CHAPTER 1: DATABASE SYSTEMS

1. Data and information are essentially the same thing.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. Data processing can be as simple as organizing data to reveal patterns.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. Data is the result of processing raw facts to reveal its meaning.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. When data are entered into a form and saved, they are placed in the underlying database as knowledge.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Moderate REF: p.4

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Data versus Information

1. Data constitute the building blocks of information.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. Metadata describe the data characteristics and the set of relationships that links the data found within the database.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.6

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. The only way to access the data in a database is through the DBMS.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Moderate REF: p.6

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Introducing the Database

1. Database programming languages receive all application requests and translate them into the complex operations required to fulfill those requests.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Moderate REF: p.6

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Introducing the Database

1. The DBMS reveals much of the database’s internal complexity to the application programs and users.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Moderate REF: p.6

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Introducing the Database

1. One disadvantage of the DBMS is that it increases the risk of data security breaches.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.7

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. An operational database is sometimes referred to as an enterprise database.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.9

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. A data warehouse can store data derived from many sources.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.9

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. The same data might be simultaneously structured and unstructured depending on the intended processing.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Moderate REF: p.9

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Introducing the Database

1. Corporations use only structured data.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Moderate REF: p.10

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Introducing the Database

1. Field refers to a collection of related records.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.15

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Evolution of File System Data Processing

1. Structural dependence exists when it is possible to make changes in the file structure without affecting the application program’s ability to access the data.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Moderate REF: p.19

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Problems with File System Data Processing

1. Data anomaly is defined as the condition in which all of the data in the database are consistent with the real-world events and conditions.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.21

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Problem with File System Data Processing

1. One disadvantage of a database system over previous data management approaches is increased costs.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.28

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Database System

1. An advantage of database systems is that you needn’t perform frequent updates and apply latest patches.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Moderate REF: p.28

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Database System

1. One advantage of a database system over previous data management approaches is that the database system is considerably less complex.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Moderate REF: p.28

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Database System

1. \_\_is the result of revealing the meaning of raw facts.
   1. End-user data b. An encoded sample

c. An encrypted bit d. Information

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. \_\_\_\_ is the body of information and facts about a specific subject.
   1. Validation b. A format

c. Knowledge d. A database

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.5

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. Accurate, relevant, and timely information is the key to
   1. data management b. good decision making

c. knowledge d. understanding

*ANSWER:* b

PTS: 1 DIF: Difficulty: Moderate REF: p.5

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Data versus Information

1. End-user data is .
   1. knowledge about the end users b. raw facts of interest to the end user

c. information about a specific subject d. accurate, relevant and timely information

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.6

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. \_\_\_provide a description of the data characteristics and the set of relationships that link the data found within thedatabase.
   1. Queries b. End-user data

c. Metadata d. Schemas

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.6

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. \_\_\_ serve as the intermediary between the user and the database.
   1. DBMSs b. Metadata

c. End-user data d. Programming languages

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.6

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. The database structure in a DBMS is stored as a .
   1. single file b. collection of files

c. set of key/value pairs d. collection of queries

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.6

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. A(n) might be written by a programmer or it might be created through a DBMS utility program.
   1. query b. operating system

c. database management system d. application

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.6

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. \_\_\_\_ exists when different versions of the same data appear in different places.
   1. Data inconsistency b. Poor data security

c. Structural dependence d. Conceptual dependence

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.7

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. The response of the DBMS to a query is the .
   1. ad hoc query b. ad hoc response

c. query result set d. integrated view of the data

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.7

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. A(n) database is used by an organization and supports many users across many departments.
   1. desktop b. workgroup

c. enterprise d. transactional

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.8

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. A(n) database supports a relatively small number of users (usually fewer than 50) or a specific departmentwithin an organization.
   1. desktop b. workgroup

c. enterprise d. transactional

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.8

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. A workgroup database is a(n) database.
   1. single-user b. multiuser

c. desktop d. distributed

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.8

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. A desktop database is a database.
   1. single-user b. multiuser

c. workgroup d. distributed

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.8

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. Data warehouse contains historical data obtained from the .
   1. operational databases b. desktop database

c. enterprise databases d. workgroup databases

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.9

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. data exist in the format in which they were collected.
   1. Structured b. Semistructured

c. Unstructured d. Historical

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.9

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. \_\_\_data exist in a format that does not lend itself to processing that yields information.
   1. Structured b. Semistructured

c. Unstructured d. Historical

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.9

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. \_\_ are the result of formatting disorganized data in order to facilitate storage, use and generation of information.
   1. Structured data b. Raw data

c. Unstructured data d. Obsolete data

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.9

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. Most data that can be encountered are best classified as .
   1. structured b. semistructured

c. unstructured d. historical

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.10

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. An XML database supports the storage and management of XML data.
   1. structured b. multistructured

c. fullystructured d. semistructured

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.10

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. The organization of data within folders in a manual file system is determined by .
   1. its date of creation b. its expected use

c. the title of the documents in the folder d. the data processing specialist

*ANSWER:* b

PTS: 1 DIF: Difficulty: Moderate REF: p.14

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Evolution of File System Data Processing

1. A is a logically connected set of one or more fields that describes a person, place, or thing.
   1. database b. column

c. record d. file

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.15

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Evolution of File System Data Processing

1. A is a collection of related records.
   1. schema b. field

c. column d. file

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.15

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Evolution of File System Data Processing

1. A is a character or group of characters that has a specific meaning.
   1. database b. field

c. record d. file

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.15

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Evolution of File System Data Processing

1. Which of the following is true of spreadsheet applications?

a. They provide enhanced security and robust data sharing b. They do not allow manipulation of data

features. onceentered.

c. They are a better alternative to databases. d. They enhance the user’s ability to understand the data.

*ANSWER:* d

PTS: 1 DIF: Difficulty: Moderate REF: p.17

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Evolution of File System Data Processing

1. Which of the following refers to the situation where different versions of the same data are stored at different placesbecause they weren’t updated consistently?
   1. Data query b. Data integrity

c. Data dictionary d. Data redundancy

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.20

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Problems with File System Data Processing

1. Data is said to be verifiable if:
   1. the data always yields consistent results. b. the data cannot be changed or manipulated.

c. the data is obtained from trusted sources. d. the data is stored in different places within the database.

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.20

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Problems with File System Data Processing

1. \_\_\_\_\_\_ is defined as the condition in which all of the data in the database are consistent with the real-world eventsand conditions.
   1. Data integrity b. Data anomaly

c. Data ubiquity d. Data quality

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.20

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Problems with File System Data Processing

1. The term refers to an organization of components that define and regulate the collection, storage,management and use of data within a database environment.
   1. structured data b. transaction

c. management system d. database system

*ANSWER:* d

PTS: 1 DIF: Difficulty: Moderate REF: p.22

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Database Systems

1. relates to the activities that make the database execute transactions more efficiently in terms of storage andaccess speed.
   1. Performance tuning b. Database design

c. Query access d. Database management

*ANSWER:* a

PTS: 1 DIF: Difficulty: Moderate REF: p.25

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Database Systems

1. refer to a type of database that stores most of its data in RAM rather than in hard disks.
   1. Integrated databases b. Cloud databases

c. Desktop databases d. In-memory databases

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.30

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Preparing for Your Database Professional Career

1. is the result of processing raw data to reveal its meaning.

*ANSWER:* Information

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. To reveal meaning, information requires .

*ANSWER:* context

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. Raw data must be properly for storage, processing and presentation.

*ANSWER:* formatted

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. Information is produced by processing

*ANSWER:* data

PTS: 1 DIF: Difficulty: Easy REF: p.4

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Data versus Information

1. is data about data through which the end-user data are integrated and managed.

*ANSWER:* Metadata

PTS: 1 DIF: Difficulty: Easy REF: p.6

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. A(n) is a collection of programs that manages the database structure and controls access to the data storedin the database.

*ANSWER:* DBMS (database management system)

database management system (DBMS)

database management system

DBMS

PTS: 1 DIF: Difficulty: Easy REF: p.6

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. A(n) is a spur-of-the-moment question.

*ANSWER:* ad hoc query

PTS: 1 DIF: Difficulty: Moderate REF: p.7

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Introducing the Database

1. A(n) is a specific request issued to the DBMS for data manipulation.

*ANSWER:* query

PTS: 1 DIF: Difficulty: Easy REF: p.7

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. databases focus primarily on storing data used to generate information required to make tactical or strategicdecisions.

*ANSWER:* Analytical

PTS: 1 DIF: Difficulty: Easy REF: p.9

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. is a special language used to represent and manipulate data elements in a textual format.

*ANSWER:* XML (Extensible MarkupLanguage)

Extensible Markup Language (XML)

Extensible Markup Language

XML

PTS: 1 DIF: Difficulty: Easy REF: p.10

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Introducing the Database

1. exists when it is possible to make changes in the data storage characteristics without affecting an applicationprogram’s ability to access data.

*ANSWER:* Data independence

PTS: 1 DIF: Difficulty: Moderate REF: p.19

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Problem with File System Data Processing

1. The term refers to scattered locations storing the same basic data.

*ANSWER:* islands of information

PTS: 1 DIF: Difficulty: Easy REF: p.20

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Problems with File System Data Processing

1. exists when the same data are stored unnecessarily at different places.

*ANSWER:* Data redundancy

PTS: 1 DIF: Difficulty: Easy REF: p.20

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Problems with File System Data Processing

1. exists when different and conflicting versions of the same data appear in different places.

*ANSWER:* Data inconsistency

PTS: 1 DIF: Difficulty: Easy REF: p.20

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Problems with File System Data Processing

1. A(n) develops when all required changes in the redundant data are not made successfully.

*ANSWER:* data anomaly

anomaly

PTS: 1 DIF: Difficulty: Easy REF: p.21

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Problems with File System Data Processing

1. The DBMS uses the to look up the required data component structures and relationships, thus relievingprogrammers from having to code such complex relationships in each program.

*ANSWER:* data dictionary

PTS: 1 DIF: Difficulty: Easy REF: p.25

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Database Systems

1. relates to activities that make a database operate more efficiently in terms of storage and access speed.

*ANSWER:* Performance tuning

PTS: 1 DIF: Difficulty: Easy REF: p.25

NAT: BUSPROG: Technology STATE: DISC: Information Technologies

KEY: Bloom's: Knowledge TOP: Database Systems

1. Describe what metadata are and what value they provide to the database system.

*ANSWER:* The metadata describe the data characteristics and the set of relationships that links the data foundwithin the database. For example, the metadata component stores information such as the name of eachdata element, the type of values (numeric, dates, or text) stored on each data element, and whether thedata element can be left empty. The metadata provide information that complements and expands thevalue and use of the data. In short, metadata present a more complete picture of the data in thedatabase. Given the characteristics of metadata, you might hear a database described as a “collection ofself­describing data.”

PTS: 1 DIF: Difficulty: Moderate REF: p.6

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Introducing the Database

1. What are the advantages of having the DBMS between the end user’s applications and the database?

*ANSWER:* Having a DBMS between the end user’s applications and the database offers some importantadvantages. First, the DBMS enables the data in the database to be shared among multiple applicationsor users. Second, the DBMS integrates the many different users’ views of the data into a single all­encompassing data repository.

PTS: 1 DIF: Difficulty: Moderate REF: p.6

NAT: BUSPROG: Analytic STATE: DISC: Information Technologies

KEY: Bloom's: Comprehension TOP: Introducing the Database

1. Discuss some considerations when designing a database.

*ANSWER:* Proper database design requires the designer to identify precisely the database’s expected use.

Designing a transactional database emphasizes accurate and consistent data and operational speed.Designing a data warehouse database emphasizes the use of historical and aggregated data. Designing adatabase to be used in a centralized, single-user environment requires a different approach from thatused in the design of a distributed, multiuser database.

Designing appropriate data repositories of integrated information using the two-dimensional tablestructures found in most databases is a process of decomposition. The integrated data must bedecomposed properly into its constituent parts, with each part stored in its own table. Further, therelationships between these tables must be carefully considered and implemented so the integrated viewof the data can be re-created later as information for the end user. A well-designed database facilitatesdata management and generates accurate and valuable information. A poorly designed database is likelyto become a breeding ground for difficult­to­trace errors that may lead to bad decision making—and baddecision making can lead to the failure of an organization. Database design is simply too important to beleft to luck. That’s why college students study database design, why organizations of all types and sizessend personnel to database design seminars, and why database design consultants often make anexcellent living.

PTS: 1 DIF: Difficulty: Moderate REF: p.14

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

KEY: Bloom's Comprehension TOP: Why Database Design is Important

1. What are some reasons for studying file systems?

*ANSWER:* A brief explanation of the evolution of file system data processing can be helpful in understanding thedata access limitations that databases attempt to overcome. Understanding these limitations is relevant todatabase designers and developers because database technologies do not make these problems magicallydisappear—database technologies simply make it easier to create solutions that avoid these problems.

Creating database designs that avoid the pitfalls of earlier systems requires that the designer understandthese problems and how to avoid them; otherwise, the database technologies are no better (and arepotentially even worse!) than the technologies and techniques they have replaced.

PTS: 1 DIF: Difficulty: Moderate REF: p.14

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

KEY: Bloom's Comprehension TOP: Why Database Design is Important

1. What are the problems associated with file systems? How do they challenge the types of information that can

becreated from the data as well as the accuracy of the information?

*ANSWER:* The following problems associated with file systems, whether created by DP specialists or through aseries of spreadsheets, severely challenge the types of information that can be created from the data aswell as the accuracy of the information:

*Lengthy development times.* The first and most glaring problem with the file system approach isthat even the simplest data-retrieval task requires extensive programming. With the older filesystems, programmers had to specify what must be done and how to do it.

*Difficulty of getting quick answers.* The need to write programs to produce even the simplestreports makes ad hoc queries impossible. Harried DP specialists who worked with mature filesystems often received numerous requests for new reports. They were often forced to say thatthe report will be ready “next week” or even “next month.” If you need the information now,getting it next week or next month will not serve your information needs.

*Complex system administration.* System administration becomes more difficult as the number offiles in the system expands. Even a simple file system with a few files requires creating andmaintaining several file management programs. Each file must have its own file managementprograms that allow the user to add, modify, and delete records; to list the file contents; and togenerate reports. Because ad hoc queries are not possible, the file reporting programs canmultiply quickly. The problem is compounded by the fact that each department in the organization“owns” its data by creating its own files.

*Lack of security and limited data sharing.* Another fault of a file system data repository is alack of security and limited data sharing. Data sharing and security are closely related. Sharingdata among multiple geographically dispersed users introduces a lot of security risks. In terms ofspreadsheet data, while many spreadsheet programs provide rudimentary security options, theyare not always used, and even when they are, they are insufficient for robust data sharing amongusers. In terms of creating data management and reporting programs, security and data-sharingfeatures are difficult to program and consequently are often omitted from a file systemenvironment. Such features include effective password protection, the ability to lock out parts offiles or parts of the system itself, and other

measures designed to safeguard data confidentiality.Even when an attempt is made to improve system and data security, the security devices tend tobe limited in scope and effectiveness.

*Extensive programming.* Making changes to an existing file structure can be difficult in a filesystem environment.

PTS: 1 DIF: Difficulty: Moderate REF: p.18-19

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

KEY: Bloom's Comprehension TOP: Problem with File System Data Processing

1. Describe the five types of users identified in a database system.

*ANSWER:* 1. System administrators oversee the database system’s general operations.

1. Database administrators, also known as DBAs, manage the DBMS and ensure that the databaseis functioning properly.
2. Database designers design the database structure. They are, in effect, the database architects. Ifthe database design is poor, even the best application programmers and the most dedicated DBAscannot produce a useful database environment. Because organizations strive to optimize their dataresources, the database designer’s job description has expanded to cover new dimensions andgrowing responsibilities.
3. System analysts and programmers design and implement the application programs. They designand create the data-entry screens, reports, and procedures through which end users access andmanipulate the database’s data.
4. End users are the people who use the application programs to run the organization’s dailyoperations. For example, sales clerks, supervisors, managers, and directors are all classified asend users. High-level end users employ the information obtained from the database to maketactical and strategic business decisions.

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1. What are the disadvantages of database systems?

*ANSWER:* Although the database system yields considerable advantages over previous data managementapproaches, database systems do carry significant disadvantages:

*Increased costs*. Database systems require sophisticated hardware and software and highlyskilled personnel. The cost of maintaining the hardware, software, and personnel required tooperate and manage a database system can be substantial. Training, licensing, and regulationcompliance costs are often overlooked when database systems are implemented.

*Management complexity*. Database systems interface with many different technologies and havea significant impact on a company’s resources and culture. The changes introduced by theadoption of a database system must be properly managed to ensure that they help advance thecompany’s objectives. Because database systems hold crucial company data that are accessedfrom multiple sources, security issues must be assessed constantly.

*Maintaining currency*. To maximize the efficiency of the database system, you must keep yoursystem current. Therefore, you must perform frequent updates and apply the latest patches andsecurity measures to all components. Because database technology advances rapidly, personneltraining costs tend to be significant.

*Vendor dependence*. Given the heavy investment in technology and personnel training,companies might be reluctant to change database vendors. As a consequence, vendors are lesslikely to offer pricing point advantages to existing customers, and those customers might be limitedin their choice of database system components.

*Frequent upgrade/replacement cycles*. DBMS vendors frequently upgrade their products byadding new functionality. Such new features often come bundled in new upgrade versions of thesoftware. Some of these versions require hardware upgrades. Not only do the upgradesthemselves cost money, it also costs money to train database users and administrators to properlyuse and manage the new features.

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1. Discuss any three functions performed by the DBMS that guarantee the integrity and consistency of the data in thedatabase.

*ANSWER:* (answers may vary)

*Data dictionary management*. The DBMS stores definitions of the data elements and their relationships (metadata) in a data dictionary. In turn, all programs that access the data in the database work through the DBMS. The DBMS uses the data dictionary to look up the required data component structures and relationships, thus relieving you from having to code such complex relationships in each program. Additionally, any changes made in a database structure are automatically recorded in the data dictionary, thereby freeing you from having to modify all of the programs that access the changed structure. In other words, the DBMS provides data abstraction, and it removes structural and data dependence from the system.

*Data storage management*. The DBMS creates and manages the complex structures required for data storage, thus relieving you from the difficult task of defining and programming the physical data characteristics. A modern DBMS provides storage not only for the data but for related data-entry forms or screen definitions, report definitions, data validation rules, procedural code, structures to handle video and picture formats, and so on. Data storage management is also important for database performance tuning. Performance tuning relates to the activities that make the database perform more efficiently in terms of storage and access speed. Although the user sees the database as a single data storage unit, the DBMS actually stores the database in multiple physical data files. Such data files may even be stored on different storage media. Therefore, the DBMS doesn’t have to wait for one disk request to finish before the next onestarts. In other words, the DBMS can fulfill database requests concurrently.

*Data transformation and presentation*. The DBMS transforms entered data to conform torequired data structures. The DBMS relieves you of the chore of distinguishing between thelogical data format and the physical data format. That is, the DBMS formats the physicallyretrieved data to make it conform to the user’s logical expectations.

*Security management*. The DBMS creates a security system that enforces user security anddata privacy. Security rules determine which users can access the database, which data itemseach user can access, and which data operations (read, add, delete, or modify) the user canperform. This is especially important in multiuser database systems.

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