> ### *Chapter 3*
> ### *Data Modelling*

True-False Questions

1.   The letter "M" in the acronym DBMS stands for "maintenance."

2.   The letter "M" in the acronym DBMS stands for "management."

3.   An accounting information system database is a collection of facts and figures that serves the accounting information needs of one or more organizational subsystems.

4.   Given the flexibility and usefulness of computerized accounting databases, a company will always find it cost effective to use them in processing, storing, and retrieving accounting data.

5.   The correct order of elements, from smallest to largest, in the data hierarchy is data field, record, file (table), database.

6.   The correct order of elements, from smallest to largest, in the data hierarchy is data field, file (table), record, database.

7.   The correct order of elements, from smallest to largest, in the data hierarchy is database, data field, record, file (table).

8.   The basic unit of information in an accounting information system database is the debit.

9.   The largest unit of information in an accounting information database is a data field.

10.   The basic unit of information in an accounting information database is a table.

11.   The smallest unit of information in the data hierarchy is a data field.

12.   The largest unit of information in the data hierarchy is a record.

13.   A computer record is used to store all the information about one transaction, but several such records must be used to store the information about one employee, one inventory part, and so forth, on a master file.

14.   The data field that distinguishes one record from another in a database table is called the *primary key*.

15.   Record keys on computer files are unique only to the extent that they classify computer records by some general category.

16.   A last name such as "Smith" is an example of a useful primary record key.

17.   A Social Insurance Number (SIN) is a good example of a useful primary record key.

18. For a file of employee workers, it would make more sense to use their last name as a primary key rather than their Social Insurance Number because this would better preserve their privacy.

19. A *foreign key* is a data field in the records of one file that references a primary key in the records of another file.

20. Three database concerns when creating large databases are "data integrity," "processing accuracy," and "data security."

21. A data dictionary is a computer file describing the data items of an accounting database.

22. The term "transaction control" refers to the requirement that a database system either process a transaction entirely, or not at all.

23. The "concurrency" control in database operations refers to the need to convert foreign currency amounts into dollar terms before reporting them to subschema viewers.

24. The idea behind *concurrency control* is to deny several users access to the same database record at the same time.

25. Database security is no longer important because DBMSs are already so safe.

26. The idea behind *view controls* is to allow users access to only that information that they need to see.

27. An REA accounting system takes an "enterprise-wide view" of accounting data.

28. The initials *R-E-A* in the REA accounting framework refer to "resources, events, and accounting."

29. "Protecting privacy" is one of the important goals in data modelling.

30. "Avoiding data redundancy" is one of the important goals in data modelling.

31. The E-R model refers to the "entity-relationship" model.

32. An example of a database cardinality is "one-to-many."

33. An example of a database cardinality is "one-to-few."

34. An example of a database cardinality is "one-to-one."

35. An example of a "one-to-one" relationship is "employee to assigned parking stall."

36. An example of a "one-to-many" relationship is "students to classes."

37. A relational data structure should *never* be used for accounting systems.

38. A disadvantage of relational databases is that they *cannot* accommodate a variety of file inquiries.

39.   An advantage of relational databases is that additional indexes can be added at later points of time as new data processing requirements dictate.

40.   Normalizing accounting data refers primarily to eliminating errors and outliers, thus creating "normal data."

41.   An important reason for normalizing data is to eliminate data redundancy.

42.   There are exactly three normal forms.

43.   Databases *cannot* store more than one value in the same data field of the same record.

44.   A database is in *first normal form* if the data it contains is free of errors and outliers.

45.   A database is in *second normal form* if all of its records are in first normal form, and a second, duplicate record exists for each of them.

46.   A database is in *third normal form* if all of its records are in second normal form, and there are no transitive dependencies.

47.   An example of a transitive relationship in a parking-tickets application is the one between "ticket code" and "fine amount."

48.   An example of a transitive relationship in a medical application is the one between "medical procedure code" and "cost of treatment."

49.   An example of a transitive relationship in a medical application is the one between "doctor number" and "patient name."

Multiple-Choice Questions

50.   All of these are reasons why databases are important to AISs *except*:
    a)   AIS databases store valuable information
    b)   Many AISs are large and therefore potentially unwieldy
    c)   The databases of some organizations are very complex
    d)   The hard disk space used to store AIS databases is comparatively expensive
    e)   all of these are reasons why databases are important to AISs

51.   The basic unit of information on a computer file of accounting data is a(n):
    a)   Inventory part number
    b)   Data field
    c)   Computer record
    d)   Bit

52. All of the following are items within the data hierarchy *except*:
    a) Database
    b) Data field
    c) Record
    d) all of these items are part of the data hierarchy

53. The data item which uniquely identifies a computer record in an AIS database table is called the:
    a) Pointer address
    b) Primary record key
    c) Employee number
    d) Header label
    e) Sort field

54. All of these are types of record keys *except:*
    a) Primary record key
    b) Foreign record key
    c) Tertiary record key
    d) all the above are record key terms

55. Which of the following creates relationships by linking the data in one file (e.g., customer) to an item in a second file (e.g., a sales order)?
    a) Foreign key
    b) Data dictionary
    c) Relationships link bit
    d) Index file

56. The _____ is *not* necessarily unique for the records in a database table, but is nonetheless often used to locate a particular record:
    a) Foreign key
    b) Data dictionary
    c) Relationships link bit
    d) Index file

57. The best choice for the primary key in an "Employees" table would be his or her:
    a) Last name
    b) First name
    c) Phone number
    d) Employee number

58. From the following choices, the best example of a primary key for an employee table would be his or her:
    a) Social Insurance Number
    b) Phone number
    c) Last name
    d) Office number

59. The foreign key in one database table will always be a _____ key in a linked table.
    a)   Secondary key
    b)   Domestic key
    c)   Primary key
    d)   all of these are always true

60. Which of these comes closest in structure to that of a hierarchical database?
    a)   Organization chart
    b)   List of students and their classes
    c)   List of specialty doctors and their patients
    d)   A map of a city

61. The terms "parent record," "child record," and "sibling record" describe the records in a:
    a)   Hierarchical database
    b)   Network database
    c)   Relational database
    d)   Flat file

62. This type of database structure enables users to create relationships after the database has been created and implemented:
    a)   Hierarchical
    b)   Network
    c)   Star
    d)   Relational

63. A major advantage of relational databases is:
    a)   All records are stored together
    b)   No pointers are used
    c)   The ability to add tables and relationships after the database becomes operational
    d)   It closely resembles a flat file

64. Which of the following is *not* an objective of a computerized database?
    a)   Minimize data redundancy
    b)   Make efficient use of storage media
    c)   Distribute information to end users
    d)   Eliminate the data-gathering responsibilities of some subsystems within the organization
    e)   Reduce the decision-making functions of subsystem managers

65. The _____ helps developers document a database:
    a)   Data documentation detailer (DDD)
    b)   Data dictionary
    c)   Database schema system
    d)   Data OLAP system

66. A data dictionary:
    a)   Is a book defining computer terms
    b)   Is a reference document describing how accounting data are collected
    c)   Is usually a computer file that maintains descriptive information about the data items of an accounting information system
    d)   all of the above

67. A data dictionary can help an accountant:
    a)   Prepare tax forms for the CRA
    b)   Establish an audit trail
    c)   Correct clerical mistakes in transaction data
    d)   Perform an audit of the petty cash fund

68. Controls that require a database to either execute a transaction completely, or not at all, are examples of:
    a)   Data integrity controls
    b)   Transaction controls
    c)   Concurrency controls
    d)   Privacy controls

69. Edit tests that catch data entry errors are examples of:
    a)   Data integrity controls
    b)   Transaction controls
    c)   Concurrency controls
    d)   Privacy controls

70. Controls that do *not* allow users to update the same database record at the same time are examples of:
    a)   Data integrity controls
    b)   Data processing controls
    c)   Concurrency controls
    d)   Privacy controls

71. In the REA accounting framework, the letter "R" stands for:
    a)   Resources
    b)   Recording
    c)   Remembering
    d)   Reporting

72. The REA accounting framework is most closely associated with which of the following?
    a)   SQL
    b)   An enterprise-wide view of accounting processes
    c)   Normalization of accounting data for recording and query purposes
    d)   An example of a data manipulation language

73. Which of these would be an example of an "agent" in the REA framework?
    a)   Salesperson
    b)   Customer
    c)   Manager
    d)   all of these are possibilities

74. Which of these would be an example of a "resource" in the REA framework?
    a) Equipment
    b) Inventory
    c) Cash
    d) all of these are possible examples of resources

75. In the REA framework, which of these would be recorded as an "event?"
    a) Hiring a new president of the company
    b) Taking an initial sales order from a customer
    c) Buying a piece of equipment for cash
    d) all of these would be recorded as events

76. In the REA framework, an account receivable would be classified as a(n):
    a) Asset
    b) Event
    c) Resource
    d) none of these

77. In the REA framework, a database designer should create a _____ for each entity.
    a) Record
    b) Table
    c) Secondary key
    d) all of these

78. Assume that an accounts receivable application contains database tables for customer orders, inventory items, customers, and salespersons. All of these would be likely data fields in a customer order table *except*:
    a) Customer name
    b) Customer number
    c) Date of order
    d) Order number

79. Assume that an accounts receivable application contains database tables for customer orders, inventory items, customers, and salespersons. Which of these items would probably be a *foreign key* in the customer orders table?
    a) Order number
    b) Customer name
    c) Salesperson number
    d) all of these

80. The letters "E-R" in the term *E-R diagram* refers to:
    a) Entity relationship
    b) Economic relationship
    c) Enterprise resource
    d) none of these

81. The purpose of the E-R model is to help database designers:
    a) Identify data redundancies
    b) Create databases in third normal form
    c) Design databases and depict data relationships
    d) Answer structured queries about the data in accounting databases

82. All of these are symbols in the E-R model *except*:
    a) Star
    b) Diamond
    c) Oval
    d) Rectangle

83. In the E-R model, this symbol represents a database entity such as a customer:
    a) Diamond
    b) Rectangle
    c) Arrow
    d) Parallelogram

84. In the E-R model, an oval denotes a(n):
    a) Data attribute such as a Social Insurance Number
    b) One-to-many relationship
    c) "is a" characteristic
    d) Transitive relationship

85. In the E-R model, the primary record key of a file is indicated by:
    a) An asterisk
    b) Underlining
    c) Using a square
    d) Printing the term (e.g., part number) in italics

86. Within a database context, the relationship between "natural parent" and "child" would most likely be:
    a) one-to-one
    b) one-to-many
    c) many-to-one
    d) many-to-many

87. Within a database context, the relationship between "military officer" and "private" would most likely be:
    a) one-to-one
    b) one-to-many
    c) many-to-one
    d) many-to-many

88. Within a database context, the relationship between "students" and "classes" would most likely be:
    a) one-to-one
    b) one-to-many
    c) many-to-one
    d) many-to-many

89. Within a database context, the relationship between "assigned parking space" and "car" would most likely be:
    a)   one-to-one
    b)   one-to-many
    c)   many-to-one
    d)   many-to-many

90. Within a database context, the relationship between "doctor" and "patient" would most likely be:
    a)   one-to-one
    b)   one-to-many
    c)   many-to-one
    d)   many-to-many

91 . Within a database context, the relationship between "military sergeant" and "private" would most likely be:
    a)   one-to-one
    b)   one-to-many
    c)   many-to-one
    d)   many-to-many

92. Within a database context, the relationship between "premier" and "deputy premier" would most likely be:
    a)   one-to-one
    b)   one-to-many
    c)   many-to-one
    d)   many-to-many

93. Within a database context, the relationship between "grandparent" and "grandchild" would most likely be:
    a)   one-to-one
    b)   one-to-many
    c)   many-to-one
    d)   many-to-many

94. Within a database context, the relationship between "general ledger" and "subsidiary ledger" would most likely be:
    a)   one-to-one
    b)   one-to-many
    c)   many-to-one
    d)   many-to-many

95. Within a database context, the relationship between "sales invoice" and "line item" would most likely be:
    a)   one-to-one
    b)   one-to-many
    c)   many-to-one
    d)   many-to-many

96.   The process of *data normalization* refers to:
        a)   Eliminating data errors and other problems from "normal data"
        b)   Scaling data to values between zero and one
        c)   Storing data in normal storage media such as hard disks
        d)   none of these

97.   As described in the chapter, all of these are normalization "forms" *except*:
        a)   First normal form
        b)   Second normal form
        c)   Third normal form
        d)   Transaction form

98.   The reason why database designers normalize data is:
        a)   To eliminate data errors
        b)   To scale data properly
        c)   To create backup copies of data
        d)   To create efficient database tables

99.   In the context of databases, the term *data redundancy* refers to:
        a)   Storing the same information in several records
        b)   Repeating data on multiple reports
        c)   Using foreign keys which duplicate the values of primary keys
        d)   all of these are possible examples of data redundancy

100.   A database is in third normal form if it is second normal form and:
        a)   It contains no data redundancies
        b)   It contains no foreign keys
        c)   It contains no transitive dependencies
        d)   all of these

101.   An example of a *transitive dependency* in a database is:
        a)   Student → grade
        b)   Telephone area code → phone number
        c)   Airline → flight number
        d)   Parking Code → parking fine amount

102.   An example of a *transitive dependency* in a database is:
        a)   Student → university course number
        b)   Parking ticket code → total of student parking fines
        c)   Product number → product price
        d)   Age → Social Insurance Number

Note to Instructor: The following questions are drawn from past AICPA examinations.

103.   In recent years many businesses have formed a common information source within their business organization called a database. One of the advantages of building databases is the simultaneous updating of files with common data elements. Another major advantage of the database concept is that:
   a)   Database systems can be used in microcomputers as well as on large computers
   b)   Database systems are simple to install and maintain
   c)   Database systems are generally less expensive than separate file systems
   d)   More duplication of data occurs with a database system
   e)   Fewer skilled people are required to run a database system than another system

104.   Ander and Company has designed an electronic data processing system utilizing the database systems concept. In this system, transactions are entered into the system only once. In order to accomplish this Ander's files:
   a)   Must utilize magnetic tape
   b)   Must be separated by function (e.g., marketing has a set of files, production has a set, etc.)
   c)   Must be located in an integrated file located in online storage
   d)   Must be updated in a real-time environment
   e)   Must be handled in some other manner than described above

105.   An important data field found in a typical computer record of an inventory file that would be vital to purchasing agents would be the inventory item's:
   a)   Inventory number
   b)   Assembly code
   c)   Vendor code
   d)   Assembly pointer address

The following data apply to items 106-108. The Oxford Corporation has the following eleven master files:

   * Accounts payable   * Raw materials inventory
   * Accounts receivable   * Sales summary
   * Bill of materials   * Vendor history
   * Finished goods inventory   * Work in process inventory
   * Open production orders   * Operations list (labor operations and
   * Open purchase orders   machine requirements for production)

106.   Master files maintained as part of the sales order processing system are:
   a)   Accounts receivable, bill of materials, sales summary
   b)   Accounts payable, accounts receivable, finished goods inventory
   c)   Accounts receivable, sales summary, operations list
   d)   Accounts receivable, finished goods inventory, sales summary
   e)   Accounts receivable, sales summary, vendor history

107. Master files that are maintained as part of the processing of purchase transactions are:
    a) Accounts payable, bill of materials, finished goods inventory, open purchase orders
    b) Accounts payable, open purchase orders, raw materials inventory, work in process inventory
    c) Accounts payable, bill of materials, open purchase orders, vendor history
    d) Accounts payable, finished goods inventory, open purchase orders, vendor history
    e) Accounts payable, open purchase orders, raw materials inventory, vendor history

108. Master files used to plan and report on the resources required for the coming period are:
    a) Bill of materials, open production orders, work in process inventory, operations list
    b) Finished goods inventory, open production orders, open purchase orders, work in process inventory
    c) Finished goods inventory, open purchase orders, raw materials inventory, work in process
    d) Bill of materials, open production orders, vendor history, operations list
    e) Accounts payable, bill of materials, open production orders, raw materials inventory

Short Answer Questions

109. Explain the difference between Primary Record Keys, Secondary Record Keys, and Foreign Record Keys.

110. Explain the difference between REA and traditional accounting views of data collection and storage.