

In order to create this report, four dialogues occur: (1) set up the report date and headings; (2) establish which fields are to be included in the report columns, (3) determine where the breaks and margins will be, and (4) create a dialogue for report format. The first time through the process of data entry to report generation may take two

File: Equip Inv Rept
Report: Equip Inventory 1

Computer	Ser # Comp	Comp Model	Room No.	Person	Date Install
IBM-XT	6468635	089	F-202	Joyce Lemaster	Mar 10 86
IBM-XT	6106358	089 w/Tecmar	F-203	Carol Bratton	Feb 4 86
IBM-XT	6105588	089 w/AST	F-203	Computer Center	Feb 4 86
Sanyo 555	14838502		F-203	Computer Center	
IBM-XT	6475483	089	F-206	Jo Ann Cottrell	Mar 10 86
IBM	1922985	176	F-206	Laurie Riorden	Aug 26 86
IBM-XT	2041544	089 w/MTBackup	F-207	Nancy Owen	Jun 5 86

File: Equip Inv Rept
Report: Equip Inventory 2

Printers	Ser # Print	Printer Model	Room No.	Person	Date Install
Quietwriter	4021034		F-202	Joyce Lemaster	Mar 10 86
Quietwriter	4021126	Model 2	F-203	Carol Bratton	Feb 4 86
C.ITOH F-10	BJ19BU	Starwriter	F-203	Computer Center	Feb 4 86
C.ITOH F-10	BJ19BU	Starwriter	F-203	Computer Center	
Quietwriter	0141468		F-206	Jo Ann Cottrell	Mar 10 86
Quietwriter	4032844	Model 2	F-206	Laurie Riorden	Aug 26 86
Quietwriter	0138545		F-207	Nancy Owen	Jun 5 86

Figure 5.

to three hours to complete. In contrast, a programmer using a computer language, such as COBOL, may require a week or two to write the program just to print the report.

compatibility with other programs is an asset with DBMS programs and provides a way to move data between files and other programs. The most typical interchange is a transfer of information between the DBMS and spreadsheet, word processing, and graphics programs--generally found in most integrated software. A data interchange facility of the DBMS in which file data are made available to other programs is a plus when selecting DBMS software. An important feature to consider is capability of file import/export compatibility.

restructure ability allows one file to be restructured to accept data from a second file with simple commands. In most DBMS programs, data from an old file must be copied into a second (temporary) file in order to restructure it; then the original data are appended to the new file structure. A general model used by most DBMSs to restructure might include the following commands:

```
USE OLDFILE
COPY TO NEWFILE STRUCTURE
USE NEWFILE
MODIFY STRUCTURE
APPEND FROM OLDFILE
RENAME NEWFILE AS OLDFILE
```

data integrity consists of back-up and restore routines for file maintenance, access control for files that are shared with other users, and other programs to guarantee the safety of data. Effectiveness of DBMS in handling errors and recovering data is a critical factor. To increase this effectiveness, the following methods are suggested to enhance data integrity:

(a) A back-up copy is the best protection against complete loss of records and can restore previously deleted records to an active state and provide information for an audit trail.

(b) An audit trail is the recorded history of insertions, deletions, modifications, and restorations performed on a file. A complete audit trail is maintained if the DBMS stores the date and time of every modification made to every record in the file. This may be impractical; therefore, one way of obtaining a satisfactory audit trail is to produce periodically a dated report containing all records in the file and to print all modifications to the file as

they are made. The report combined with the printed transactions constitute a reasonable audit trail. A back-up copy also can be part of an audit trail by providing a dated copy of all records at a certain point in the life of the file. A history of the file can then be reconstructed from the periodic back-up reports and the record of modifications.

(c) A secure DBMS performs a special kind of delete operation. Whenever a record is deleted, it marks the record with a deletion flag rather than actually erasing the record. This means the record is still recorded in the file. Because it is flagged, it is skipped whenever a look-up, modify, or print operation is performed. A sophisticated program can copy the active and 'deleted' records to another file, making the deleted records active again. This kind of recovery is called "back-up with restore".

multiple-user DBMS supports several users at the same time who have access to one or more large disks holding commonly accessed files. Certain problems can arise from this configuration called race conditions: (a) Suppose one user of a file is modifying a record when a second user attempts to look up the same record. Does the second user obtain the new version of the record or the record as it was prior to the modification? The uncertainty of the outcome for the second user is a race condition. OR (b) Suppose the first user accesses a record just before a second user modifies one of the fields in the record; the first user may decide whether to modify the record on the basis of values that were changed by the second user--without knowing that the second user has modified the record. A race condition occurs again because the outcome is uncertain for the first user.

To overcome these problems the DBMS must be able to lock the file whenever modifications are performed. A file is locked if only one user is allowed access to it. The shared file must be locked before any user can modify, delete, or insert a record into the file. Some systems use a "record lock" so that simultaneous modifications can occur elsewhere in the file but not to the locked record.

Database/Electronic Publishing Services

With the emphasis on getting the right information to the right person at the right time for effective decision making, access to data is critical. Besides access to data within an organization, it is just as important to know about outside database services which are available to an organization or an individual. A database service offers

access to large amounts of information that has been indexed and stored in a computer by a service company. Access to the service may be accomplished by communicating from any computer terminal to the database service computer generally for a subscription fee and/or a monthly fee and the cost of using telephone lines over which to communicate. Examples of these types of services include Compu-Serve, The Source (Reader's Digest), Dow Jones News/Retrieval (Dow Jones and Company), Westlaw (Westlaw Publishing Company), Dialog Information Retrieval (Lockheed Missile and Space Company), Information Bank (New York Times Information Service-NYT), and others.

Two other types of electronic publishing services are teletext and videotex (called videotext in England). These terms describe a service that makes text and graphic information stored in a computer available through a specially equipped television or a VDT. Usually small computer memory and a control pad or keyboard is added to the TV or VDT in order to be able to access these databanks.

(a) Teletext is an electronic publishing service that is distributed to many TV stations and includes news headlines, entertainment listings, captions for the hearing impaired, airline schedules, classified ads, and other easily condensed materials.

(b) Videotex is an electronic publishing service that is distributed by cable TV or telephone wires that provides the home user access to large centralized databases. Its service is comparable to time-sharing services such as the database services mentioned above. Videotex is interactive (has two-way communication capabilities) which provides electronic mail, personal computer functions, and in-home banking and shopping. The future possibilities for the home user include shopping, banking, reading a newspaper, and receiving stock quotations through the TV set. An example of how this service might work is as follows:

An individual at home viewing a TV screen might see an offer for a particular item. The advertiser of the item explains the offer and asks the viewer to respond. The responses are possible by using reply frames. Reply frames might ask the viewer certain multiple choice format questions such as color, size, and quantity. The viewer

selects the color from choices and keys in the reference number of the item along with the viewer's ID. From the order form on the TV screen, the viewer fills in the requested information and the advertiser uses the information to fill the order.

Videotex service was started in England in 1979 and is called Prestel. In France, this service is called Teletel or Antiope; Teledon is the Canadian name for the same service.

On a limited basis, this service is provided in the United States by AT&T and Knight-Ridder Newspapers, Continental Telephone, and IBM. Look for this type of service to grow in the future as home users learn of the advantages of having access to public databanks such as Compu-Serve, The Source, Information Bank, etc.

Issues in Database Management

(Note to instructor: Use the following questions to stimulate discussion on the following issues related to data access, ownership, and security.)

Controlling Access to Data. Discuss the need for systems and procedures in organizations which will address the following issues in database systems:

(a) Who has access to what data? Who owns the data? and for what purpose? Which data are used to generate which reports?

(b) What are the back-up procedures including what data are backed up and how often are they backed up?

(c) What controls must be placed on the data so only authorized personnel have access to the data?

(d) When and how are data to be updated?

(e) If data are downloaded to personal computers, what controls will be placed on that data?

(f) In a distributed database environment where data are placed on multiple computers in different geographic locations and the computers are linked by data communications, how are access to and updating of the data to be controlled?

(g) Is it "right" for owners of data to sell their information to the highest bidders?

Data Security. Discuss methods of security of facilities and data such as access to computing facilities, passwords, encryption, or others. Discuss other issues which have evolved from the widespread use of computer technology such as ethics, privacy, and data ownership (intellectual property).

Most organizations have safeguards against unauthorized use of the information in their databases. No matter how secure data are, sometimes data can be tampered with illegally and even stolen. Within an organization, there are many types of information which should remain confidential: salary, health, benefits, production and trade secret agreements, etc. Access to an organization's personnel records database by certain departments requires careful attention to passwords and codes which will provide only that portion of the information needed by that department.

Many news stories in recent years have focused on people who gain access to data maintained by business and government organizations. This is a criminal act and they can be and are being prosecuted for it. For these reasons, organizations have installed passwords, encryption techniques, and key cards or combination codes for accessing data and computer facilities. Organizations are having to deal with other computer crimes, such as employee sabotage of database information and/or stealing of information from corporate databases for profit.

How safe is information stored in an organization's computer database? And is it a good idea for an organization to place all of its information in a database?

These issues are coupled with the concern for personal privacy. Organizations sell their databases or share the data with other similar organizations. A person's name may be listed with an organization which is embarrassing for that individual; e.g., a person may be listed as a member of a political organization from which he/she has resigned due to a change in political viewpoint. If the organization's list is sold to another entity, that person's name may still be on the list.

Information legislation. Recent legislation has been forthcoming regarding some of these issues:

(a) Personal data issues. One law, Federal Privacy Act, passed in 1974, has established limits on the personal information that is kept in government files. This law is intended to prevent any misuse of information about individuals in governmental files. This law is based on the CARTS principle that personal information in federal files must be Complete, Accurate, Relevant, Timely, and Secure. Another law, Freedom of Information Act, passed in 1966, gives people the right to see data that government agencies and businesses are keeping about them. Still another, the Fair Credit Reporting Act, passed in 1970, gives individuals control over the distribution of data about themselves. This law allows people to see the credit records that businesses keep about them.

(b) Two other privacy acts have been enacted to ensure privacy of student records and financial information: The Education Privacy Act, enacted in 1974, ensures the privacy of students records on file with schools that receive federal funds. In most cases, students are asked if their names can be given to outside agencies. The Right to Financial Privacy Act, passed in 1978, gives individuals the right to review information about themselves that is maintained by banks, credit bureaus, and other related financial institutions.

(c) The Federal Copyright Law, passed in 1976, makes duplicating commercial software disks without permission of the publishers as illegal as copying and distributing photocopies of documents and books. This is called software piracy. Hundreds of millions of dollars are lost by manufacturers of software programs because software is being copied for friends, neighbors, and co-workers. This kind of crime is hard to detect; manufacturers are having to rely on the personal integrity and ethics of individuals to deter this crime. Other more drastic measures may include using software encryption to alter a software program when it is copied or putting software programs on firmware chips which are built into computers and cannot be copied.

Individuals and organizations which do not recognize or obey these laws are displaying unethical behavior. However, many times it is difficult to prove that laws are being broken; or else the cost of enforcement may outweigh the benefits. It is imperative that organizations and individuals within the organization publish and maintain a set of professional ethics as it relates to data ownership, intellectual property, and software piracy. These are critical issues that will

become even larger as the amount of and access to information proliferates.

KEEPING UP-TO-DATE

(Note to instructor: Assign reports on outside readings to enhance students' knowledge and awareness of database systems: DBMS applications; new, developing, and changing conditions in DBMS environment; networking with DBMS; accessing large databases from personal computers to mainframes or file servers or minicomputers; careers in database systems; and security features and factors.)

SUMMARY: Concepts, terminology, and vocabulary reviewed and included in the Glossary Related to Database Management Terminology at the end of this task area.

SUGGESTED CLASS ACTIVITIES:

1. Take a field trip to a computing center (preferably on the campus) to observe types of hardware, software, printers, cabling, documents, and security measures is encouraged to get a broad view of data processing.

2. Bring a recipe card file (box with recipes inside) to class and explain how it relates to a file, record, field, entry, and byte. This exercise will help students conceptualize a database system.

3. A suggested format for outside readings is included in the "Student Materials" section as Exercise 1-1.

4. A suggested outline for students to complete as Task Area 1 is included in the "Student Materials" section as Exercise 1-2.

5. In the "References" section, a short article entitled "The World of Data Bases" is included. Ask students to read and summarize the article.

6. Test 1 and Test 2 related to Task Area 1 are included in the "Evaluation" section.

GLOSSARY OF DATABASE MANAGEMENT TERMINOLOGY

audit trail is the recorded history of insertions, deletions, modifications, and restorations performed on a file.

byte is the string of characters within the fields.

CODASYL (Conference On DAta SYstems Languages) is an organization which is seeking to establish appropriate standards, designs, and specifications for databases that can be widely used by database vendors.

compatibility with other programs is an asset with DBMS programs and provides a way to move data between files and other programs.

data dictionary is a special file containing the names, types, and widths of all fields in the files maintained by the DBMS.

data integrity consists of back-up and restore routines for file maintenance, access control for files that are shared with other users, and other programs to guarantee the safety of data.

data processing is the processing of raw data or facts (numbers, letters, or symbols) into usable written information. Data processing is the oldest of the three elements in the information processing cycle and is generated for in-house consumption. The data that are processed are in what is called a database.

database file is the full collection of data about a specific subject.

database management systems (DBMS) are electronic files that have been set up to structure raw data into files which can be stored, retrieved, processed, manipulated, and disseminated for decision making.

database service offers access to large amounts of information that has been indexed and stored in a computer by a service company. Examples of these types of services include Compu-Serve, The Source, Dow Jones News/Retrieval, Westlaw, Dialog Information Retrieval, and others.

entry is the information in each field.

Fair Credit Reporting Act, passed in 1970, allows people to see the credit records that businesses keep about them.

Federal Copyright Law, passed in 1976, makes duplicating commercial software disks without permission of the publishers as illegal as copying and distributing photocopies of documents and books. Another name for this is software piracy.

Federal Privacy Act, passed in 1974, is intended to prevent any misuse of information about individuals in governmental files. This law is based on the CARTS principle: personal information in federal files must be Complete, Accurate, Relevant, Timely, and Secure.

field is a single element of data, such as person, room number, date installed, computer serial number, account balance, etc.

Freedom of Information Act, passed in 1966, gives people the right to see data that government agencies and businesses are keeping about them.

hierarchical database is one in which it is assumed that the data are organized in a top to bottom relationship between a collection of sets (a set being the fundamental collection of records under one branch of the tree-like DBMS structure) much like the members of a family on a family tree. This kind of database is sometimes referred to as a parent-child relationship.

information processing is defined as the manipulation of data and text into final format and/or movement to its final destination.

list or file structure is a simple database--a single list with different records each containing several fields. These kinds of structures also are called file handlers, file management, or list processing.

locked file allows access to one user at a time.

multiple-user DBMS supports several users at the same time, having access to one or more large disks holding commonly accessed files.

network database acts in much the same way as a hierarchical database, i.e., data are entered in a top to bottom structure. Elements within the database can have more than one relationship. These relationships are sometimes referred to as owner and member. These databases include conceptual files which consist of entries and fields, and owner-coupled sets which consist of records.

query facility gives nonprogrammers (end-users) a way to process and update information stored in the database.

race conditions occurs when one user of a file is modifying a record at the same time that a second user attempts to look up the same record. Does the second user obtain the new version of the record or the record as it was prior to the modification? The uncertainty of the outcome for the second user is a race condition.

record is the entry made into the database file.

record lock is used by some systems so that simultaneous modifications can occur elsewhere in the file but not to the locked record.

relational algebra is the description of one of three relational operations which can be undertaken when a request (query for information in a database) is made:

(a) join: the request may be to join two different relations through the use of common fields.

(b) projection: the request may be to "display the part number and vendor number for any part that has been ordered in a quantity greater than five on a single order".

(c) selection: the request may be to "find and list parts in inventory which have a quantity greater than 40". This creates a new "relation" containing these records.

relational database determines the relationships between data at the time the data are accessed. Data stored in a relational database are kept in tables, with each record having the same unique number and type of fields. The record in a relational database is sometimes referred to as a tuple.

report generator is a special kind of query facility. Instead of processing files for the purpose of updating another file, a report generator processes files for the purpose of printing the results on paper.

restructure ability allows one file to be restructured to accept data from a second file with simple commands. In most DBMS programs, data from an old file must be copied into a second (temporary) file in order to restructure it; then the original data are appended to the new file structure.

schema or structures of databases present a logical picture of the relationships among files and records in the database.

teletext is an electronic publishing service that is distributed to many TV stations and includes news headlines, entertainment listings, captions for the hearing impaired, airline schedules, classified ads, and other easily condensed materials.

tuple refers to the record in a relational database.

videotex is an electronic publishing service that is distributed by cable TV or telephone wires that provides the home user access to large, centralized databases. In England, this service is called videotext.

DATABASE SYSTEMS

Task Area 2

Given a microcomputer, dedicated system, host, or other configuration in the classroom and database management software, the student will be able to produce database documents which include utilization of the common features and the more advanced features of the software with 90% accuracy (or to the level of mastery). The focus of this course is to build on skills acquired in Computer Business Applications I (the prerequisite course).

Suggested teaching strategies: (1) Tour the classroom with teacher demonstration; follow up with apprentice-type instruction where teacher and student answer questions and perform basic manuevers together. Oral or written examination of procedures to ensure automatization through the use of a laboratory identification exercise.

(2) Complete hands-on exercises by students to meet the course objectives. Exercises should include inputting, storing, retrieving, processing, printing, and distributing database documents.

Identify the purpose of the course (what is to be accomplished); then identify the hardware, software, peripherals, and other equipment students will need to be able to access and manipulate. (NOTE TO INSTRUCTOR: Cover this material only if you feel that the students do not have the background or familiarity with your classroom procedures from other courses.)

HARDWARE

1. Identify the basic parts of the computer hardware configuration in your classroom. Generally, these parts should include: CPU, monitor, internal microprocessor (be specific: 8088, 8086, 80186, 80286, 80386, 6502, 65C02, etc.), memory (ROM, RAM, K available for classroom configuration: suggested: 256K for single function software; 512/640K for integrated software; and 1Mb and up for network controllers), keyboard (identify elements which are different from traditional typewriter), printer, hard disk or other storage media, light pen, mouse, voice entry equipment (if available and a part of the course), touch screen, OCR, or graphics tablets.

THE NAME OF THE COMPUTER(S) USED IN THIS CLASSROOM:

_____.

IT (THEY) HAS (HAVE) _____ AMOUNT OF MEMORY IN THE RAM; IT USES (THEY USE) A _____ MICROPROCESSOR. THE PARTS OF THE KEYBOARD WHICH ARE DIFFERENT FROM A REGULAR TYPEWRITER ARE: FUNCTION KEYS, SOFT KEYS, AN ESC(APE) KEY, A TEN-KEY PAD, ALT/CONTROL KEYS, CAPS LOCK KEY, A DELETE KEY, etc. DOES IT HAVE A MOUSE OR A LIGHT PEN? (Ask students to identify the keys, also.)

2. Care of hardware should include:

Start-up procedures:

Turn on the equipment in the appropriate sequence. To ensure that students know this procedure, ask them to teach it to someone else in the class. Take the time to allow this to happen right now.

Exhibit proper disk handling techniques.

Open disk drive door(s) and insert disk(s) in the proper sequence and manner. Identify A and B drives.

Close disk drive door(s) and boot the system and appropriate software to begin program execution, identifying and using correct function or control keys required to complete the process.

Adjust the workstation (screen, chair, paper stand, etc.) for comfort and efficient operation. PRACTICE THESE PROCEDURES IMMEDIATELY FOR REINFORCEMENT.

Power-down procedures:

Store the materials created on the computer during work time to the proper media available in the classroom.

Remove disks and store in the location designated in the classroom for students' materials (or the proper care and handling if students are responsible for their own disks).

Turn off the equipment (printer, CPU, monitor) in the proper sequence. Again, ensure automatization by asking students to demonstrate to someone else.

3. Availability and accessability of the hardware in your classroom should be discussed with students, especially if you require laboratory time. Be sure that students know where hours are posted, who is in charge and

available to assist them, and how they can access documentation pertinent to the hardware for reference.

THE LAB IS LOCATED: _____
THE LAB HOURS ARE POSTED: _____
THE LAB ASSISTANT(S) IS(ARE): _____
THE DOCUMENTATION IS LOCATED: _____
PAPER AND RIBBONS/TONER LOCATED: _____

THE PROPER PROCEDURE TO CHECK OUT SOFTWARE IS POSTED:
_____.
YOU STORE YOUR DISKS: _____.

SOFTWARE

1. Identify and define the basic parts of the media on which programs are recorded, as indicated: floppy disks: sectors, double-/single-sided, double/single density, double sid ./quad density; 3-1/2" disks; 5-1/4" disks; 8" disks; hard disks; optical disks (CD-ROM or optical digital disks); purpose of the covering (jacket) of the media.

2. Describe the care and handling of disks:

   Avoid touching the exposed surfaces of the disk.

   Avoid exposure to magnetic and electrical equipment.

   Do not write directly on the disk with anything but a felt-tip pin. OR Write on the label before applying it to the disk.

   Do not use paper clips or metal clips to hold groups of disks together or to attach to letters, etc. Avoid exposure to extreme heat or cold. Recommended storage temperatures are between 50-125°F and 20-80% humidity.

   (If possible, open an old disk and display the magnetic sheet on which data are stored.)

   Start-up procedures:

   Proper insertion of disk into disk drive. OR Proper start-up from hard disk.

   What to expect from the disk drive after the software has been inserted: red light on, noises, etc. When or is it permissible to open a disk drive door when the

red light is on?

Power-down procedures:

Proper disk storage procedure for materials created on the computer during work time. Proper exit from software. Why is it important to go through the "exit" routine (if it is required on your software)?
Proper removal of disk from disk drive. OR Proper exit from hard disk.

Storage procedure of disk into sleeve; where to store disk in the classroom; or proper care if students are responsible for transporting disks themselves.

3. Discuss accessability and availability of applications software in the classroom: where stored, how to access, what identification is necessary for laboratory assistant (if any), hours of availability, access to documentation for applications software for reference. Where do students obtain data disks? How many will be needed for the course?

THE DOCUMENTATION IS LOCATED: _____
THE PROPER PROCEDURE TO CHECK OUT SOFTWARE IS POSTED:
_____.
THE SOFTWARE YOU WILL NEED: _____
_____.
YOU STORE YOUR DISKS: _____

4. Discuss types of application software to be used in this course and the operating systems which correspond: CP/M, MS-DOS, PC-DOS, Unix, Xenix, etc. Suggested database management software programs include but are not limited to: dBase II, dBase III, dBase III+, R:Base, Appleworks, Framework, Multimate Advantage, Smart, Enable, PFS File/Report, Power Base, Data Ease, Excel, RapidFile, Reflex, etc.

(See "Visuals" for an overview of database management functions. Add specific visuals for the database management software you will use in your classroom.)

Database Management: SOFTWARE: _____

Defined as electronically collecting and storing word and numeric data for subsequent referral and manipulation.

Amount of memory used by the database management software applications program in your computer environment.

AMOUNT OF MEMORY REQUIRED BY SOFTWARE IS: _____

Structure of a database applications program includes files, records, fields, and the database. Differentiate between field entries and field names.

Uses of database management application software in this course will include:

data entry
editing/adding records
revising/changing records
sorting/analyzing
modifying a database structure
arranging a database file
generating simple reports
advanced searching
advanced report generation

5. Students will complete the tutorial for the specific database management software, if available, which is to be used in the classroom--either individually or as a group. Successful completion of this tutorial is evidenced by the score of 90 or above on the exercises turned in for evaluation.

6. Integrated applications software (if appropriate):

SOFTWARE: _____

Defined as software which permits the creation and integration of word processing, spreadsheet, database, and graphics to be merged into one document.

Amount of memory used by the integrated software applications program in your computer environment.

AMOUNT OF MEMORY REQUIRED BY SOFTWARE IS: _____

Uses of integrated software in this course will create, edit, and format word processing, spreadsheet, and data base documents which can be integrated into one document, along with the creation of appropriate graphics. (Add visuals pertaining to integrated software here, if appropriate.)

STORAGE MEDIA

1. Identify and discuss the care and handling of other storage media which might be used in your classroom.

   Specific information should be supplied about cassettes or tape drives:

   Cassettes

   How to backup material on cassettes and where to store the cassettes for future reference. Where cassettes are located.

   Tape reels

   Generally, tape reels are used with larger computers; however, in an environment where terminals are networked into a minicomputer or larger, tape reels may be appropriate storage devices. If this is the case in your classroom, how to store and where to retrieve will be critical information.

2. Availability and accessability of storage devices in the classroom should be discussed with students so that they know lab hours, assistance available, and any documentation that is available for reference.

PERIPHERALS

1. Identify the basic parts of the peripherals available in the classroom: printers, monitors, disk drives, light pen, mouse, OCR, or other peripherals students will use for this course.

2. Describe the care and handling of the peripheral equipment as it applies to your classroom. Care and handling will be dependent on availability in your classroom. The most common peripherals which students most likely will use are printers, monitors, and disk drives.

Specific information regarding printers should include:

Type:

Specific brand of printer on which students will be working; is it dot matrix, character/wheel printer, thermal, ink jet, laser; classified as impact/non-impact; tractor or friction feed: does it feed paper

continuously or sheet feed paper or both; does it require ribbons or toner; how fast does it print; price range, if available; other data.

Start-up procedures:

How and where to turn on, when to turn on, how to adjust paper to begin printing, loading paper, feeding paper (if appropriate).

Power-down procedures:

How to turn off, when to turn off; where paper is stored.

Care and handling of printers:

How to change ribbons; how to change the toner cartridge (if allowed); where ribbons and toner are stored; how to change the switches for controlling printing modes; simple troubleshooting exercises for equipment peculiarities.

NAME OF PRINTER: _____
MANUFACTURER: _____
TYPE: DOT MATRIX NEAR-LETTER QUALITY LASER
IMPACT NON-IMPACT DAISY WHEEL
ELECTRONIC TYPEWRITER LETTER QUALITY
PARALLEL SERIAL
PAPER FEED: TRACTOR FRICTION CONTINUOUS
SHEET FEED BOTH
WHAT IS REQUIRED TO CHANGE FROM CONTINUOUS FEED TO SHEET FEED?
DISCUSS HOW TO CHANGE PAPER, RIBBONS, TONER, TURN ON/OFF, TROUBLESHOOTING, OTHER.
DOES IT USE: RIBBON TONER
SPEED: _____
PRICE: _____
HOW IS IT CONNECTED TO COMPUTER?
PAPER AND RIBBONS/TONER LOCATED: _____

Specific information regarding monitors should include:

Start-up procedures:

How and where to turn on; when to turn on in the boot-up sequence; what to expect when material is displayed; adjustment for comfort.

Screen: number of lines displayed, 80 column display, display (green on dark background, black on white background, white on black background, amber on gray or dark background, color), graphics capability (pixel count), touch screen; brand of monitor.

Power-down procedures:

How to turn off; when to turn off in the power-down procedure; results of not being turned off when powered down.

NAME OF MONITOR: _____
MANUFACTURER: _____
NUMBER OF LINES DISPLAYED
HOW TO TURN ON/OFF
COLOR OF SCREEN _____
GRAPHICS CAPABILITY? PIXEL COUNT (if known)
PRICE: _____
HOW IS IT CONNECTED TO COMPUTER?

Specific information regarding power surge protection should include:

Why it is necessary; what to do in the event that the monitor goes blank; the value of saving often; damage to the equipment which may result without it; costs and types. What is available in your classroom?

IS SURGE PROTECTION PROVIDED ON THE EQUIPMENT STUDENTS WILL BE USING? DISCUSS ANSWERS TO QUESTIONS ABOVE.

Specific information regarding disk drives should include:

Disk drives:

Start-up procedures: Where located on CPU. Proper way to open a disk drive door, without forcing, and the proper insertion of the disk(s). Meaning of noises and red light on disk drives. If more than one disk, which is 1 or 2 or A or B. What happens when disks are inserted the wrong way or into the wrong disk drive to begin with? How does disk drive "read" disk?

Power-down procedures: Proper way to remove disks, and to turn off disk drives.

Cleaning: Demonstrate the proper cleaning of the disk read/write heads with a disk-cleaning kit. Discuss the

need, timing, and results of proper disk drive maintenance.

Hard disks:

How to access programs stored on the hard disk; what to expect in the way of noise and lights; how to store created materials on to students' floppy disks on floppy disk drives; how to log off hard disk and power down computer.

OTHER EQUIPMENT

As applicable and appropriate in your classroom setting, review the start-up, care and handling, and power-down procedures for equipment not specifically mentioned. This might include the mouse, light pen, or touch screen--equipment which would be used in this course.

TROUBLESHOOTING

Discuss with students: IDENTIFY AND CORRECT SIMPLE PROBLEMS WITH THE HARDWARE OR SOFTWARE IN THE CLASSROOM WHICH MIGHT INCLUDE: PAPER ALIGNMENT IN PRINTER, PAPER FEED IN PRINTER, POWER OUTAGES, POWER BLOCKS, LINE SPIKES, DISK ERRORS, AND MECHANICAL PROBLEMS, AND WHAT THEY ARE PERMITTED TO DO TO CORRECT THESE PROBLEMS.

Demonstration of the diagnostic disk to determine the malfunction and/or the necessity of calling for outside help is also appropriate. The purpose of this discussion is to inform students of the most common problems encountered in your particular classroom and to help them learn to make decisions as to when they can correct the problem or when they need to call for assistance. Decision-making skills in this area are important for transferability to the work place.

DISTRIBUTION OF DATABASE DOCUMENTS

At the end of this phase of Task Area 2, the student will be able to demonstrate how to distribute database information to final destination using traditional methods (mail, face-to-face, etc.), as well as modems or facsimile (if equipment is available), by accomplishing the following commands:

a. determine the best method of disseminating the information created for the following situations:

(1) normal distribution of information to persons inside and outside the organization;
(2) overnight delivery of document;
(3) delivery of document (called for at 9:00 a.m.) to manager in another city who needs it by 12 Noon for a meeting at 1:00 p.m.;
(4) delivery of information to employee in another department who has come in person;
(5) delivery of copy of document to manager overseas;
(6) delivery of information to employee in another department who has called;
(7) delivery of information from one colleague to another colleague who is out of the office but needs the information when he/she returns.

b. demonstrate how to use facsimile, modems, or other information distribution devices which may be available in the classroom to send documents.

SUMMARY: Review the care, handling, accessability, and availability of hardware, peripherals, and other equipment in your classroom by providing a hands-on test for students: label the equipment in the classroom by putting numbers or instructions on hardware, software, printers, storage devices, cabinets, documentation, etc., asking students to identify the part(s) or demonstrate the care and use. A suggested evaluation is included in the "Evaluation" section as Test 3.

At the conclusion of Task Area 2, students will be able to demonstrate mastery skills in manipulating database software; i.e., entering data, revising, sorting, modifying, printing, generating reports, and searching. A suggested evaluation form is included in the "Evaluation" section as Test 4.

Suggested Textbooks

Textbook materials are readily available from publishing companies which will provide students with the opportunity to develop competencies in the functions of database management software listed above. Some of these textbooks are listed below:

Appleworks[R]: Integrated Applications for Microcomputers. Dean Clayton and Ok D. Park. South-Western Publishing Company, 5101 Madison Road, Cincinnati, OH 45227.

Applications Using the Personal Computer. Nancy Groneman and Susan Owen. South-Western Publishing Company, 5101 Madison Road, Cincinnati, OH 45227.

Computing Today: Microcomputer Concepts and Applications, David R. Sullivan, Theodore G. Lewis, and Curtis R. Cook. Houghton Mifflin Company, 13400 Midway Road, Dallas, TX 75244-5165.

Computing Tools: Appleworks[TM]. Minnesota Educational Computing Corporation, 3490 Lexington Avenue North, St. Paul, Minnesota 55126.

Database, Iris Blanc/Elinore Hildebrandt. Dictation Disc Company, 14 E. 38 Street, New York, NY 10016.

101 Database Exercises. Jeffrey R. Stewart, Jr., Sandra R. McMinnis, and Nancy M. Melesco. Gregg/McGraw-Hill, 1221 Avenue of the Americas, New York, NY 10020.

Mastering Reflex. Sybex Computer Books, 2021 Challenger Drive, #100, Alameda, CA 94501.

Mastering RapidFile. Sybex Computer Books, 2021 Challenger Drive, #100, Alameda, CA 94501.

Mastering dBase III or Mastering dBase III +. Sybex Computer Books, 2021 Challenger Drive, #100, Alameda, CA 94501.

MultiMate[TM] Advantage: A Practical Approach. Sally Graham. South-Western Publishing Company, 5101 Madison Road, Cincinnati, OH 45227.

Teacher-developed materials.

...and others.

DATABASE SYSTEMS

Task Area 3

Given a list of database management systems software, the student will be able to develop factors to be considered in comparison and evaluation, selection of, modification of, and utilization of database management systems in an automated environment to the satisfaction of the instructor.

Suggested teaching strategies: Students' efforts will be directed toward problem solving and decision making in a case study.

(Note to instructor: The performances in the next three task areas center around preparation for problem solving and decision making related to the major case study in Task Area 5.) In this task area, selection and comparison factors are selected by the class in order to compare four database management software packages.

1. On an individual or project team basis, select four off-the-shelf database management software packages which are unfamiliar to the individual or group to compare and evaluate. Some of these packages may be available in the classroom or laboratory. Others will be reviewed in the vendor's showroom.

2. The class as a whole should develop the factors to be considered in comparison and evaluation, selection, modification, and utilization of the database management software packages. After hands-on experience with one software package in Task Area 2, the resulting evaluation form may include the following factors as the very minimum:

   Name of software

   Type of software (if not readily recognizable in the name of the software)

   Version number and date

   Developer (vendor, manufacturer)/name of company

   Cost: list vs actual? What is included? License agreement? Can back-up copies be made? Vendor availability for problems [toll-free number]? Are updates available at low cost? Networked versions available? etc.

Requirements to run software: Compatibility with hardware (specifically, type of PC, model #, etc.)? RAM required to support software? Other peripherals required or supported? Cabling required and available?

Printers supported or system configuration requirements

Description of the scope of the functions of the software based on the following criteria:

(1) type of structure (list processing, hierarchical, relational, network)
(2) flexibility of the report generator
(3) capability of file import/export and compatibility
(4) effectiveness of error handling and recovery
(5) extent of multiple-file processing
(6) clarity, simplicity, and power of the query language
(7) power and number of on-screen forms
(8) multiuser capability
(9) file access time
(10) processing speed
(11) data access method (sort versus index)
(12) password security or other security feature
(13) compatibility with the next version of the software
(14) other features

Terminology encountered: Is the terminology familiar or are there too many new terms? Who could use it in the automated office and for what purposes?

Report on at least one review of the software in a current computing magazine or research service write-up to get the users' viewpoint. (These services include DataPro or Seybold reports.)

Value of the software to the automated office: Will it save time? Will it enhance decision making? etc.

Documentation: Is it easy to read? Is a learning disk or tutorial included? Is there on-line help?

Limitations encountered with the software: What do you see as the drawbacks (keeping in mind that the perfect piece of software is never available)?

Recommendations: Is it worth the cost? Is it going to automate repetitive tasks or enhance decision making? What will be accomplished through the purchase of this software by a company? Would documentation need to be rewritten? Is training required? Other?

This evaluation checklist is included in the "Student Materials" section as Exercise 3-1. It contains a typical list of factors to use when comparing several DBMS packages. This kind of comparison may not reveal the nature of the program; however, it does allow comparison of essential features.

3. Oral presentations (including visual aids) should be made to the class by the individuals and/or project teams, illustrating the comparison and evaluation of the four packages chosen by the individual or group.

4. A handout will be distributed to class members by the individuals or project team during the oral presentation, covering the comparisons and evaluations of the four software packages.

5. Read the case study which can be found as Exercise 5-1 in the "Student Materials" section. Choose one of the four DBMS software packages to apply to the case study situation. Be prepared to defend that choice by specifically pointing out the features of the DBMS software which will meet the minimum requirements in the case study.

6. A written critique will be prepared for evaluation by the instructor. The written critique also will include the defense of the one database software for the case study situation.

A suggested time length for completing all the requirements in this task area is two weeks.

DATABASE SYSTEMS

Task Area 4

Given a list of factors developed for the comparison and evaluation, selection, modification, and utilization of database management software, the student will be able to gather information, design, create, set up, utilize, and integrate the selected database into the automated environment and demonstrate a knowledge of the process of database development through an oral presentation to the satisfaction of the instructor.

Suggested teaching strategies: Students' efforts will be directed toward problem solving and decision making in a case study.

The way in which a database is created depends on the software program that is used. The file will group similar items of information together so that all the items will be entered in the same order. If the same order for entry is not followed, it will be impossible to accurately use the database program. Once a database has been created, it is a simple matter to add, delete, or change information. This capability allows the user to keep the database accurate and up to date.

One of the advantages of using a database is the ability to pick out specific records from the entire file. Because the software has this capability, the user saves time, money, and effort. Even though most database software programs have this ability, the commands will be different for each database management applications software package as has been seen in the presentations in Task Area 3.

The files can be printed in a variety of different ways--the entire database can be printed or just a portion of it. A variety of formats can be created depending on different combinations of records and fields.

To complete the requirements for this task area, the students will accomplish the following:

1. Given a set of data in Exercise 4-1 found in the "Student Materials" section, students either individually or as a class exercise, will first respond to a series of questions. These questions are included in Exercise 4-2 in the "Student Materials" section.

2. Upon answering the questions in Exercise 4-2, the students will create the database file on selected database management software building on skills and knowledges from Task Areas 1-3.

3. From a list of suggested report formats, individuals or project teams will select one format to generate and present to the class in an oral presentation. The oral report will include visual aids and handouts. The handout will serve as a written report to the instructor and will be evaluated.

4. Select one of the following report formats, create the report format, print it, and report to the class on the specific procedures of the database management software to create the format:

First format:
Alphabetical listing of insurers.
Alphabetical listing of insurers by agent.
Alphabetical listing of insurers by zip code.
Alphabetical listing of insurers by telephone prefix.

Second format:
Listing of insurers by type of insurance (in alphabetic order).
Listing of insurers by type of insurance (in numerical amount of insurance).

Third format:
Provide each agent with his own: alphabetical list of insurers by zip code, telephone prefix, amount and type of insurance.

Provide each agent with the amount of insurance he has sold to date, listing the largest amount to the smallest amount.

Provide each agent with his/her list of insurers and the date of the last call.

Fourth format:
Provide the owner of the agency with one listing which has the following information: alphabetical listing of insurers, alphabetical listing of insurers by agent, the amount of insurance sold by agent listed in descending order, the amount of insurance sold by agent listed in ascending order, plus other information.

Provide the format of the monthly report which is sent to each of the home offices represented by this independent agency.

Fifth format:
Provide each office in the agency with information from the database which you determine it needs. The offices

are Personnel, Accounts Payable (including agents' commissions), Accounts Receivable (including insurance payments), Agents, and others.

(Note to instructor: Be sure that each of these formats is covered by the class in order to see a wide variety of applications. Assign the formats to various groups OR require each group to create each format.)

****

INDIVIDUAL OR CLASSROOM EXERCISE

Prior to completing the classroom exercise, review Exercise 4-2, Database Applications Procedures, with students:

1. To create a database, the following questions must be answered (depending on the software that will be utilized):

   What are the variables--fields (categories)--that you will use in this database?

   How are new records inserted, deleted, modified?

   How are new fields (categories) added, deleted, modified?

   How would a misspelled name be corrected once it is in the database?

   If a multiuser system, is there a lock or record lock which needs to be activated? How?

   Is a data dictionary available? What are the query terms that need to be set up?

   How is the database saved to disk?

   What is the name of the database?

2. To create a report from the database, the following questions must be answered (depending on the software that will be utilized):

   How are reports generated? How is the report format arranged?

How would this database be printed in alphabetical order? numerical order? in mailing labels?

How is the database retrieved from disk?

How are data sorted?

How are the revised data saved? printed?

What other reports could be created from these data?

What are the query terms?

3. To select specific records from the database, the following questions must be answered (depending on the software that will be utilized):

How is the database retrieved from disk?

How are data selected by zip code, phone prefix, ag ., type of insurance? or other formats?

How are the data displayed alphabetically in report form for each set of specific data?

How is the newly created or newly revised database printed?

4. To print the database, the following questions must be answered (depending on the software that will be utilized):

How is the database retrieved from disk?

How is the database sorted alphabetically? What other sorts are possible with this database?

How are only two columns of this database printed? (depending on the software)

How are only portions of the data in the database printed? How can they be saved as a new database?

<u>SUMMARY</u>: At the conclusion of this task area, students should be able to answer questions related to creating a database document, selecting a report format, manipulating the software to create the report format, and printing the selected report format.

DATABASE SYSTEMS

Task Area 5

Given a specific database management environment, the student will be able to set up, disseminate, and revise written guidelines and documentation for database users in the specified automated environment <u>to the satisfaction of the instructor</u>.

<u>Suggested teaching strategies</u>: Students' efforts will be directed toward problem solving and decision making in a case study.

---

1. From the case study, Exercise 5-1, found in the "Student Materials" section, students, either individually or in project teams will:

   (A) Plan the implementation of a database management system explained in the case study. This may include, but not be limited to:

   (1) Recommending software.
   (2) Recommending hardware: microcomputers or other computer configurations.
   (3) Recommending peripherals: printers, storage media, OCR, copiers, modems, FAX, network, etc.
   (4) Recommending security measures.
   (5) Recommending office design and layout (in general terms).

   (B) Set up and disseminate written guidelines for the end-users in the insurance agency for one application of database management software, using one of the database management applications software packages reviewed in Task Area 3 (preferably the package that was selected and defended by individuals or project groups). The factors in Exercise 4-2, Database Applications Procedures from Task Area 4, will provide guidelines for the written documentation. (An example of written documentation for use of a database management software package--Nutshell--is included in the "References" section.)

2. Identify the elements of a database management system which must be taken into account before a plan can be suggested which may include but not be limited to:

   (A) Prepare an organization chart (broad overview of insurance agency).

(B) Develop a simple data flow diagram, showing movement of records and data between entities within the organization.

(C) Determine the number of persons in the organization who will need access to insurance agency's database.

(D) Identify kinds of documents which will be produced.

(E) Determine which documents will be used in-house and which documents will go outside the agency.

(F) Determine kinds of printers needed to accommodate the documents: nonletter quality, letter quality, near-letter quality, laser, intelligent printer/copier, etc.

(G) Determine how will data be accessed. PC to host? CRT to host? Will data be downloaded on to PC to be manipulated and uploaded to the mainframe or file server?

(H) Determine what kind of security measures will (must) be taken.

(I) Determine which off-the-shelf database management programs can accommodate the requirements for these applications.

(J) Determine if a programmer will be needed to develop any other kinds of applications.

(K) Determine what hardware will run the chosen database management software.

(L) Determine if plans and physical accommodations been made for growth and expansion.

(M) Determine what software is needed and available since telecommunications capabilities will be needed.

(N) Find a suggested configuration in a computer textbook which might apply to this situation. (Suggested textbooks are listed at the conclusion of this task area.)

3. Discuss the case, answers to the questions in Exercise 4-2, and the elements in #2 above as a classroom exercise prior to assigning group work.

SUMMARY: As the result of the five task areas in this course, Database Systems, students be provided hands-on experience in:

(1) Operational manipulation of one database software package.

(2) Identification and development of factors to be used in comparison and evaluation, selection, and utilization of four other software packages.

(3) Designing and setting up one database application required in a case study.

(4) Writing documentation for the one database application.

(5) Setting up the plans for the implementation of a database management system as outlined in a case study.

The end result of this course should be an understanding of getting the right information to the right person at the right time for effective decision making.

Suggested Textbooks

Arn, Joseph V. and Beverly J. Oswalt. (1988) Office Automation: An Information Systems Approach. Boston, MA: Boyd & Fraser Publishing Company.

Arntson, L. Joyce. (1987) Word/Information Processing, 2nd edition. Boston, MA: Kent Publishing Company.

Bergerud, Marly and Thomas Keller. (1988) Computers for Managing Information. New York: John Wiley & Sons.

Bergerud, Marly and Jean Gonzalez. (1987) Word and Information Processing: Concepts of Office Automation. 3rd ed. New York: John Wiley & Sons.

Fife, Dennis W.; W. Terry Hardgrave; and Donald R. Deutsch. (1986) Database Concepts. Dallas: South-Western Publishing Company.

Fruehling, Rosemary T. and Constance K. Weaver. (1987) Electronic Office Procedures. Dallas: Gregg/McGraw-Hill Book Company.

Jarrett, Dennis. (1984) The Electronic Office: A Management Guide to the Office of the Future, 2nd edition. Brockfield, VT: Gower Publishing Company.

Kleinschrod, Walter A. (1987) Update 1987-88: Approaching the Automated Office. Willow Grove, PA: Administrative Management Society Foundation.

Shelly, Gary B. and Thomas J. Cashman. (1984) Computer Fundamentals for an Information Age. Brea, CA: Anaheim Publishing Company, Inc.

Sullivan, David R.; Theodore G. Lewis; and Curtis R. Cook. (1985) Computing Today: Microcomputer Concepts and Applications. Dallas: Houghton Mifflin Company.

U. S. Congress, Office of Technology Assessment, Automation of America's Offices: 1985-2000. Washington, D. C.: U. S. Government Printing Office, OTA-CIT-287, 12/85.

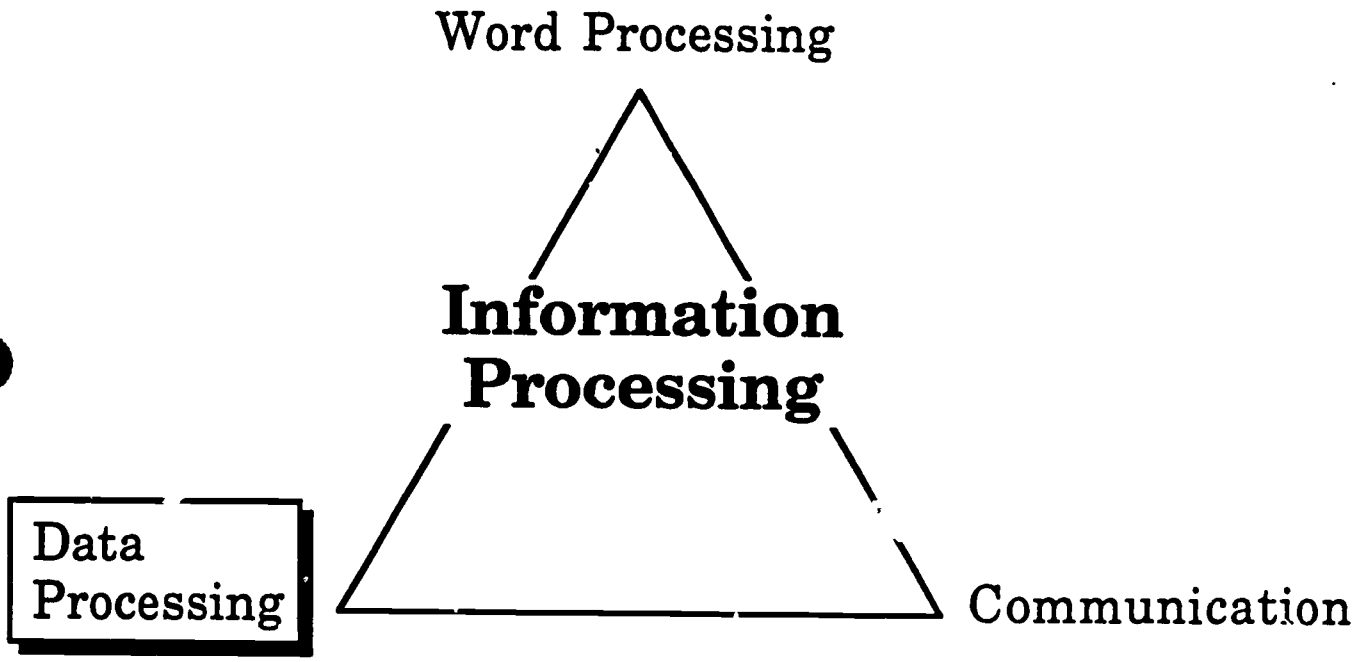
Wagoner, Kathleen P. and Mary M. Ruprecht. (1984) Office Automation: A Management Approach. New York: John Wiley & Sons.

Database Systems

course three

Visuals

•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•


Word Processing
Information Processing
Data Processing
Communication

INFORMATION HANDLING

COLLECTING
*
ORGANIZING
*
STORING
*
CLASSIFYING
*
ANALYZING
*
INTERPRETING
*
RETRIEVING
*
COMMUNICATING
*

A

DATABASE

PROVIDES

INFORMATION

THAT IS

ORGANIZED

FOR ANALYSIS

AND

DECISION MAKING

DATABASE MANAGEMENT SYSTEMS (DBMS)

ARE PROGRAMS SET UP
TO STRUCTURE RAW DATA
INTO FILES WHICH CAN BE

STORED
*
RETRIEVED
*
PROCESSED
*
MANIPULATED
*
DISSEMINATED
*
CHANGED
*
SHARED

FOR DECISION MAKING

RETRIEVAL FROM A DATABASE CAN BE ACCOMPLISHED BY:

NAMES

DATES

ACCOUNTS

LOCATIONS

AND OTHER IDENTIFYING CRITERIA

A DBMS CAN DUPLICATE
THE WORK OF LARGE
FILING DEPARTMENTS.

ONE DATABASE CAN HOLD
INFORMATION ON A
COMPANY'S

SALES FIGURES
AND
CORRESPONDENCE
AND
ACCOUNTS
AND
PERSONNEL DOCUMENTS
AND
PRODUCTION
AND
BILLINGS
AND
OTHER VITAL INFORMATION

THE ADVANTAGES OF A DBMS INCLUDE:

(1) ELIMINATES DATA REDUNDANCY

(2) ELIMINATES DUPLICATION OF EFFORT

(2) INCREASED RELIABILITY

(3) ELIMINATES NEED TO MANUALLY UPDATE MULTIPLE FILES

(4) CAN BE USED WITH ANY SYSTEM AND PROGRAM

(5) PROVIDES ACCESS TO COMMON FILES TO ENHANCE DATA SHARING

DATABASE VOCABULARY

DATABASE

FILE

RECORD

CATEGORY/FIELD

ENTRY

CHARACTER

DATABASE VOCABULARY

USING THE TELEPHONE BOOK AS AN EXAMPLE:

DATABASE: THE ENTIRE TELEPHONE BOOK, INCLUDING YELLOW PAGES.

FILE: THE YELLOW PAGES LISTINGS FOR ONE CATEGORY OF LISTINGS.

EX. COMPUTER VENDORS

RECORD: THE YELLOW PAGES LISTING FOR ONE COMPUTER VENDOR.

EX. PERFORMANCE COMPUTERS.

CATEGORY/ FIELD: THE YELLOW PAGES CATEGORY OR FIELD USED TO ENTER DATA FOR ALL THE COMPUTER VENDORS.

EX. "STREET ADDRESS", "CITY", "STATE", "ZIP", ETC.

ENTRY: THE YELLOW PAGES LISTING OF THE ADDRESS FOR ONE PARTICULAR COMPUTER VENDOR.

EX. 828 SOUTH BOULEVARD, #1

CHARACTER: ONE OF THE NUMBERS, LETTERS, OR SYMBOLS IN THE ADDRESS OR NAME OF THE COMPUTER VENDOR.

EX. 8, S, B, D, #, ETC.

DBMS
FEATURES, CONCEPTS, AND TERMINOLOGY

SCHEMA OR STRUCTURES:

A LOGICAL PICTURE OF RELATIONSHIPS AMONG FILES AND RECORDS IN THE DATABASE

FILES:

USUALLY THOUGHT OF AS THE COMPLETE FILES OF DATA THAT BREAK DOWN INTO RECORDS, FIELDS, ENTRIES, AND BYTES

RECORDS:

THE BASIC UNITS OF FILES--MUCH LIKE SHEETS OF PAPER IN A FOLDER IN A FILING CABINET--OR LIKE A CARD IN A FILE THAT CONTAINS INFORMATION ON EACH PERSON

FIELDS:

THE DISTINCT ITEMS WITHIN THE RECORDS--NAMES, ADDRESSES, INVENTORY NUMBERS, LOCATIONS--INTO WHICH DATA ARE ENTERED; ALSO SOMETIMES CALLED CATEGORIES; A RECORD IS MADE UP OF 1 OR MORE FIELDS

ENTRIES:

A PIECE OF DATA IN EACH FIELD WITHIN A RECORD, SUCH AS THE NAME OF THE CITY

BYTES:

THE MOST BASIC UNIT--THE STRING OF CHARACTERS WITHIN THE FIELDS

ILLUSTRATION OF DATABASE TERMINOLOGY

File: Equipment Inventory

File of all records

Report: Equipment Inventory Report - June, 19xx

Record 1 of 22

Computer:	IBM-XT
Monitor:	IBM
Printers:	C.-ITOH F-10
Ser # Comp:	6105588
Ser # Mon:	0078044
Ser # Print:	BJ19BU
Ser # Keyb:	
Room Number:	F-203
Person:	Computer Center
Printer Model:	Starwriter
Comp Model:	089 w/AST
Date Installed:	FEb 4 86

Field

Entry

One record in the file named Equipment Inventory.

Figure 1.

ENTERING DATA INTO A DATABASE

```
Record 1 of 22
Computer:  IBM-XT
Monitors:  IBM
Printers:  C-ITOH F-10
Room Number:  F-203
Date Installed: ■■
```

OR

```
Computers:
IBM-XT

Monitors:
IBM

Printers:
C-ITOH-F-10

Room No.:
F-203
```

etc.

Figure 2.

4 TYPES OF DATABASE SCHEMA OR STRUCTURES

1.

* LIST PROCESSING

ALSO CALLED FILE HANDLERS,
FILE MANAGEMENT OR LIST STRUCTURE

SIMPLE LIST OF RECORDS

SEVERAL FIELDS

SEARCHING IN SEQUENCE IS SLOW

2.

* HIERARCHICAL

-- PARENT-CHILD RELATIONSHIP

-- SEEN IN GOVERNMENTAL STRUCTURES

-- MUST BE INDICATED AT THE TIME DATA ARE STORED

-- EACH ELEMENT HAS ONLY ONE RELATIONSHIP

-- OLDEST STRUCTURE; NOW BEING REPLACED BY MORE USEFUL SCHEMA

3.

* NETWORK

-- SIMILAR TO HIERARCHICAL IN THAT IT IS TOP TO BOTTOM STRUCTURE

-- ELEMENTS CAN HAVE MORE THAN 1 RELATIONSHIP

-- MORE FLEXIBLE THAN HIERARCHICAL BUT SCHEMA STILL MUST BE DEFINED WHEN DATABASE IS CREATED

4.

*RELATIONAL

- -- CAN DETERMINE RELATION BETWEEN DATA WHEN DATA ARE ACCESSED
- -- DATA ARE STORED IN TABLES WITH EACH RECORD HAVING THE SAME UNIQUE NUMBER AND TYPE OF FIELDS
- -- RECORD IS REFERRED TO AS A TUPLE
- -- WHEN REQUEST FOR DATA IS MADE, 1 OR MORE OF 3 RELATIONAL ALGEBRA OPERATIONS MAY BE PERFORMED:

SELECTION
PROJECTION
JOIN

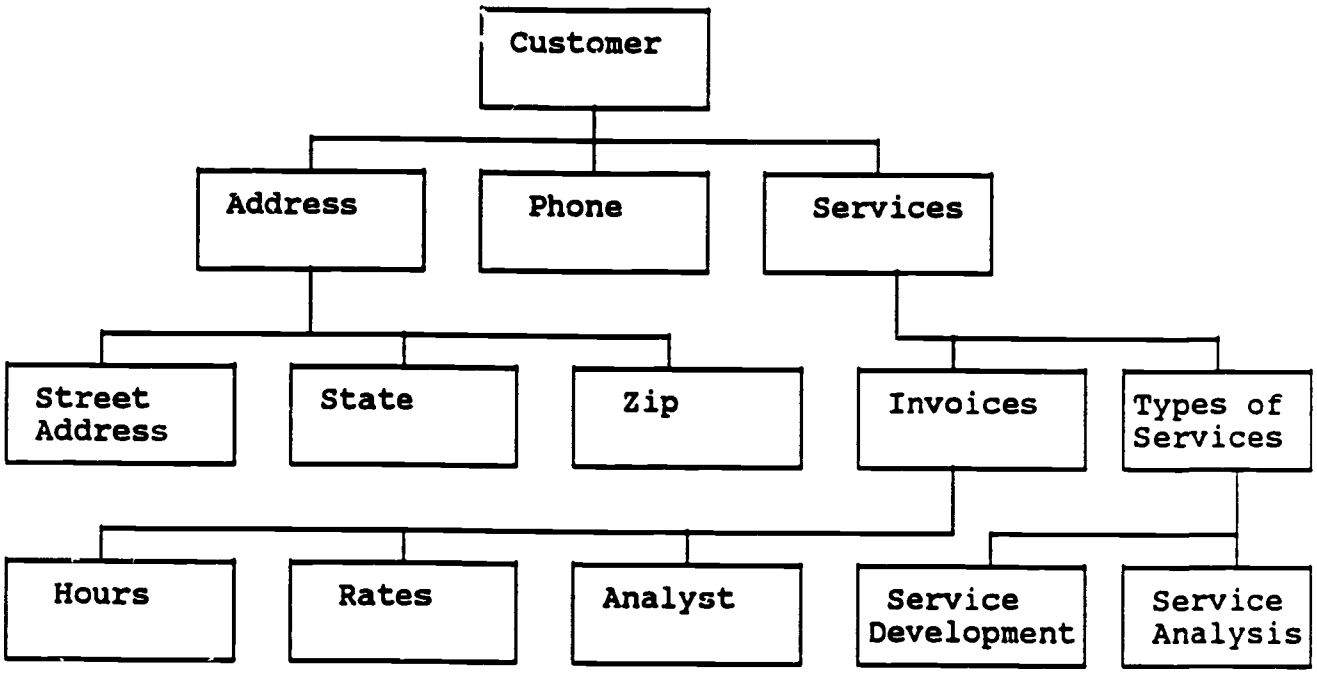


Figure 3.

A HIERARCHICAL DATABASE

A RELATIONAL DATABASE

Service File

Job#	Client	Service	Days
88-1	Co. C	analysis	20
88-2	Co. E	program.	25
88-3	Co. A	training	15
88-4	Co. B	dvelopmt	25
88-5	Co. D	analysis	22

Rate File

Type of Service	Rate
analysis	550
development	600
programming	500
training	475

Customer File

Address	City	Zip
Co. A		
Co. B		
Co. C		
Co. D		
Co. E		

Figure 4.

DBMS VOCABULARY

DATA DICTIONARY

NAMES, TYPES, AND WIDTHS OF
ALL FIELDS IN FILES IN DBMS

QUERY FACILITY

A WAY TO PROCESS AND UPDATE
STORED DATED BY USING
NEAR-ENGLISH COMMANDS

REPORT GENERATOR

PROCESSES FILES FOR PRINTING
USING VARIOUS FIELDS

COMPATIBILITY

ABLE TO MOVE DATA BETWEEN FILES
AND OTHER PROGRAMS

DBMS VOCABULARY

RESTRUCTURE ABILITY

ALLOWS ONE FILE TO BE RESTRUCTURED
TO ACCEPT DATA FROM A SECOND FILE
TO CREATE A WHOLE NEW FILE

DATA INTEGRITY

BACK-UP AND RESTORE ROUTINES
HANDLES ERRORS AND RECOVERS DATA
ALLOWS FILES TO BE SHARED
GUARANTEES SAFETY OF DATA

METHODS USED TO ENHANCE DATA INTEGRITY:
<u>BACK-UP</u>
<u>AUDIT TRAILS</u>
<u>"BACK-UP WITH RESTORE"</u>

MULTIPLE-USER DBMS

SUPPORTS SEVERAL USERS AT THE SAME TIME
LOCK FILE AND RECORD LOCK FEATURES

File: equipinvreport1
Report: Equip Inventory 1

Computer	Ser # Comp	Comp Model	Room No.	Person	Date Install
IBM-XT	6468635	089	F-202	Joyce Lemaster	Mar 10 86
IBM-XT	6106358	089 w/Tecmar	F-203	Carol Bratton	Feb 4 86
IBM-XT	6105588	089 w/AST	F-203	Computer Center	Feb 4 86
Sanyo 555	14838502		F-203	Computer Center	
IBM-XT	6475483	089	F-206	Jo Ann Cottrell	Mar 10 86
IBM	1922985	176	F-206	Laurie Riorden	Aug 26 86
IBM-XT	2041544	089 w/MTBackup	F-207	Nancy Owen	Jun 5 86

EXAMPLE OF TWO REPORT FORMATS USING THE SAME DATABASE

File: equipinvreport1
Report: Equip Inventory 2

Printers	Ser # Print	Printer Model	Room No.	Person	Date Install
Quietwriter	4021034		F-202	Joyce Lemaster	Mar 10 86
Quietwriter	4021126	Model 2	F-203	Carol Bratton	Feb 4 86
C.ITOH F-10	BJ19BU	Starwriter	F-203	Computer Center	Feb 4 86
C.ITOH F-10	BJ19BU	Starwriter	F-203	Computer Center	
Quietwriter	0141468		F-206	Jo Ann Cottrell	Mar 10 86
Quietwriter	4032844	Model 2	F-206	Laurie Riorden	Aug 26 86
Quietwriter	0138545		F-207	Nancy Owen	Jun 5 86

DATABASE SERVICES

THE SOURCE
COMPU-SERVE
DOW JONES NEWS/RETRIEVAL
WESTLAW
DIAGLOG INFORMATION RETRIEVAL
INFORMATION BANK

ELECTRONIC PUBLISHING SERVICES

TELETEXT

(HEADLINES, ENTERTAINMENT LISTINGS.
HEARING-IMPAIRED CAPTIONS,
AIRLINES SCHEDULES, CLASSIFIEDS, ETC.)

VIDEOTEX

(E-MAIL, IN-HOME SHOPPING AND BANKING,
RECEIVING STOCK QUOTATIONS,
READING THE NEWSPAPER, ETC.)

An individual at home viewing a TV screen might see an offer for a particular item. The advertiser of the item explains the offer and asks the viewer to respond. The responses are possible by using reply frames. Reply frames might ask the viewer certain questions, such as color, size, quantity in multiple-choice format. The viewer selects the color, size, quantity, etc. from choices and keys in the reference number of the item, along with the viewer's ID. From the order form on the TV screen, the viewer fills in the requested information and the advertiser uses the information to fill the order.

VIDEOTEX ELECTRONIC PUBLISING SERVICE

ISSUES IN DATABASE MANAGEMENT

1

WHO HAS ACCESS TO WHAT DATA?
WHO "OWNS" THE DATA?
FOR WHAT PURPOSE?
WHICH DATA ARE USED
TO GENERATE WHICH REPORTS?

2

WHAT ARE THE BACK-UP PROCEDURES
FOR WHAT DATA AND HOW OFTEN ARE
THEY BACKED UP?

3

WHAT CONTROLS ARE PLACED ON
DATA SO THAT ONLY AUTHORIZED
PERSONNEL HAVE ACCESS TO THE DATA?

4

WHEN AND HOW ARE DATA UPDATED?

5

WHAT CONTROLS ARE PLACED ON DATA
THAT ARE DOWNLOADED TO PC'S?

6

HOW ARE DATA ACCESSED AND UPDATED
IN A DISTRIBUTED DATABASE WHERE
MANY USERS ARE LINKED BY
DATA COMMUNICATIONS?

GUIDELINES FOR DATA SECURITY

SUGGESTED CLASSIFICATIONS OF DATA TO BE SECURED

PRODUCTION

DATA USED OR PRODUCED ON AUTOMATED OFFICE SYSTEMS THAT SUPPORT AND ENHANCE NORMAL BUSINESS OPERATIONS WITHIN THE COMPANY

CRITICAL

DATA USED OR PRODUCED ON AUTOMATED OFFICE SYSTEMS THAT IF LOST, DESTROYED, DISCLOSED, OR COMPROMISED COULD DISRUPT THE EFFECTIVE OPERATIONS OF THE COMPANY

SENSITIVE

DATA USED OR PRODUCED ON AUTOMATED SYSTEMS THAT IF LOST, DESTROYED, DISCLOSED, OR COMPROMISED COULD CAUSE EMBARRASSMENT OR COULD CAUSE LEGAL OR FINANCIAL LIABILITY TO THE COMPANY

SECURITY METHODS WHICH SAFEGUARD DATABASES

KEY CARDS WHICH LIMIT ACCESS TO COMPUTING FACILITIES

PASSWORDS

ENCRYPTION

OTHERS

FEDERAL LEGISLATION RELATED TO INFORMATION

FREEDOM OF INFORMATION ACT
1966
***

FAIR CREDIT REPORTING ACT
1970
***

FEDERAL PRIVACY ACT
1974
***

EDUCATION PRIVACY ACT
1974
***

FEDERAL COPYRIGHT LAW
1976
(RELATED TO SOFTWARE PIRACY)
***

RIGHT TO FINANCIAL PRIVACY ACT
1978
***

NARRATIVE OF COMPUTER LEGISLATION TO ACCOMPANY TRANSPARENCIES

(a) Personal data issues. One law, Federal Privacy Act, passed in 1974, has established limits on the personal information that is kept in government files. This law is intended to prevent any misuse of information about individuals in governmental files. This law is based on the C RTS principle that personal information in federal files must be Complete, Accurate, Relevant, Timely, and Secure. Another law, Freedom of Information Act, passed in 1966, gives people the right to see data that government agencies and businesses are keeping about them. Still another, the Fair Credit Reporting Act, passed in 1970, gives individuals control over the distribution of data about themselves. This law allows people to see the credit records that businesses keep about them.

(b) Two other privacy acts have been enacted to ensure privacy of student records and financial information: The Education Privacy Act, enacted in 1974, ensures the privacy of students records on file with schools that receive federal funds. In most cases, students are asked if their names can be given to outside agencies. The Right to Financial Privacy Act, passed in 1978, gives individuals the right to review information about themselves that is maintained by banks, credit bureaus, and other related financial institutions.

(c) The Federal Copyright Law, passed in 1976, makes duplicating commercial software disks without permission of the publishers as illegal as copying and distributing photocopies of documents and books. This is called software piracy. Hundreds of millions of dollars are lost by manufacturers of software programs because software is being copied for friends, neighbors, and co-workers. This kind of crime is hard to detect; manufacturers are having to rely on the personal integrity and ethics of individuals to deter this crime. Other more drastic measures may include using software encryption to alter a software program when it is copied or putting software programs on firmware chips which are built into computers and cannot be copied.

Individuals and organizations which do not recognize or obey these laws are displaying unethical behavior. However, many times it is difficult to prove that laws are being broken; or else the cost of enforcement may outweigh the benefits. It is imperative that organizations and individuals within the organization publish and maintain a set of professional ethics as it relates to data ownership, intellectual property, and software piracy. These are critical issues that will become even larger as the amount of and access to information proliferates.

EVALUATON FACTORS FOR DBMS SOFTWARE AND REPORTS

* * * * * *

NAME AND MANUFACTURER OF SOFTWARE

VERSION NUMBER AND DATE

COSTS: LIST VS ACTUAL

HARDWARE REQUIREMENTS

PRINTERS OR OTHER SYSTEM CONFIGURATIONS

DESCRIBE FUNCTIONS OF DBMS SOFTWARE:
- STRUCTURE
- REPORT GENERATOR
- FILE IMPORT/EXPORT
- COMPATIBILITY
- ERROR HANDLING AND RECOVERY
- MULTIPLE-FILE PROCESSING
- FILE ACCESS AND PROCESSING SPEED
- SECURITY FEATURES
- COMPATIBILITY WITH NEXT VERSION
- NETWORKABLE

TERMINOLOGY

VALUE TO AUTOMATED OFFICE

DOCUMENTATION

ONE MAGAZINE REVIEW OF SOFTWARE

LIMITATIONS

RECOMMENDATIONS

TO PLAN AND CREATE A DATABASE

THE USER MUST:

CONSIDER NEEDS

GENERATE A LIST OF
CATEGORIES OR FIELDS

ORGANIZE THE LIST
AS DATA SHOULD BE ENTERED

CONSIDER USES OF DATABASE

RECHECK THE CATEGORIES,
FIELDS, AND NEEDS

ENTER THE DATA

MANIPULATE THE DATA
IN NEEDED FORMATS

TO CREATE A DATABASE MANAGEMENT FILE, THE USER MUST ASK CERTAIN QUESTIONS:

HOW MANY RECORDS PER FILE?

WHAT IS THE MAXIMUM NUMBER OF CATEGORIES OR FIELDS PER RECORD?

WHAT IS THE MAXIMUM RECORD LENGTH?

WHAT IS THE MAXIMUM ENTRY LENGTH?

WHAT IS THE MAXIMUM CATEGORY NAME LENGTH?

Database Systems

course three

Student Materials

•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•INFORMATIONSYSTEMSCURRICULUM•

DATABASE SYSTEMS

Exercise 1-1

Each week, you will be responsible for one (1) outside reading related to database management systems. You will prepare for class and hand in each week a 5"x7" typed index card, using the following format:

Author	Your name
Name of publication	
Title of article	
Bibliographic information: volume #, date, page numbers.	
Summary of article	

Some topics of interest may include (but not be limited to):

1. New, developing and changing conditions in DBMS environment.
2. Networking with DBMS.
3. Accessing large databases from personal computers to mainframes, file servers, or minicomputers.
4. Careers in database systems.
5. Security features and factors of database management systems.
6. Articles regarding misuses, abuses, and criminal activity related to database management systems.

DATABASE SYSTEMS

Exercise 1-2

STUDY OUTLINE

The intent of this study outline is to make you aware of the highlights of the Database Systems unit. Your goal will be to understand the details which will be presented and relate them to these general ideas. Feel free to fill in the details as they become available to you on this paper.

a. Databases store information to be used in the future

b. Information may be entered, updated, selected, sorted, calculated, and printed to hard copy

c. Information is organized in such a way as to meet the needs of a business

d. Databases are well suited to numerous applications in which organization of information is necessary

e. Databases are organized by the use of fields and records

f. Database information is stored in a file

g. Information may change as time passes

h. Information may be presented to the user in a variety of formats

i. Information may and needs to be efficiently manipulated so the user has quick access to desired data

j. Insignificant data may be deleted or replaced

k. Hard copy may be desired

DATABASE SYSTEMS

Exercise 3-1

EVALUATION FORM - SOFTWARE PRESENTATIONS
(Database Management)

Name of software

Type of software (if not readily recognizable in the name of the software)

Version number and date

Developer (vendor, manufacturer)/name of company

Cost: list vs actual? What is included? License agreement? Can back-up copies be made? Vendor availability for problems [toll-free number]? Are updates available at low cost? Networked versions available? etc.

Requirements to run software: Compatibility with hardware (specifically, type of PC, model #, etc.)? RAM required to support software? Other peripherals required or supported? Cabling required and available?

Printers supported or system configuration requirements

Description of the scope of the functions of the software based on the following criteria:

(1) type of structure (list processing, hierarchical, relational, network)
(2) flexibility of the report generator
(3) capability of file import/export and compatibility
(4) effectiveness of error handling and recovery
(5) extent of multiple-file processing
(6) clarity, simplicity, and power of the query language
(7) power and number of on-screen forms
(8) multiuser capability
(9) file access time
(10) processing speed
(11) data access method (sort versus index)
(12) password security or other security feature
(13) compatibility with the next version of the software
(14) other features

Terminology encountered: Is the terminology familiar or are there too many new terms? Who could use it in the automated office and for what purposes?

Report on at least one review of the software in a current computing magazine or research service write-up to get the users' viewpoint. (These services include DataPro or Seybold reports.)

Value of the software to the automated office: Will it save time? Will it enhance decision making? etc.

Documentation: Is it easy to read? Is a learning disk or tutorial included? Is there on-line help?

Limitations encountered with the software: What do you see as the drawbacks (keeping in mind that the perfect piece of software is never available)?

Recommendations: Is it worth the cost? Is it going to automate repetitive tasks or enhance decision making? What will be accomplished through the purchase of this software by a company? Would documentation need to be rewritten? Is training required? Other?

To complete this exercise:

1. Prepare an oral presentation (including visual aids), comparing and evaluating the four database management software packages you or your group have chosen.

2. Prepare a handout to be distributed to your class members based on your comparisons and evaluations of the four software packages.

3. Read the case study, Exercise 5-1, and choose one of the four DBMS packages to recommend for the case study situation. Be prepared to defend your choice during your oral presentation.

4. Turn in a written critique to your instructor for evaluation. The written critique will include your comparisons and evaluations of the four DBMS software packages, as well as the recommendation of one software package for the case study situation.

DATABASE SYSTEMS

Exercise 4-1

List of Insurers

The list includes information in the following order: Name of policyholder, address, zip, home telephone number, marital status, number of children or other pertinent information, kind(s) of insurance currently holding, amount of the insurance policy(ies), when the last follow-up was made by an insurance agent (if available), and the name of the insurance agent who made the last contact.

Patricia Witherow, 1028 Petunia, Dallas, TX 75202, 458-1212, unmarried, life, $75,000, follow-up: 7/87 Stewart

J. Robert Wilson, 884 South Main, Dallas, TX 75208, 882-9776, married, 1 child, life $50,000, health Metropolitan-extended, education $125,000, follow-up: 12/86 Gates

John Corwin, 12908 Lancaster, Dallas, TX 75225, 409-6622, married, 3 children, life $100,000, retirement annuity, follow-up: 8/86 Smith

Alfred Diamond, 15608 Goose Creek Blvd., Dallas, TX 75214, 552-9900, married, no children, life $150,000, health Aetna-extended, retirement annuity, follow-up: 12/85 Holcomb

Patricia Stein, 6099 Feather Ridge Road, Dallas, TX 75228, 779-4455, divorced, 1 child, life $70,000, education $10,000; follow-up: 1/84 Stewart

Susan Li, MBank, 1616 Main Street, Dallas, TX 75201, 880-1313, unmarried, supports family in Taiwan, life $25,000, retirement $10,000; follow-up: 9/87 Everett

Bruce Delgado, 78012 Willow Drive, Dallas, TX 75221, 410-5513, married, life $250,000, retirement ? follow-up: 5/87 Thompson

Randolph Douglass, 300 Longwood Avenue, Dallas, TX 75209, 409-8890, unmarried, supports family in Houston, Life $25,000, retirement ? follow-up: 3/87 Jonesby

Robert Ebersole, M.D., 228 West Birchbark Avenue, Dallas, TX 72105, 889-1234, married, 5 children, life $250,000, health-Aetna-extended, education 5 policies @ $10,000 each; follow-up: 12/84 Huber

Katherine Reed, 500 J. Clyde Jones Road, Dallas, TX 75230, 554-6789, married, 2 children, retired, life $100,000, health-Metropolitan-extended, retirement annuity; follow-up: 12/87 Jonesby

Rita Pratt, 1641 Chatham Avenue, Arlington, TX 75345, 345-8912, marital status unknown, life $10,000; follow-up: none Everett

Maria Park, 3838 Mockingbird Lane, Dallas, TX 75278, 578-8492, married, no children, life $35,000, retirement annuity; follow-up: 4/86 Stubbs

Mr. and Mrs. John S. Nolan (Jennifer), 9800 Stemmons Expressway, #124, Dallas, TX 75204, 203-9485, retired follow-up: 11/83 Jonesby

Ernest Abbott (Sharron), 4590 Prairie Parkway, Dallas, TX 75290, 474-8382, married, 3 children, life $25,000, retirement annuity; follow-up: 3/87 Everett

Mr. and Mrs. Timothy Gumnit (Sally), 2151 Trapan Circle, Mesquite, TX 78901, 574-8392, divorced; status of insurance policy unknown at this time; follow-up: none Coffey

Mahmood S. Rayes, 19380 Smith Avenue, Dallas, TX 75244, 498-3489, single, 423-8789, single, life $100,000; follow-up: 1/86 Gates

Jayne Pinney, 220 Alexander Street, Dallas, TX 75222, 239-8457, unmarried, life $10,000, status of other insurance unknow, follow-up: none Gibbs

Neil B. Schraeder (Nell), 307 Claiborne Hill, Mesquite, TX 78902, 524-7038, married, 2 children, life $50,000, education $25,000 on each child, follow-up: 5/83 Holcomb

E. H. Tucker (Sarah), 78 Highland Park Drive, Dallas, TX 75221, 524-3789, married, 2 children out of home, life $500,000, retirement ? follow-up: 12/85 Sprague

Emily P. Morgan, 17200 Redoak Drive, Arlington, TX 75344, 758-0431, separated, 1 child, life $5,000, education $1,500, follow-up: [illegible].87 Holmes

Arthur Brueggemann, 10500 Mulholland, #450, Dallas, TX 75290, 573-4812, single, life $50,000, follow-up: none Everett

Harold and Sissy Stec, 1029 Oleander, Dallas, TX 75224, 238-4570, married, no children, retired; asked for follow-up in about 6 months from 12/87. Gates

Roger and Jeanette Cole, 1256 DeSoto Drive, Mesquite, TX 78901, 578-3994, married, 7 children, education $10,000 each child, follow-up: none Holmes

Ronald Zaninovic, 1001 Mulrose Blvd., Dallas, TX 75229, 743-9021, not at home when agent called; follow-up: None Sprague

Joan Carney, 3 Audubon Plaza Drive, Dallas, TX 75234, 984-5767, single, supports mother, health on mother $25,000, follow-up: 6/86 Everett

Terrance and Lizzie Busse, 555 New Ballos Road, Grand Prairie, TX 75889, 702-3458, married, 4 children, education $15,000 on each child; follow-up: 3/88 Holmes

Thomas Cracco (Melissa, daughter), 1503 Hillcrest Road, Dallas, TX 75258, 574-8539, divorced, support of daughter, education $15,000; follow-up: none Gates

Nancy and Luther Santana, 275 Hospital Drive, Grand Prairie, TX 75887, 723-4568, married, no children; follow-up: 11/86 Huber

John and Cindy Nelson, 1652 Deere Avenue, Dallas, TX 75280, 765-8349, married, 1 child now and expecting a child in May, 1988; education $10,000; follow-up: 2/88 Stewart

Jerry and Pat McIntyre, 25 Banyan Court, Grand Prairie TX 75888, 845-8923, married, no children at home, retirement annuity; follow-up: none Bridges

Sandra and Travis Ludwig, 710 West 168th Street, Dallas, TX 75211, 578-1349, married, 2 children, life $50,000, education $15,000 on one child; follow-up: none Smith

Other information which also might be available on this partial list of insurers is payment history, names of children, when policy(ies) was(were) first purchased, etc.

DATABASE SYSTEMS

DATABASE MANAGEMENT PROCEDURES

Exercise 4-2

1. To create a database, the following questions must be answered (depending on the software that will be utilized):

   What are the variables--fields (categories)--that you will use in this database?

   _____

   _____

   _____

   _____

   _____

   How are new records inserted, deleted, modified?

   _____

   _____

   _____

   _____

   _____

   _____

   How are new fields (categories) added, deleted, modified?

   _____

   _____

   _____

   _____

   _____

   _____

How would a misspelled name be corrected once it is in the database?

_____

_____

_____

If a multiuser system, is there a lock or record lock which needs to be activated? How?

_____

_____

_____

Is a data dictionary available? What are the query terms that need to be set up?

_____

_____

_____

How is the database saved to disk?

_____

_____

_____

What is the name of the database?

_____

_____

_____

_____

2. To create a report from the database, the following questions must be answered (depending on the software that will be utilized):

How are reports generated? How is the report format arranged?

_____

_____

_____

How would this database be printed in alphabetical order? numerical order? in mailing labels?

_____

_____

_____

_____

_____

_____

How is the database retrieved from disk?

_____

_____

_____

How are data sorted?

_____

_____

_____

How are the revised data saved? printed?

_____

_____

_____

What other reports could be created from these data?

_____

_____

_____

What are the query terms?

_____

_____

_____

3. To select specific records from the database, the following questions must be answered (depending on the software that will be utilized):

How is the database retrieved from disk?

_____

_____

_____

How are data selected by zip code, phone prefix, agent, type of insurance? or other formats?

_____

_____

_____

_____

_____

_____

How are the data displayed alphabetically in report form for each set of specific data?

_____

_____

_____

How is the newly created or newly revised database printed?

_____

_____

_____

4. To print the database, the following questions must be answered (depending on the software that will be utilized):

How is the database retrieved from disk?

_____

_____

_____

How is the database sorted alphabetically? What other sorts are possible with this database?

_____

_____

_____

How are only two columns of this database printed? (depending on the software)

_____

_____

_____

How are only portions of the data in the database printed? How can they be saved as a new database?

_____

_____

_____

5. Select one of the following report formats, create the report format, print it, and report to the class on the specific procedures of the database management software to create the format:

<u>First format</u>:
Alphabetical listing of insurers.
Alphabetical listing of insurers by agent.
Alphabetical listing of insurers by zip code.
Alphabetical listing of insurers by telephone prefix.

<u>Second format</u>:
Listing of insurers by type of insurance (in alphabetic order).
Listing of insurers by type of insurance (in numerical amount of insurance).

<u>Third format</u>:
Provide each agent with his own: alphabetical list of insurers by zip code, telephone prefix, amount and type of insurance.

Provide each agent with the amount of insurance he has sold to date, listing the largest amount to the smallest amount.

Provide each agent with his/her list of insurers and the date of the last call.

<u>Fourth format</u>:
Provide the owner of the agency with one listing which has the following information: alphabetical listing of insurers, alphabetical listing of insurers by agent, the amount of insurance sold by agent listed in descending order, the amount of insurance sold by agent listed in ascending order, plus other information.

Provide the format of the monthly report which is sent to each of the home offices represented by this independent agency.

Fifth format:
Provide each office in the agency with information from the database which you determine it needs. The offices are Personnel, Accounts Payable (including agents' commissions), Accounts Receivable (including insurance payments), Agents, and others.

6. Your oral presentation to the class will include the specific answers to these and other questions, as well as a visual presentation of the one application format which you selected from #5 above.

DATABASE SYSTEMS

Exercise 5-1

CASE STUDY

An independent insurance agency in Dallas with one large centralized office maintains card files on nearly 5,000 insurers. The card files contain names, addresses, telephone numbers, family information, name of agent, type of insurance, amount of insurance, follow-up calls, and other important information. The insurance agency also produces about 50 daily, weekly, and monthly reports on paper ranging from a total of 50 to 100 pages per month which go to different home offices. Policy payment information is filed on nearly 10,000 cards. Printed information of the data in the files is available in one monthly report due to cost and limitations in producing copies.

This insurance agency already uses word processing software to prepare letters and contracts. However, it is now seeking to create a more efficient and cost-effective way of handling its data files and reports. Some of the capabilities it would require of a database management system would be:

(1) a way to automate its card files with alphanumeric, dollar, and date information.
(2) a way to generate the daily, weekly, and monthly reports by agent.
(3) a way to provide multiuser access to the data.
(4) a way to use the present system: IBM compatibles with PC-DOS, 40 Mb hard disk, near-letter quality printers.
(5) a way to transmit information electronically to the home offices with which this agency deals.
(6) a way to provide a back-up system.
(7) a method of securing its files.
(8) a way to look at future expandability as the agency grows.

<u>Complete the following tasks, using this case study</u>:

For Task Area 3: As a <u>minimum</u>, your recommendation for a specific DBMS software package should take these requirements into consideration.

For Task Area 4: The demonstration of the report format which you or your group will make is based on information in this case study.

For Task Area 5: Your two tasks include:

(1) make recommendations for a database management system; and

(2) set up and disseminate written guidelines for the end-users in the agency for at least <u>one</u> database application in your proposed system; (e.g., how to gain access data on a mainframe system; how to generate reports; how to print reports), OR set up a training manual for teaching a specific database management software package.

Database Systems

course three

Evaluation

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DATABASE SYSTEMS

Test 1

1. Define the following terms:

information processing: _____

data processing: _____

database management structures: _____

schema or structures: _____

files: _____

records: _____

fields: _____

entries: _____

bytes (as it relates to database management): _____

2. List the advantages of a database management system:

3. List the features of a database management system:

4. Name the 3 common database structures and give a description of each:

(1)

(2)

(3)

5. Discuss the following terminology as each relates to database management system.

data dictionary: _____

query facility: _____

report generator: _____

compatibility with other programs: _____

restructure ability: _____

data integrity: _____

multiple-user database management systems: _____

6. What are three methods of securing facilities and data in relation to a DBMS and why are these methods necessary?

_____

7. Discuss one issue related to database management (e.g., privacy, integrity, legislation, etc.)

DATABASE SYSTEMS

Test 2

Contrast and compare the following database structures:

1. hierarchical:

2. network:

3. relacional:

Contrast a list file structure with the three database structures listed above.

DATABASE SYSTEMS

Test 3

1. From the attached list of equipment available in this classroom, draw a diagram of the room, labeling each of the items listed.

2. List 5 rules to be followed in handling disks.

a. _____
b. _____
c. _____
d. _____
e. _____

DATABASE SYSTEMS
Test 4

NAME:_____ DATE: _____

ORAL OR WRITTEN EVALUATION BASED ON THE QUESTIONS BELOW: (Points for each question indicated at the end of the question.)
TOTAL POSSIBLE POINTS: 100.

****

1.	How is a database document created on this software?	5
2.	How would a misspelled name be corrected once it is in the database?	5
3.	Define database, file, record, field, and entry.	10
4.	How is a database file retrieved from the disk?	5
5.	How is a database file alphabetized by last name?	5
6.	How are new records inserted in a database file?	5
7.	How is a field eliminated from a database file?	5
8.	How is a database file printed by a certain field?	5
9.	How is a database file printed using this software?	5
10.	How are two columns of a database file printed?	10
11.	How is a report generated using this software?	10
12.	How do you "sort" using this software?	5
13.	How are the < and > signs used in database files?	10
14.	How is a database file sorted numerically?	10
15.	From the list below, can you identify what is a <u>field</u> and what is an <u>entry</u>?	10

City _____
Houston _____
Zip _____
Membership No. _____
88-1234-98 _____
Physician _____

<u>TOTAL EVALUATION POINTS</u>: _____

****

Database Systems

course three

References

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THE WORLD OF DATA BASES

The chances are very great that you already have used a database without even knowing it. A database is simply collected information that a person would refer to now or in the future. A phone book is an example of a database that we have all used. We periodically reference this source to locate particular information. If the data that appeared in a phone book were computerized, the desired data could be accessed quickly and efficiently. Could you imagine if information operators had to look through phone books to tell you the number you requested? Computerized databases are a must.

Of course, as time changes, so does information. Data are useless if they are not accurate. All information must be updated continually in order to facilitate the operations of the business. It is possible that the data in question only need to be sorted in a different manner or possibly calculations need to be performed to illustrate a new dimension. On the other hand, the data may need to be deleted. The data must reflect an accurate picture in order to enhance the organizational effectiveness of the business.

Data are usually as unique as the business itself. For example, many businesses keep an inventory of the products they sell. However, the inventory of a chemical plant would be much different than that of a hospital. Police departments keep records and so do credit unions. The chances are great that their record files are unrelated and very different. The person who sets up the database must weigh the importance of the data available for the business and record only the information useful to that particular establishment.

Recordkeeping is a necessary part of doing business and without proper management very time-consuming. As a business expands, it will find that its data need to be arranged in such a way that they may be referenced efficiently. The data must be current and usable. Organizing information into a database will definitely enhance the organizational position and efficiency of a business--and its workers.

This is an example of written documentation for one database management software package. Use this for illustration purposes for Task Area 5.

NUTSHELL

Loading Nutshell

Once the system is booted and the DOS prompt (A>) is displayed, you are ready to load Nutshell.

If you make a mistake, press the ESCAPE key and retype the command.

To load Nutshell:

Floppy disk system:

1. Insert the Nutshell Working Copy in Drive A and a data disk in Drive B.

2. At the A>, type Nutshell.

3. Press the RETURN key.

Hard-disk system:

1. At the C>, type: cd\ nutshell.

2. Press the RETURN key.

3. Type: nutshell.

4. Press RETURN.

The system loads Nutshell. When it's finished loading, the screen clears and the Cabinet screen appears.

THE CABINET SCREEN

You see the Cabinet screen each time you load or leave Nutshell. Notice the blinking dash, called the cursor. Here, as in the entire Nutshell program, the cursor marks your current position. All the Nutshell operations you perform take place at the cursor location.

From here you can create or open a file.

To exit the program from the Cabinet screen: Press the ESCAPE key.

Creating New Files

To create a new file, from the Cabinet screen:

1. Type the drive where you want to store the file, then type a filename. Example: b:clients

2. Press RETURN

3. Press RETURN to confirm that you want to create the file. The file is created, the cabinet opens, and an empty Browse screen appears.

Filenames

Only DOS filenames are accepted in Nutshell. These consist of three parts:

1. Drive: the single-letter name of the disk where you want to store the file. The name of the drive is followed by a colon (:). Examples: a: b: c:

2. Filename: and identifier for the file. You may use up to eight characters, but not the following reserved characters.

? * / : . , < > + [ ] |

Examples: clients newstock oldstock 2-8stock inv5-3

3. Extension: an optional name that identifies the file's type. The extension is preceded by a period (.). You may use up to three characters, but not the reserved characters.

Examples: .db .asc .dat .nut

If you omit a drive name, the file is stored on the drive named in the DOS prompt when you loaded Nutshell.

If you type a filename that already exits, the existing file opens, A new file is not created.

If you omit the extension, the program automatically adds.db when it creates the file.

You can type the drive and filename when you load Nutshell from DOS. The name will be copied onto the Cabinet screen.

Example:

Loading Instructions	Cabinet screen display
A>nutshell b:clients	Filename: b:clients

Files are stored in the current directory on the current drive. (To alter the paths see below, Path. For more information on paths and directories, see your DOS manual.)

Opening Existing Files

To open an existing file, form the Cabinet screen:

1. Type the drive and filename.

   Example: b:clients

2. Press RETURN

The cabinet opens and the Browse screen appears.

If you omit the drive name, Nutshell searches for the file on the drive that was named in the DOS prompt when you loaded the program.

If you omit the extension, Nutshell searches for files with the extension .db.

You can type the drive and filename when you load Nutshell form DOS. The name is then copied onto the Cabinet screen, the cabinet opens, and the Browse screen appears.

If you can't remember the filename, select SHOW FILES.

Show Files

You can display lists of files on the Cabinet screen. This allows you to see what files are stored on a disk, to search other drives and paths, and to choose the file you want to open without typing its filename.

To display a list of files and open a file, from the Cabinet screen:

1. Select SHOW FILES.
   Select displays a list of files and a menu at the bottom of the screen. It also displays the current drive, extension, and path (if any) on which the files are stored. (For information about paths and directories, see your DOS manual.)

2. Choose the file you wish to use
   The cabinet opens and the Browse screen appears.

If you type a drive or extension on the Cabinet screen, the files with that drive or extension are listed. For example, if you type b:nut, then select SHOW FILES, Nutshell displays a list of files on Drive B with the extension .nut. If you don't type a drive or extension, Nutshell lists all files with the extension.db that are stored on the drive named in the DOS prompt when you loaded the program.

If the file you wanc isn't displayed, you can change the drive, path, and extension so that Nutshell displays other files.

You can alter the path that you use to store files.

Drive

This option lets you list files form other drives on the Cabinet screen

To display the files on another drive, from the Cabinet screen:

1. Select SHOW FILES Drive
   The cursor moves to the current drive name.

   Type a drive name then press (return). To cancel, press escape

2. Type the new drive name then press RETURN.
   A list of files on the drive you specified is displayed as well as the current path (if any).

Extension

This option lets you list files with different extensions on the Cabinet screen.

To display files with a different extension, form the Cabinet screen

1. Select SHOW FILES Extension.
   The cursor moves to the first character of the current extension.

   Type a file extension, then press (return). To cancel, press escape.

2. Type the new extension then press RETURN
   A new list of files is displayed.

To display all files, regardless of extension, type * as the extension.

SHOW FILES Path

Files are opened from and created in the current directory. The Path option; lets you change that directory.

To alter the path, from the Cabinet screen:

1. Select SHOW FILES Path
   The cursor moves to the first character of the current path.

Type a directory path name, then press RETURN. To cancel, press escape.
Show directories

2. Type the new path, then press RETURN
   A new list of files is displayed.

Begin Directories

You can display a list of directories on the current drive and choose from the list to alter the path. By selecting SHOW DIRECTORIES you can

Change from the current directory to the root directory.
Change from the current directory to its parent directory.
Choose a directory below the current directory.

To change the directories on the current drive, from the Cabinet Screen:

1. Select SHOW FILES PATH SHOW DIRECTORIES
The screen displays a list of directories

2. Choose a directory.
The new path and another list of directories is displayed.

3. Repeat step 2 to choose other directories.

4. When you finish, press ESCAPE.
   The cursor moves to the first character of the current path.

5. Press RETURN
   A new list of files is displayed.

Exiting from Nutshell

After you close a file from the Browse screen, the Cabinet screen appears. You can create or open another file, or you can exit the program and return to DOS.

To exit from Nutshell, from the Cabinet screen:

Press ESCAPE
The Cabinet screen disappears and the DOS prompt is displayed on the screen.

HELP SHEET FOR NUTSHELL

The BROWSE screen is the main screen in NUTSHELL.
From here you can select:

FIND	to select certain records from the file
ADD	to add records to the file
MODIFY	to modify the data in a record
REMOVE	to remove records from the file
SORT	to change the order of the records
OUTPUT	to print records or copy them to a file
LAYOUT	to arrange the display of fields and text
DEFINE	to define the type of data in each field

USEFUL KEYS:

F2	moves the cursor to the menu
——|	selects an option from the menu
PgUp, }	turns the page to previous or
PgDn }	next records
Ctrl-PgUp	displays the first record in the file
Ctrl-PgDn	displays the last record in the file
Esc	closes the file

see pp. 115-117——Press Esc to return from Help

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