100 Intermediate Level MCQs on ER Diagrams

Entity-Relationship Modeling for RDBMS

1. **What is the primary purpose of Entity-Relationship modeling?**
   - A) To create a physical database structure
   - B) To create a conceptual representation of data and relationships
   - C) To normalize tables in a database
   - D) To optimize SQL queries
   - **Answer: B) To create a conceptual representation of data and relationships**

2. **Which phase of database design typically follows the ER modeling phase?**
   - A) Requirements analysis
   - B) Database implementation
   - C) Logical database design
   - D) Conceptual database design
   - **Answer: C) Logical database design**

3. **In the context of ER modeling, what does abstraction refer to?**
   - A) The process of hiding irrelevant details
   - B) Creating complex entities
   - C) Implementing business rules
   - D) Creating primary keys
   - **Answer: A) The process of hiding irrelevant details**

4. **Which of the following is NOT a component of an ER diagram?**

- A) Entity
- B) Relationship
- C) Attribute
- D) Method
- **Answer: D) Method**

5. **An ER model is primarily used for:**
   - A) Network management
   - B) Data storage
   - C) Database conceptualization and design
   - D) User interface design
   - **Answer: C) Database conceptualization and design**

6. **Which statement best describes the relationship between an ER model and a relational database schema?**
   - A) They are identical representations
   - B) The ER model is converted into a relational schema through mapping rules
   - C) Relational schema is created first, then converted to ER model
   - D) They have no relationship to each other
   - **Answer: B) The ER model is converted into a relational schema through mapping rules**

7. **In the context of database development lifecycle, when is ER modeling typically performed?**
   - A) After database implementation
   - B) During requirements gathering and analysis

- C) After normalization
- D) After physical database design
- **Answer: B) During requirements gathering and analysis**

8. **What is NOT a benefit of using ER modeling?**
   - A) Improved communication between developers and users
   - B) Better understanding of the data structure
   - C) Direct execution of database queries
   - D) Documentation of data requirements
   - **Answer: C) Direct execution of database queries**

9. **The ER model was originally proposed by:**
   - A) E.F. Codd
   - B) Peter Chen
   - C) C.J. Date
   - D) Edgar F. Bachman
   - **Answer: B) Peter Chen**

10. **Which of the following best describes a weak entity?**
    - A) An entity with few attributes
    - B) An entity whose existence depends on another entity
    - C) An entity with optional attributes
    - D) An entity that cannot participate in relationships
    - **Answer: B) An entity whose existence depends on another entity**

Entities, Attributes, Relationships

11. **What does an entity represent in an ER diagram?**
    - A) A column in a table
    - B) A real-world object or concept
    - C) A primary key
    - D) A relationship between tables
    - **Answer: B) A real-world object or concept**

12. **Which symbol is commonly used to represent an entity in Chen notation?**
    - A) Oval
    - B) Rectangle
    - C) Diamond
    - D) Triangle
    - **Answer: B) Rectangle**

13. **What is a composite attribute?**
    - A) An attribute that can have multiple values
    - B) An attribute that can be derived from other attributes
    - C) An attribute that can be divided into smaller attributes
    - D) An attribute that uniquely identifies an entity
    - **Answer: C) An attribute that can be divided into smaller attributes**

14. **What is a derived attribute?**
    - A) An attribute whose value is calculated from other attributes
    - B) An attribute that must have a value
    - C) An attribute that can have multiple values
    - D) An attribute that identifies an entity

- **Answer: A) An attribute whose value is calculated from other attributes**

15. **Which of the following is NOT a valid type of attribute?**
    - A) Simple
    - B) Composite
    - C) Relational
    - D) Multi-valued
    - **Answer: C) Relational**

16. **What does a key attribute do in an ER diagram?**
    - A) Encrypts data
    - B) Uniquely identifies each entity instance
    - C) Connects two entities
    - D) Provides access to the database
    - **Answer: B) Uniquely identifies each entity instance**

17. **How is a multi-valued attribute typically represented in an ER diagram?**
    - A) Double-lined oval
    - B) Dashed-lined oval
    - C) Rectangle
    - D) Diamond
    - **Answer: A) Double-lined oval**

18. **What symbol is typically used to represent a relationship in Chen notation?**
    - A) Rectangle
    - B) Oval
    - C) Diamond

- D) Triangle
- **Answer: C) Diamond**

19. **When an attribute can have a null value, it is called:**
    - A) Optional attribute
    - B) Null attribute
    - C) Empty attribute
    - D) Composite attribute
    - **Answer: A) Optional attribute**

20. **What is a strong entity?**
    - A) An entity that can exist independently
    - B) An entity with many attributes
    - C) An entity with complex relationships
    - D) An entity with high cardinality
    - **Answer: A) An entity that can exist independently**

21. **What is the defining characteristic of a weak entity?**
    - A) It has fewer attributes than other entities
    - B) It cannot be part of relationships
    - C) It cannot exist without its owner entity
    - D) It has only derived attributes
    - **Answer: C) It cannot exist without its owner entity**

22. **How is a weak entity typically represented in an ER diagram?**
    - A) Double-lined rectangle
    - B) Dashed rectangle

- C) Oval shape
- D) Triangle shape
- **Answer: A) Double-lined rectangle**

23. **What is a discriminator in the context of weak entities?**
    - A) An attribute that distinguishes between different weak entities related to the same owner
    - B) A relationship that connects weak entities
    - C) A special type of primary key
    - D) A validation rule for weak entities
    - **Answer: A) An attribute that distinguishes between different weak entities related to the same owner**

24. **Which of the following is TRUE about attributes in ER modeling?**
    - A) Every entity must have at least one attribute
    - B) Attributes can never be null
    - C) Attributes always represent relationships
    - D) Attributes can only be of numeric type
    - **Answer: A) Every entity must have at least one attribute**

25. **The term "domain" in the context of attributes refers to:**
    - A) The geographical location where data is stored
    - B) The set of allowable values for the attribute
    - C) The logical grouping of entities
    - D) The primary key's scope
    - **Answer: B) The set of allowable values for the attribute**

Degree of Relationships

26. **What is the degree of a relationship?**
    - A) The number of entities participating in a relationship
    - B) The number of attributes in the relationship
    - C) The cardinality ratio between entities
    - D) The number of instances in a relationship
    - **Answer: A) The number of entities participating in a relationship**

27. **A relationship that connects two entities is called:**
    - A) Unary relationship
    - B) Binary relationship
    - C) Ternary relationship
    - D) N-ary relationship
    - **Answer: B) Binary relationship**

28. **A relationship that connects three entities is called:**
    - A) Unary relationship
    - B) Binary relationship
    - C) Ternary relationship
    - D) Quaternary relationship
    - **Answer: C) Ternary relationship**

29. **What is a recursive relationship?**
    - A) A relationship where an entity relates to itself
    - B) A relationship that can be derived from other relationships
    - C) A relationship with multiple cardinalities

- D) A relationship between more than three entities
- **Answer: A) A relationship where an entity relates to itself**

30. **Which of the following is an example of a unary relationship?**
    - A) Student takes Course
    - B) Employee works in Department
    - C) Employee supervises Employee
    - D) Customer purchases Product
    - **Answer: C) Employee supervises Employee**

31. **In a university database, what would be the degree of the relationship "Student takes Course taught by Professor"?**
    - A) Unary
    - B) Binary
    - C) Ternary
    - D) Quaternary
    - **Answer: C) Ternary**

32. **What is the most common type of relationship in ER diagrams?**
    - A) Unary
    - B) Binary
    - C) Ternary
    - D) N-ary
    - **Answer: B) Binary**

33. **An example of a ternary relationship would be:**
    - A) Student enrolls in Course

- B) Supplier supplies Part
- C) Doctor prescribes Medication to Patient
- D) Employee manages Department
- **Answer: C) Doctor prescribes Medication to Patient**

34. **What is the degree of the relationship "Part is used in Product at Location"?**
    - A) Binary
    - B) Ternary
    - C) Quaternary
    - D) Unary
    - **Answer: B) Ternary**

35. **Which statement is TRUE about relationship degrees?**
    - A) Higher degree relationships are always preferable
    - B) Binary relationships are sufficient for all modeling needs
    - C) Higher degree relationships are more difficult to implement in relational databases
    - D) Unary relationships can never be implemented
    - **Answer: C) Higher degree relationships are more difficult to implement in relational databases**

Cardinality of Relationships

36. **What does cardinality represent in an ER diagram?**
    - A) The number of entities in the database
    - B) The number of attributes in an entity
    - C) The maximum number of entity instances that can participate in a relationship

- D) The minimum number of relationships in a diagram
- **Answer: C) The maximum number of entity instances that can participate in a relationship**

37. **Which of the following is NOT a typical cardinality constraint?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-many
    - D) Zero-to-zero
    - **Answer: D) Zero-to-zero**

38. **In a one-to-many relationship between entities A and B, if A is on the "one" side:**
    - A) Each A can be related to many B instances
    - B) Each B can be related to many A instances
    - C) Each A must be related to exactly one B
    - D) Each B must be related to exactly one A
    - **Answer: A) Each A can be related to many B instances**

39. **Which cardinality would you use to model "A student can enroll in multiple courses, and a course can have multiple students enrolled"?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: D) Many-to-many**

40. **What is the correct implementation approach for a many-to-many relationship in a relational database?**
    - A) Use a foreign key in either table
    - B) Use a foreign key in both tables
    - C) Create a junction table with foreign keys to both entities
    - D) Merge the two entities into one table
    - **Answer: C) Create a junction table with foreign keys to both entities**

41. **Which cardinality would you use to model "An employee has exactly one assigned office, and each office is assigned to exactly one employee"?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: A) One-to-one**

42. **What is partial participation in a relationship?**
    - A) When only some instances of an entity participate in the relationship
    - B) When an entity can participate in multiple relationships
    - C) When a relationship has optional attributes
    - D) When a relationship connects more than two entities
    - **Answer: A) When only some instances of an entity participate in the relationship**

43. **How is minimum cardinality typically represented in an ER diagram?**
    - A) By a label near the relationship line
    - B) By the thickness of the relationship line

- C) By the shape of the entity
- D) By the color of the relationship line
- **Answer: A) By a label near the relationship line**

44. **In Chen notation, what does a "crow's foot" symbol represent?**
    - A) One-to-one relationship
    - B) One-to-many relationship (on the "many" side)
    - C) A weak entity
    - D) A derived attribute
    - **Answer: B) One-to-many relationship (on the "many" side)**

45. **In the notation (min, max), what does (0,N) represent?**
    - A) Zero or one participation
    - B) Exactly one participation
    - C) Zero to many participation
    - D) One to many participation
    - **Answer: C) Zero to many participation**

46. **What does (1,1) cardinality notation indicate?**
    - A) Optional participation with maximum of one
    - B) Mandatory participation with exactly one
    - C) Mandatory participation with many
    - D) Optional participation with many
    - **Answer: B) Mandatory participation with exactly one**

47. **What does (0,1) cardinality notation indicate?**
    - A) Optional participation with maximum of one

- B) Mandatory participation with exactly one
- C) Mandatory participation with many
- D) Optional participation with many
- **Answer: A) Optional participation with maximum of one**

48. **A relationship where Department has many Employees, but each Employee belongs to exactly one Department is:**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: B) One-to-many**

49. **Total participation of an entity in a relationship means:**
    - A) The entity has many attributes
    - B) Every instance of the entity must participate in the relationship
    - C) The entity can participate in multiple relationships
    - D) The entity has a composite primary key
    - **Answer: B) Every instance of the entity must participate in the relationship**

50. **Which of the following represents a many-to-many relationship in a relational database design?**
    - A) A primary key in one table references another table
    - B) A foreign key in one table references another table
    - C) A third table contains foreign keys to two different tables
    - D) Two tables have the same primary key

- **Answer: C) A third table contains foreign keys to two different tables**

Relational Database Model

51. **When mapping an ER diagram to a relational model, a strong entity typically becomes:**
    - A) A column
    - B) A table
    - C) A constraint
    - D) A view
    - **Answer: B) A table**

52. **How is a one-to-many relationship typically implemented in a relational database?**
    - A) Using a junction table
    - B) By placing a foreign key in the "many" side table
    - C) By placing a foreign key in the "one" side table
    - D) By duplicating the data in both tables
    - **Answer: B) By placing a foreign key in the "many" side table**

53. **What is the main purpose of normalization in relational database design?**
    - A) To speed up query execution
    - B) To reduce data redundancy and dependency
    - C) To create more tables
    - D) To simplify ER diagrams
    - **Answer: B) To reduce data redundancy and dependency**

54. **In the relational model, what is a foreign key?**
    - A) A key that must be kept secret

- B) An attribute that references a primary key in another table
- C) A composite key made of multiple attributes
- D) A key that can only contain numeric values
- **Answer: B) An attribute that references a primary key in another table**

55. **How is a weak entity typically mapped to the relational model?**
    - A) It is merged with its owner entity's table
    - B) It becomes a separate table with a foreign key to its owner
    - C) It becomes a view in the database
    - D) It is implemented as a stored procedure
    - **Answer: B) It becomes a separate table with a foreign key to its owner**

56. **What happens to a multi-valued attribute when mapping to a relational model?**
    - A) It becomes a separate table
    - B) It is converted to multiple columns
    - C) It is stored as an array
    - D) It is ignored
    - **Answer: A) It becomes a separate table**

57. **In mapping a composite attribute to a relational model, what is the most common approach?**
    - A) Create a separate table for the attribute
    - B) Flatten it into individual simple attributes (columns)
    - C) Store it as a serialized object
    - D) Create a view for the attribute
    - **Answer: B) Flatten it into individual simple attributes (columns)**

58. **Which normal form addresses the issue of partial dependencies on a primary key?**
    - A) First Normal Form (1NF)
    - B) Second Normal Form (2NF)
    - C) Third Normal Form (3NF)
    - D) Boyce-Codd Normal Form (BCNF)
    - **Answer: B) Second Normal Form (2NF)**
59. **An entity in an ER model corresponds to which relational database concept?**
    - A) A row
    - B) A table
    - C) A column
    - D) A constraint
    - **Answer: B) A table**
60. **An instance of an entity in an ER model corresponds to which relational database concept?**
    - A) A row (tuple)
    - B) A table
    - C) A column
    - D) A constraint
    - **Answer: A) A row (tuple)**
61. **What type of integrity constraint ensures that a foreign key value must match an existing primary key value or be null?**
    - A) Domain integrity
    - B) Entity integrity

- C) Referential integrity
- D) User-defined integrity
- **Answer: C) Referential integrity**

62. **When mapping a ternary relationship to a relational model, what is typically created?**
    - A) Three separate tables
    - B) A single table with foreign keys to all three participating entities
    - C) Three binary relationships
    - D) A view combining all three entities
    - **Answer: B) A single table with foreign keys to all three participating entities**

63. **What is denormalization in database design?**
    - A) The process of removing redundant data
    - B) The process of adding redundant data to improve performance
    - C) The process of creating more tables
    - D) The process of removing foreign keys
    - **Answer: B) The process of adding redundant data to improve performance**

64. **What is a surrogate key?**
    - A) A natural attribute that uniquely identifies an entity
    - B) An artificial identifier created for database purposes
    - C) A composite key made of multiple attributes
    - D) A foreign key that references multiple tables
    - **Answer: B) An artificial identifier created for database purposes**

65. **In the relational model, a derived attribute would typically be implemented as:**
    - A) A separate table

- B) A computed column or a view
- C) A check constraint
- D) A foreign key
- **Answer: B) A computed column or a view**

Creating an ERD for a Database Based on a Scenario

66. **When designing an ER diagram for a library system, which entity would NOT typically be included?**
    - A) Book
    - B) Member
    - C) Loan
    - D) Building material
    - **Answer: D) Building material**
67. **For a university database, which of the following would be a many-to-many relationship?**
    - A) Student and Student ID
    - B) Student and Department
    - C) Student and Course
    - D) Course and Course ID
    - **Answer: C) Student and Course**
68. **In an e-commerce database design, which relationship would be one-to-many?**
    - A) Customer to Order
    - B) Product to Category
    - C) Order to Product

- D) Customer to Product
- **Answer: A) Customer to Order**

69. **In a hospital management system, what would be the most appropriate relationship between Doctor and Patient?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: D) Many-to-many**

70. **When designing an ER diagram for a social media platform, which entity would represent a weak entity?**
    - A) User
    - B) Post
    - C) Comment (depending on Post)
    - D) Interest
    - **Answer: C) Comment (depending on Post)**

71. **In a banking system ER diagram, what relationship would exist between Customer and Account if a customer can have multiple accounts and an account can be owned by multiple customers?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many

- **Answer: D) Many-to-many**

72. **In a hotel reservation system, which would be the most appropriate relationship between Room and Reservation?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: B) One-to-many**
73. **When designing an ER diagram for an airline reservation system, which entity would be considered a strong entity?**
    - A) Passenger
    - B) Seat assignment
    - C) Payment
    - D) Meal preference
    - **Answer: A) Passenger**
74. **In a project management system, what type of relationship would exist between Employee and Project if employees can work on multiple projects and projects can have multiple employees?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: D) Many-to-many**

75. **In an inventory management system, what would be the most appropriate relationship between Supplier and Product?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: D) Many-to-many**

76. **In an ER diagram for a blog platform, what would be the relationship between Blog Post and Author if each post has exactly one author, but an author can write multiple posts?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: C) Many-to-one**

77. **When creating an ER diagram for a school, which of the following would most likely be modeled as a ternary relationship?**
    - A) Student enrollment in courses
    - B) Teacher assignment to courses in specific semesters
    - C) Student attendance record
    - D) School building and classroom
    - **Answer: B) Teacher assignment to courses in specific semesters**

78. **In a music streaming service database, what would be an appropriate composite attribute?**
    - A) Song title

- B) Artist name (first name, last name)
- C) Stream count
- D) Release date
- **Answer: B) Artist name (first name, last name)**

79. **In a restaurant ordering system, which entity would likely have a multi-valued attribute?**
    - A) Menu item (ingredients)
    - B) Customer (name)
    - C) Payment (amount)
    - D) Restaurant (location)
    - **Answer: A) Menu item (ingredients)**

80. **In a car rental system, what would be the cardinality between Customer and Rental?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: B) One-to-many**

81. **When designing an ER diagram for a veterinary clinic, which relationship would best represent Pets and Owners?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: B) One-to-many**

82. **In an ER diagram for an online learning platform, what would be the relationship between Course and Module?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one
    - D) Many-to-many
    - **Answer: B) One-to-many**

83. **In a movie database, what would be a derived attribute for a Movie entity?**
    - A) Title
    - B) Release date
    - C) Average rating (calculated from individual ratings)
    - D) Director
    - **Answer: C) Average rating (calculated from individual ratings)**

84. **When modeling a manufacturing database, which of these would likely be a weak entity?**
    - A) Product
    - B) Material
    - C) Component (of a specific product)
    - D) Supplier
    - **Answer: C) Component (of a specific product)**

85. **In a sports league database, what would be the relationship between Team and Player?**
    - A) One-to-one
    - B) One-to-many
    - C) Many-to-one

- D) Many-to-many
- **Answer: B) One-to-many**

Additional Mixed Questions

86. **When converting a one-to-many relationship to a relational schema, where is the foreign key placed?**
    - A) In the table corresponding to the entity on the "one" side
    - B) In the table corresponding to the entity on the "many" side
    - C) In a separate junction table
    - D) In both tables
    - **Answer: B) In the table corresponding to the entity on the "many" side**
87. **What is an associative entity in ER modeling?**
    - A) An entity that represents a many-to-many relationship
    - B) An entity with only key attributes
    - C) An entity that cannot participate in relationships
    - D) An entity that contains only derived attributes
    - **Answer: A) An entity that represents a many-to-many relationship**
88. **Which of the following is NOT a valid representation of cardinality constraints?**
    - A) Chen notation
    - B) Crow's foot notation
    - C) Min-max notation
    - D) Circular notation
    - **Answer: D) Circular notation**
89. **What does the diamond symbol with a double line represent in an ER diagram?**

- A) Strong entity
- B) Key attribute
- C) Identifying relationship
- D) Derived attribute
- **Answer: C) Identifying relationship**

90. **Which of the following is a correct characteristic of a weak entity?**
    - A) It must have its own primary key
    - B) It always participates in at least two relationships
    - C) It must be related to at least one strong entity
    - D) It cannot have any attributes
    - **Answer: C) It must be related to at least one strong entity**
91. **What is the primary difference between logical and physical data models?**
    - A) Logical models are database-specific, physical models are conceptual
    - B) Logical models are technology-independent, physical models are technology-specific
    - C) Logical models cannot represent relationships, physical models can
    - D) Logical models are only used for documentation, physical models are used for implementation
    - **Answer: B) Logical models are technology-independent, physical models are technology-specific**
92. **Which statement about supertypes and subtypes in ER diagrams is correct?**
    - A) A subtype can belong to multiple supertypes
    - B) A supertype must have at least one subtype
    - C) A subtype inherits attributes from its supertype
    - D) Subtypes and supertypes must have the same primary key structure

- **Answer: C) A subtype inherits attributes from its supertype**

93. **In the context of ER modeling, what is a recursive relationship?**
    - A) A relationship that connects an entity to itself
    - B) A relationship that is repeated multiple times
    - C) A relationship that can be derived from other relationships
    - D) A relationship that cannot be implemented in a relational database
    - **Answer: A) A relationship that connects an entity to itself**
94. **What is the term for the maximum number of entities that can be related to a single entity through a relationship?**
    - A) Participation
    - B) Cardinality
    - C) Degree
    - D) Dependency
    - **Answer: B) Cardinality**
95. **What is the primary purpose of an identifying relationship?**
    - A) To create a one-to-one relationship
    - B) To connect a weak entity to its owner entity
    - C) To implement recursion in an ER diagram
    - D) To represent derived attributes
    - **Answer: B) To connect a weak entity to its owner entity**
96. **What is NOT true about a composite key?**
    - A) It consists of multiple attributes
    - B) All attributes in the key must be used together to uniquely identify an entity
    - C) It can only be used in weak entities

- D) It is used when no single attribute can uniquely identify an entity
- **Answer: C) It can only be used in weak entities**

97. **In what situation would you use a ternary relationship rather than multiple binary relationships?**
    - A) When you need to represent a recursive relationship
    - B) When information about the relationship between three entities cannot be captured by binary relationships
    - C) When implementing a one-to-many relationship
    - D) When mapping to a relational database
    - **Answer: B) When information about the relationship between three entities cannot be captured by binary relationships**
98. **Which of the following is TRUE about generalization in ER modeling?**
    - A) It represents a "has-a" relationship
    - B) It represents an "is-a" relationship
    - C) It always requires a ternary relationship
    - D) It can only be applied to weak entities
    - **Answer: B) It represents an "is-a" relationship**
99. **What does fan trap refer to in the context of ER diagrams?**
    - A) A problem where a relationship has too many participating entities
    - B) A model where a single entity is connected to too many relationships
    - C) A modeling error where the relationship between tables is ambiguous
    - D) A situation where attributes have contradictory domains
    - **Answer: C) A modeling error where the relationship between tables is ambiguous**
100. **What is NOT a benefit of creating an ER diagram before implementing a database?**

- A) It helps identify entities and their relationships
- B) It serves as documentation for the database structure
- C) It optimizes SQL query performance automatically
- D) It facilitates communication between stakeholders
- **Answer: C) It optimizes SQL query performance automatically**