1. **Which of the following indicates the maximum number of entities that can be involved in a relationship?**

A. ○ Minimum cardinality ✗

B. ◉ Maximum cardinality ✓

2. **Which type of entity cannot exist in the database unless another type of entity also exists in the database, but does not require that the identifier of that other entity be included as part of its own identifier?**

A. ○ Weak entity ✓

---

3. **In a one-to-many relationship, the entity that is on the one side of the relationship is called a(n) _____ entity.**

A. ◉ parent ✓

4. **Which type of entity represents an actual occurrence of an associated generalized entity?**

A. ○ Supertype entity

B. ○ Subtype entity

C. ○ Archetype entity ✗

D. ◉ Instance entity ✓

5. **A recursive relationship is a relationship between an entity and _____ .**

A. ◉ itself ✓

6. **Which of the following indicates the minimum number of entities that must be involved in a relationship?**

A. ◉ **Minimum cardinality** ✔

7. **Which of the following refers to something that can be identified in the user's work environment, something that the users want to track?**

A. ◉ **Entity** ✔

8. **In which of the following is a single-entity instance of one type related to many entity instances of another type?**

A. ○ One-to-One Relationship

B. ◉ **One-to-Many Relationship** ✔

9. **Which of the following refers to an entity in which the identifier of one entity includes the identifier of another entity?**

A. ○ Weak entity

B. ○ Strong entity

C. ◉ **ID-dependent entity** ✔

10. **Which type of entity is related to two or more associated entities that each contain specialized attributes that apply to some but not all of the instances of the entity?**

A. ◉ **Supertype entity** ✔

11. An attribute that names or identifies entity instances is a(n):

A. ○ entity.

B. ○ attribute.

C. ◉ identifier. ✔

12. Properties that describe the characteristics of entities are called:

A. ○ entities.

B. ◉ attributes. ✔

13. In which of the following can many entity instances of one type be related to many entity instances of another type?

A. ○ One-to-One Relationship

B. ○ One-to-Many Relationship

C. ◉ Many-to-Many Relationship ✔

14. Entities of a given type are grouped into a(n):

A. ○ database.

B. ◉ entity class. ✔

15. **Which of the following is NOT a basic element of all versions of the E-R model?**

A. ○ Entities

B. ○ Attributes

C. ○ Relationships

D. ◉ **Primary keys** ✔

16. **In which of the following is a single-entity instance of one type of related to a single-entity instance of another type?**

A. ◉ **One-to-One Relationship** ✔

17. **Entities can be associated with one another in which of the following?**

A. ○ Entities

B. ○ Attributes

C. ○ Identifiers

D. ◉ **Relationships** ✔

18. **Which type of entity has its relationship to another entity determined by an attribute in that other entity called a discriminator?**

A. ○ Supertype entity

B. ◉ **Subtype entity** ✔

19. Which type of entity represents a logical generalization whose actual occurrence is represented by a second, associated entity?

A. ○ Supertype entity

B. ○ Subtype entity

C. ◉ Archetype entity ✔

20. In a one-to-many relationship, the entity that is on the many side of the relationship is called a(n) _____ entity.

A. ○ parent ✘

B. ◉ child ✔

21. An ID-dependent entity is an entity whose identifier is a composite identifier where no portion of the composite identifier is an identifier of another entity.

A. ○ True

B. ◉ False ✔

22. A ternary relationship is so called because in contains two entities and one association between them.

A. ○ True ✘

B. ◉ False ✔

23. All instances of an entity class have the same attributes.

A. ◉ True ✔

24. A minimum cardinality is the minimum number of entity instances that may participate in a relationship instance.

A. ◉ True ✗

B. ○ False ✓

25. An attribute describes the entity's characteristics.

A. ◉ True ✓

26. The degree of a relationship refers to the number of entity classes in the relationship.

A. ◉ True ✓

27. Entities use identifiers while tables use keys.

A. ◉ True ✓

28. Composite identifiers consist of two or more attributes.

A. ◉ True ✓

29. When designing a database, first identify the entities, then determine the attributes, and finally establish the relationships.

A. ○ True ✗

B. ◉ False ✓

30. A subtype entity is a special case of another entity called a supertype entity.

A. ○ True ✔

31. An entity is something that can be identified in the user's work environment; something that the users want to track.

A. ◉ True ✔

32. Entity instances are associated by relationship classes.

A. ○ True

B. ◉ False ✔

33. 1:1, 1:N and N:M relationships are also known as HAS-A relationships.

A. ◉ True ✔

34. In a 1:N relationship, the parent is the entity on the one side of the relationship and the child is the entity on the N side of the relationship.

A. ◉ True ✔

35. A maximum cardinality is the maximum number of entity instances that can participate in a relationship instance.

A. ◉ True ✔

36. An entity class is a collection of entities and is described by the structure of the entities in that class.

A. ○ True ✔

37. Relationship classes are associations between entity classes.

A. ◉ True ✓

38. An identifier typically uses more than one attribute.

A. ○ True ×

B. ◉ False ✓

39. An identifier determines the type of relationship that an entity has.

A. ○ True ×

B. ◉ False ✓

40. A recursive relationship is a relationship between an archetype and an instance of that archetype.

A. ○ True

B. ◉ False ✓

2. An oval represents which of the following in an EER?

A. ◉ Attribute ✓

1. An action assertion must include which of the following?

A. ○ Anchor object ✗

B. ○ Action ✗

C. ○ Corresponding object ✗

D. ◉ All of the above ✓

3. Inheritance is which of the following?

A. ○ When a supertype entity inherits values of the subtype attribute

B. ◉ When a subtype entity inherits values of the supertype attribute ✓

4. When an entity instance must be a member of only one subtype, it is which of the following?

A. ◉ Disjoint with total specialization ✓

5. A supertype/subtype hierarchy is which of the following?

A. ○ Each subtype has only one attribute. ✗

B. ○ Each supertype has only one attribute. ✗

C. ◉ Each subtype has only one supertype. ✓

6. A rectangle represents which of the following in an EER?

A. ○ Attribute ✗

B. ◉ Entity ✓

7. **Which one of the following symbols is not used in an ERD?**

A. ○ Rectangle

B. ○ Oval

C. ○ Diamond

D. ◉ **Circle** ✔

8. **Specialization is which of the following processes?**

A. ◉ **Defining one or more subtypes of the supertype and forming supertype/subtype relationships.** ✔

9. **Which of the following statements concerning business rules is true?**

A. ○ It should be complex.

B. ○ It should not be convertible to computer code.

C. ◉ **It may include restrictions.** ✔

10. **A supertype/subtype hierarchy has which of the following features?**

A. ○ Subtypes at the lower lever in the hierarchy inherit attributes only from their immediate supertype.

B. ◉ **Attributes are assigned at the highest logical level.** ✔

11. **A subtype discriminator is which of the following?**

A. ◉ **An attribute of the supertype whose values determine the subtype** ✔

12. When an entity instance may be a member of multiple subtypes or it does not have to be a member of a subtype, it is which of the following?

A. ○ Disjoint with total specialization ✗

B. ○ Disjoint with partial specialization ✗

C. ◉ Overlap with total specialization ✓

13. A subtype entity name should be which of the following?

A. ○ A singular noun

B. ○ Specific to the organization

C. ○ Concise

D. ◉ All of the above ✓

14. Use of a supertype/subtype relationship is necessary when which of the following exists?

A. ◉ An instance of a subtype participates in a relationship that is unique to that subtype.

15. Which of the following is not one of the three ways to classify an action assertion?

A. ○ Condition ✗

B. ○ Integrity Control ✗

C. ○ Authorization ✗

D. ◉ Enabler ✓

16. Packaged data models are meant to be exactly right straight out of the box.

A. ○ True

B. ◉ False ✓

17. An action assertion is a statement that expresses some aspect of the static structure of the organization.

A. ○ True ×

B. ◉ False ✓

18. A supertype can only have only one subtype.

A. ○ True ×

B. ◉ False ✓

19. There is cardinality on an EER between the supertype and subtype.

A. ○ True ×

B. ◉ False ✓

20. A subtype discriminator of the supertype is an attribute whose values determine the target subtype(s).

A. ◉ True ✓

21. Overlapping and disjoint subtypes have different approaches on how the subtype discriminator is applied.

A. ◉ True ✓

22. An entity instance of a subtype represents the same entity instance of a supertype.

A. ◉ True ✓

23. A supertype is an entity type that shares common attributes or relationships distinct from other subgroupings.

A. ○ True

B. ◉ False ✓

24. An ERD that has had the entities clustered will display more entities.

A. ○ True ✗

B. ○ False ✓

25. Total specialization is represented by double lines between the supertype and subtype on an EER.

A. ◉ True ✓

26. Generalization is the process of defining more general entity types from a set of more specialized entity types.

A. ◉ True ✓

27. It is appropriate to use a supertype/subtype relationship when there are attributes that apply to some of the instances of an entity type.

A. ◉ True ✓

28. If an entity adheres to the disjoint rule, then an entity instance can be a member of more than one entity for a given supertype.

A. ○ True ✗

B. ◉ False ✓

29. Action assertions have traditionally been implemented within an application program.

A. ○ True ✓

30. An entity cluster is a set of one or more entity types and associated relationships.

A. ◉ True ✓

1. Needing to using more complicated SQL in database applications is a(n) _____ of normalization.

A. ○ advantage ✗

B. ◉ disadvantage ✓

2. Eliminating modification anomalies is a(n) _____ of normalization.

A. ◉ advantage ✓

3. Multivalued dependencies should _____ be eliminated.

A. ◉ always ✓

4. When assessing the table structure of an acquired set of tables with data, accessing the validity of possible referential integrity constraints on foreign keys is (part of) the:

A. ○ first step. ✗

B. ○ second step. ✗

C. ◉ third step. ✓

5. Using the SQL GROUP BY phrase with a SELECT statement can help detect which of the following problems?

A. ○ The multivalue, multicolumn problem

B. ◉ The inconsistent values problem ✓

6. When assessing the table structure of an acquired set of tables with data, determining foreign keys is (part of) the:

A. ○ first step.

B. ◉ second step. ✓

---

7. Creating a read-only database is a task that is _____ assigned to beginning database professionals.

A. ○ always ✗

B. ◉ commonly ✓

8. **Each answer below shows example data from a table. Which answer is an example of the general-purpose remarks column problem?**

A. ○ Three columns have the values 534-2435, 534-7867, and 546-2356 in the same row. ✗

B. ○ Three rows have the values Brown Small Chair, Small Chair Brown, and Small Brown Chair in the same column. ✗

C. ○ Three rows have the values Brown, NULL, and Blue in the same column. ✗

D. ◉ **One row has the value "He is interested in a Silver Porsche from the years 1978-1988" in a column.** ✓

9. **For a number of reasons, normalizations is not often an advantage for a(n) _____ database.**

A. ◉ **read-only** ✓

10. **Most of the time, modification anomalies are serious enough that tables should be normalized into:**

A. ○ 1NF. ✗

B. ○ 2NF. ✗

C. ○ 3NF. ✗

D. ◉ **BCNF.** ✓

11. **Each answer below shows example data from a table. Which answer is an example of the missing values problem?**

A. ○ Three columns have the values 534-2435, 534-7867, and 546-2356 in the same row. ✗

B. ○ Three rows have the values Brown Small Chair, Small Chair Brown, and Small Brown Chair in the same column. ✗

C. ◉ **Three rows have the values Brown, NULL, and Blue in the same column.** ✓

12. When assessing the table structure of an acquired set of tables with data, determining functional dependencies is (part of) the:

A. ○ first step. ✗

B. ◉ second step. ✓

13. Each answer below shows example data from a table. Which answer is an example of the multivalue, multicolumn problem?

A. ◉ Three columns have the values 534-2435, 534-7867, and 546-2356 in the same row. ✓

14. When assessing the table structure of an acquired set of tables with data, counting the number of table rows is (part of) the:

A. ◉ first step. ✓

15. If a table has been normalized so that all determinants are candidate keys, then that table is in:

A. ○ 1NF. ✗

B. ○ 2NF. ✗

C. ○ 3NF. ✗

D. ◉ BCNF. ✓

16. Read-only databases are _____ updated.

A. ○ always

B. ○ commonly

C. ○ seldom

D. ◉ never ✓

17. Needing to assess the validity of assumed referential integrity constraints on foreign keys is a(n) _____ of normalization.

A. ○ advantage ×

B. ○ disadvantage ×

C. ○ either an advantage or disadvantage

D. ◉ neither an advantage nor disadvantage ✓

18. When assessing the table structure of an acquired set of tables with data, determining primary keys is (part of) the:

A. ○ first step.

B. ◉ second step. ✓

19. Normalization _____ data duplication.

A. ◉ eliminates ✓

20. Each answer below shows example data from a table. Which answer is an example of the inconsistent values problem?

A. ○ Three columns have the values 534-2435, 534-7867, and 546-2356 in the same row.

B. ◉ Three rows have the values Brown Small Chair, Small Chair Brown, and Small Brown Chair in the same column. ✓

21. When building a database from an existing set of tables, we may safely assume that referential integrity constraints have been enforced on the data we are given.

A. ○ True ✗

B. ◉ False ✓

22. Most of the time, modification anomalies cause problems that are severe enough that a table should be normalized into BCNF.

A. ◉ True ✓

23. When building a database from an existing set of tables, we still need to consider normalization principles.

A. ◉ True ✔

24. We have normalized a table into **BCNF** if all candidate keys are determinants.

A. ○ True

B. ○ False ✔

25. We use the **SQL** construct **COLUMNS(*)** to determine the number and type of columns in a table.

A. ○ True ✘

B. ◉ False ✔

26. One common design problem when designing a database from existing data is the use of a single cell in one column to store multiple values of an attribute.

A. ◉ True ✘

B. ○ False ✔

27. In all cases, normalization into BCNF is desirable.

A. ○ True

B. ◉ False ✔

28. Denormalized tables are in BCNF.

A. ◉ True ✘

B. ○ False ✔

29. We can eliminate modification anomalies with proper normalization that results in tables in BCNF.

A. ○ True ✔

30. Proper normalization eliminates duplicated data.

A. ○ True ✘

B. ◉ False ✔

31. The design guidelines and priorities for read-only databases are different because read-only databases are never updated.

A. ○ True ✔

32. The phrase "SALE.CNumber must exist in CUSTOMER.CNumber" is a referential integrity constraint.

A. ◉ True ✓

33. We use the SQL construct COUNT(*) to count the number of rows in a table.

A. ◉ True ✓

34. When you are given a set of tables and asked to create a database to store their data, the first step is to create the new database.

A. ○ True ×

B. ◉ False ✓

35. Multivalued dependencies create harmless anomalies that should be noted, but do not always need to be eliminated.

A. ○ True ×

B. ◉ False ✓

36. One common design problem when designing a database from existing data is the use of a general-purpose remarks column in the received data.

A. ◉ True ✓

37. One common design problem when designing a database from existing data is the presence of missing values, called blank values, in received data.

A. ○ True

B. ◉ False ✔

38. Normalization requires programmers to write more complex SQL.

A. ◉ True ✔

39. One common design problem when designing a database from existing data is the presence of inconsistent values in the received data.

A. ◉ True ✔

40. When building a database from an existing set of tables, we may safely assume that there are no multivalued dependencies in the data we are given.

A. ○ True

B. ◉ False ✔

1. **The entity integrity rule states that:**

A. ◉ no primary key attribute may be null. ✔

2. **When mapping a many-to-many unary relationship into a relation which of the following is true?**

A. ○ One relation is created.

B. ◉ Two relations are created. ✔

3. **If no multivalued attributes exist and no partial dependencies exist in a relation, then the relation is in what normal form?**

A. ○ First normal form

B. ◉ Second normal form ✔

4. **A foreign key is which of the following?**

A. ○ Any attribute ✘

B. ○ The same thing as a primary key ✘

C. ◉ An attribute that serves as the primary key of another relation ✔

5. **A transitive dependency is which of the following?**

A. ○ A functional dependency between two or more key attributes. ✗

B. ◉ **A functional dependency between two or more nonkey attributes.** ✓

6. **When mapping a multivalued attribute into a relation which of the following is true?**

A. ○ One relation is created. ✗

B. ◉ **Two relations are created.** ✓

7. **If no multivalued attributes exist in a relation, then the relation is in what normal form?**

A. ○ First normal form ✗

B. ◉ **Second normal form** ✓

8. **A primary key is which of the following?**

A. ○ Any attribute

B. ◉ **An attribute that uniquely identifies each row** ✓

9. **The relational model consists of:**

A. ◉ data in the form of tables. ✔

10. **When mapping a binary many-to-many relationship into a relation which of the following is true?**

A. ○ One relation is created. ✘

B. ○ Two relations are created. ✘

C. ◉ Three relations are created. ✔

11. **A relation has which of the following properties?**

A. ○ Each row is not unique. ✘

B. ○ Attributes can have the same name within a given table. ✘

C. ◉ Each relation has a unique name. ✔

12. When mapping a ternary relationship with an associative entity into a relation which of the following is true?

A. ○ One relation is created. ✗

B. ○ Two relations are created. ✗

C. ○ Three relations are created. ✗

D. ◉ Four relations are created. ✓

13. When mapping a regular entity into a relation which of the following is true?

A. ◉ One relation is created. ✓

14. When mapping a supertype/subtype relationship which of the following is true?

A. ◉ The supertype primary key is assigned to each subtype. ✓

15. Relations are:

A. ◉ two-dimensional tables. ✓

16. An enterprise key is a primary key whose value is unique for a given relation.

A. ○ True ✗

B. ◉ False ✓

17. A composite attribute does not get mapped into a relation.

A. ◉ True ✓

18. A relation is a two-dimensional table.

A. ◉ True ✓

19. Weak entities do not get mapped into a relation.

A. ○ True

B. ◉ False ✓

20. A primary key may be null.

A. ◉ True ✗

B. ○ False ✓

21. A null value is assigned when no other value applies.

A. ◉ True ✓

22. A synonym is two or more attributes that have different names but the same meaning.

A. ◉ True ✓

---

23. The primary key in a relation does not need to be underlined.

A. ○ True

B. ◉ False ✓

24. In a 1:M relationship, the primary key on the one side migrates to the many side to become the foreign key on the many side.

A. ◉ True ✓

25. Normalization is a formal process for deciding which attributes should be grouped together in a relation.

A. ◉ True ✔

26. A candidate key must uniquely identify each row.

A. ◉ True ✔

27. Well-structured relations encourage anomalies of data.

A. ○ True

B. ○ False ✔

28. A foreign key may be null and still adhere to the referential integrity constraint.

A. ○ True ✔

29. If a relation is in third normal form, it does not need to be in second normal form.

A. ○ True

B. ◉ False ✔

30. **The primary key of the new relation in a many-to-many relationship is a composite key comprised of the primary keys of each of the binary entities.**

A. ◉ True ✔