

Ch2

True/False

Indicate whether the statement is true or false.

- ___ 1. A data model is usually graphical.
- ___ 2. The terms data model and database model are often used interchangeably.
- ___ 3. An implementation-ready data model should contain a description of the data structure that will store the end-user data.
- ___ 4. Within the database environment, a data model represents data structures with the purpose of supporting a specific problem domain.
- ___ 5. Data modeling starts with a very complex representation, and as knowledge of the problem is gained, the model is simplified.
- ___ 6. A manager and a programmer usually have the same view of the same data.
- ___ 7. Database designers determine the data and information that yield the required understanding of the entire business.
- ___ 8. Business rules apply to businesses and government groups, but not to other types of organizations such as religious groups or research laboratories.
- ___ 9. Business rules must be rendered in writing.
- ___ 10. In an SQL-based relational database, each table is dependent on another.
- ___ 11. In an SQL-based relational database, rows in different tables are related based on common values in common attributes.
- ___ 12. Each row in the relational table is known as an entity instance or entity occurrence in the ER model.
- ___ 13. In Chen notation, entities and relationships must be oriented horizontally.
- ___ 14. M:N relationships are not appropriate in a relational model.
- ___ 15. The focus on effective Internet interfacing makes the underlying data model more important to the end user.
- ___ 16. Use of the relational model has declined because of the difficulty in incorporating components from other data models.
- ___ 17. The network model has structural level dependency.
- ___ 18. The entity relationship model is limited to conceptual modeling, with no implementation component.

- ___ 19. The hierarchical model is software-independent.
- ___ 20. The relational model is hardware-dependent and software-independent.

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 21. Which of the following is a basic building block of all data models?
- a. category
 - b. class
 - c. constraint
 - d. customer
- ___ 22. A(n) ___ represents a particular type of object in the real world.
- a. attribute
 - b. entity
 - c. relationship
 - d. constraint
- ___ 23. A(n) ___ is anything about which data are to be collected and stored.
- a. attribute
 - b. entity
 - c. relationship
 - d. constraint
- ___ 24. A(n) ___ is the equivalent of a field in a file system.
- a. attribute
 - b. entity
 - c. relationship
 - d. constraint
- ___ 25. A(n) ___ is bidirectional.
- a. attribute
 - b. entity
 - c. relationship
 - d. constraint
- ___ 26. A(n) ___ is a restriction placed on the data.
- a. attribute
 - b. entity
 - c. relationship
 - d. constraint
- ___ 27. ___ are important to ensure data integrity.
- a. Attributes
 - b. Entities
 - c. Relationships
 - d. Constraints
- ___ 28. ___ are normally expressed in the form of rules.
- a. Attributes
 - b. Entities
 - c. Relationships
 - d. Constraints
- ___ 29. Students and classes have a ___ relationship.
- a. one-to-one
 - b. one-to-many
 - c. many-to-one
 - d. many-to-many
- ___ 30. Business rules are derived from ___.
- a. a detailed description of an organization's operations
 - b. standards and practices developed over the years
 - c. managers' recommendations
 - d. governmental oversight organization standards
- ___ 31. Which of the following is true of business rules?
- a. They allow the designer to set company policies with regard to data.
 - b. They allow the designer to develop business processes.

- c. They enable communication between the users and designers.
- d. They provide a framework for the company's self actualization.

- ___ 32. A noun in a business rule translates to a(n) ___ in the data model.
- a. entity
 - b. attribute
 - c. relationship
 - d. constraint
- ___ 33. A verb associating two nouns in a business rule translates to a(n) ___ in the data model.
- a. entity
 - b. attribute
 - c. relationship
 - d. constraint
- ___ 34. The hierarchical data model was developed in the ___.
- a. 1960s
 - b. 1970s
 - c. 1980s
 - d. 1990s
- ___ 35. The relational data model was developed in the ___.
- a. 1960s
 - b. 1970s
 - c. 1980s
 - d. 1990s
- ___ 36. The object-oriented data model was developed in the ___.
- a. 1960s
 - b. 1970s
 - c. 1980s
 - d. 1990s
- ___ 37. VMS/VSAM is an example of a(n) ___.
- a. hierarchical model
 - b. file system data model
 - c. relational data model
 - d. XML data model
- ___ 38. Oracle 10g is an example of a(n) ___.
- a. hierarchical model
 - b. file system data model
 - c. relational data model
 - d. XML data model
- ___ 39. MySQL is an example of a(n) ___.
- a. hierarchical model
 - b. file system data model
 - c. relational data model
 - d. XML data model
- ___ 40. In the ___ model, the basic logical structure is represented as an upside-down tree.
- a. hierarchical
 - b. network
 - c. relational
 - d. entity relationship
- ___ 41. In the ___ model, each parent can have many children, but each child has only one parent.
- a. hierarchical
 - b. network
 - c. relational
 - d. entity relationship
- ___ 42. One of the limitations of the ___ model was that there were no implementation standards.
- a. hierarchical
 - b. network
 - c. relational
 - d. entity relationship
- ___ 43. The DBTG report contains specifications for a(n) ___ that defines the environment in which data is to be managed.
- a. ERM
 - b. DML
 - c. DBMS
 - d. file system
- ___ 44. In the ___ model, the user perceives the database as a collection of records in 1:M relationships, where each record can have more than one parent.

- | | | |
|--|-----------------|------------------------|
| | a. hierarchical | c. object-oriented |
| | b. network | d. entity relationship |
- ___ 45. The ___ model was developed to allow designers to use a graphical tool to examine structures rather than describing them with text.
- | | |
|-----------------|------------------------|
| a. hierarchical | c. object-oriented |
| b. network | d. entity relationship |
- ___ 46. The ___ model uses the term connectivity to label the relationship types.
- | | |
|---------------|------------------------|
| a. relational | c. object-oriented |
| b. network | d. entity relationship |
- ___ 47. The ___ model uses the concept of inheritance.
- | | |
|---------------|------------------------|
| a. relational | c. object-oriented |
| b. network | d. entity relationship |
- ___ 48. The ___ model is said to be a semantic data model.
- | | |
|---------------|------------------------|
| a. relational | c. object-oriented |
| b. network | d. entity relationship |
- ___ 49. Which data model has the highest level of abstraction?
- | | |
|------------------------|-----------------|
| a. Object-oriented | c. Relational |
| b. Entity relationship | d. Hierarchical |
- ___ 50. The ___ model represents a global view of the database as viewed by the entire organization.
- | | |
|---------------|-------------|
| a. external | c. internal |
| b. conceptual | d. physical |

Completion

Complete each statement.

51. A(n) _____ is a relatively simple representation of more complex real-world data structures.
52. A(n) _____ is a brief, precise, and unambiguous description of a policy, procedure, or principle within a specific organization.
53. A(n) _____ in a hierarchical model is the equivalent of a record in a file system.
54. The _____ is the conceptual organization of the entire database as viewed by the database administrator.
55. The _____ defines the portion of the database “seen” by the application programs that produce information from the data.
56. Each row in a relation is called a(n) _____.
57. Each column in a relation represents a(n) _____.
58. A(n) _____ is a representation of the relational database’s entities, the attributes within those entities and the relationships between those entities.

59. In _____, relationships are represented by a diamond connected to the related entities through a relationship line.
60. In _____, a three-pronged symbol represents the “many” side of the relationship.
61. A(n) _____ is a collection of similar objects with a shared structure and behavior.
62. In object-oriented terms, a(n) _____ defines an object’s behavior.
63. _____ is a language based on OO concepts that describes a set of diagrams and symbols used to graphically model a system.
64. The term _____ is used to refer to the task of creating a conceptual data model that could be implemented in any DBMS.
65. When you can change the internal model without affecting the conceptual model, you have _____ independence.

Essay

66. What components should an implementation-ready data model contain?
67. What do business rules require to be effective?
68. What are the sources of business rules, and what is the database designer’s role with regard to business rules?
69. Describe the three parts involved in any SQL-based relational database application.
70. Describe a conceptual model and its advantages. What is the most widely used conceptual model?

Ch2

Answer Section

TRUE/FALSE

1.	ANS: T	PTS: 1	REF: 31
2.	ANS: T	PTS: 1	REF: 31
3.	ANS: T	PTS: 1	REF: 31
4.	ANS: T	PTS: 1	REF: 31
5.	ANS: F	PTS: 1	REF: 31
6.	ANS: F	PTS: 1	REF: 32
7.	ANS: F	PTS: 1	REF: 33
8.	ANS: F	PTS: 1	REF: 33
9.	ANS: T	PTS: 1	REF: 33
10.	ANS: F	PTS: 1	REF: 40
11.	ANS: T	PTS: 1	REF: 40
12.	ANS: T	PTS: 1	REF: 41
13.	ANS: F	PTS: 1	REF: 41
14.	ANS: T	PTS: 1	REF: 42
15.	ANS: F	PTS: 1	REF: 45
16.	ANS: F	PTS: 1	REF: 45
17.	ANS: T	PTS: 1	REF: 45
18.	ANS: T	PTS: 1	REF: 45
19.	ANS: F	PTS: 1	REF: 49
20.	ANS: F	PTS: 1	REF: 49

MULTIPLE CHOICE

21.	ANS: C	PTS: 1	REF: 32
22.	ANS: B	PTS: 1	REF: 32
23.	ANS: B	PTS: 1	REF: 32
24.	ANS: A	PTS: 1	REF: 32
25.	ANS: C	PTS: 1	REF: 33
26.	ANS: D	PTS: 1	REF: 33
27.	ANS: D	PTS: 1	REF: 33
28.	ANS: D	PTS: 1	REF: 33
29.	ANS: D	PTS: 1	REF: 33
30.	ANS: A	PTS: 1	REF: 33
31.	ANS: C	PTS: 1	REF: 34
32.	ANS: A	PTS: 1	REF: 34
33.	ANS: C	PTS: 1	REF: 34
34.	ANS: A	PTS: 1	REF: 36
35.	ANS: B	PTS: 1	REF: 38
36.	ANS: C	PTS: 1	REF: 35
37.	ANS: B	PTS: 1	REF: 35

38.	ANS: D	PTS: 1	REF: 35
39.	ANS: C	PTS: 1	REF: 35
40.	ANS: A	PTS: 1	REF: 36
41.	ANS: A	PTS: 1	REF: 36
42.	ANS: A	PTS: 1	REF: 36
43.	ANS: B	PTS: 1	REF: 37
44.	ANS: B	PTS: 1	REF: 37
45.	ANS: D	PTS: 1	REF: 40
46.	ANS: D	PTS: 1	REF: 41
47.	ANS: C	PTS: 1	REF: 43
48.	ANS: C	PTS: 1	REF: 43
49.	ANS: B	PTS: 1	REF: 49
50.	ANS: B	PTS: 1	REF: 50

COMPLETION

51.	ANS: data model		
	PTS: 1	REF: 31	
52.	ANS: business rule		
	PTS: 1	REF: 33	
53.	ANS: segment		
	PTS: 1	REF: 36	
54.	ANS: schema		
	PTS: 1	REF: 37	
55.	ANS: subschema		
	PTS: 1	REF: 37	
56.	ANS: tuple		
	PTS: 1	REF: 38	
57.	ANS: attribute		
	PTS: 1	REF: 38	
58.	ANS: relational diagram		
	PTS: 1	REF: 39	
59.	ANS: Chen notation		
	PTS: 1	REF: 41	
60.	ANS: Crow's Foot notation		
	PTS: 1	REF: 41	
61.	ANS: class		

PTS: 1 REF: 43
62. ANS: method

PTS: 1 REF: 43
63. ANS:
UML (Unified Modeling Language)
Unified Modeling Language (UML)
Unified Modeling Language
UML

PTS: 1 REF: 43
64. ANS: logical design

PTS: 1 REF: 51
65. ANS: logical

PTS: 1 REF: 52

ESSAY

66. ANS:
An implementation-ready data model should contain at least the following components:
A description of the data structure that will store the end-user data.
A set of enforceable rules to guarantee the integrity of the data.
A data manipulation methodology to support the real-world data transformations.

PTS: 1 REF: 31
67. ANS:
To be effective, business rules must be easy to understand and widely disseminated to ensure that every person in the organization shares a common interpretation of the rules. Business rules describe, in simple language, the main and distinguishing characteristics of the data *as viewed by the company*.

PTS: 1 REF: 34
68. ANS:
The main sources of business rules are company managers, policy makers, department managers, and written documentation such as a company's procedures, standards, or operations manuals. A faster and more direct source of business rules is direct interviews with end users. Unfortunately, because perceptions differ, end users sometimes are a less reliable source when it comes to specifying business rules. For example, a maintenance department mechanic might believe that any mechanic can initiate a maintenance procedure, when actually only mechanics with inspection authorization can perform such a task. Such a distinction might seem trivial, but it can have major legal consequences. Although end users are crucial contributors to the development of business rules, *it pays to verify end-user perceptions*. Too often, interviews with several people who perform the same job yield very different perceptions of what the job components are. While such a discovery may point to "management problems," that general diagnosis does not help the database designer. The database designer's job is to reconcile such differences and verify the results of the reconciliation to ensure that the business rules are appropriate and accurate.

PTS: 1 REF: 34
69. ANS:

From an end-user perspective, any SQL-based relational database application involves three parts: a user interface, a set of tables stored in the database, and the SQL “engine.” Each of these parts is explained below.

- *The end-user interface.* Basically, the interface allows the end user to interact with the data (by auto-generating SQL code). Each interface is a product of the software vendor’s idea of meaningful interaction with the data. You can also design your own customized interface with the help of application generators that are now standard fare in the database software arena.
- *A collection of tables stored in the database.* In a relational database, all data are perceived to be stored in tables. The tables simply “present” the data to the end user in a way that is easy to understand. Each table is independent from another. Rows in different tables are related based on common values in common attributes.
- *SQL engine.* Largely hidden from the end user, the SQL engine executes all queries, or data requests. Keep in mind that the SQL engine is part of the DBMS software. The end user uses SQL to create table structures and to perform data access and table maintenance. The SQL engine processes all user requests—largely behind the scenes and without the end user’s knowledge. Hence, it’s said that SQL is a declarative language that tells what must be done but not how it must be done.

PTS: 1 REF: 40

70. ANS:

The **conceptual model** represents a global view of the entire database as viewed by the entire organization. That is, the conceptual model integrates all external views (entities, relationships, constraints, and processes) into a single global view of the entire data in the enterprise. Also known as a **conceptual schema**, it is the basis for the identification and high-level description of the main data objects (avoiding any database model-specific details).

The most widely used conceptual model is the ER model. Remember that the ER model is illustrated with the help of the ERD, which is, in effect, the basic database blueprint. The ERD is used to graphically *represent* the conceptual schema.

The conceptual model yields some very important advantages. First, it provides a relatively easily understood bird’s-eye (macro level) view of the data environment.

Second, the conceptual model is independent of both software and hardware. **Software independence** means that the model does not depend on the DBMS software used to implement the model. **Hardware independence** means that the model does not depend on the hardware used in the implementation of the model. Therefore, changes in either the hardware or the DBMS software will have no effect on the database design at the conceptual level. Generally, the term **logical design** is used to refer to the task of creating a conceptual data model that could be implemented in any DBMS.

PTS: 1 REF: 50-51