

Database Systems
Question @ Answers

Question 1

What are the most important directories in the MySQL installation?

Bin – Executable

Data – Database data

Docs – Database documentation

Question 2

What is the primary goal of a database management system (DBMS)?

Question 3

Under what circumstances would one consider using a file based system instead of a DBMS?

Question 4

Differentiate between a database schema and a database instance.

Question 5

What does the term *relation* imply in a relational model?

Question 6

Describe the basic steps of a database design.

Question 7

What is an entity-relationship (E-R) data model?

The E-R model was developed to facilitate database design by allowing specification of an enterprise schema that represents the overall logical structure of a database.

Question 8

The E-R database model employs three basic concepts: entity sets, relationship sets, and attributes. Briefly describe each concept.

Question 9

Provide an example of a *Simple* and a *Composite* attribute.

Question 10

Provide an example of a *Single-valued* and *multivalued* attribute.
Is there a preference between the two types of attribute?

Question 11

What is a derived attribute?

Question 12

Explain the purpose of a key.

Question 13

Explain the difference between a Super Key, Candidate Key, and Primary Key.

Question 14

Determine the primary keys for the database schema below.

Employee (SS#, FirstName, LastName, Title, LaborGrade, Salary)

Works (SS#, CompanyName, Division,)

Company (CompanyName, Division, City)

Manages (SS#, ManagerSS#)

Question 15

Provide the E-R diagram for the database schema in Question #14.

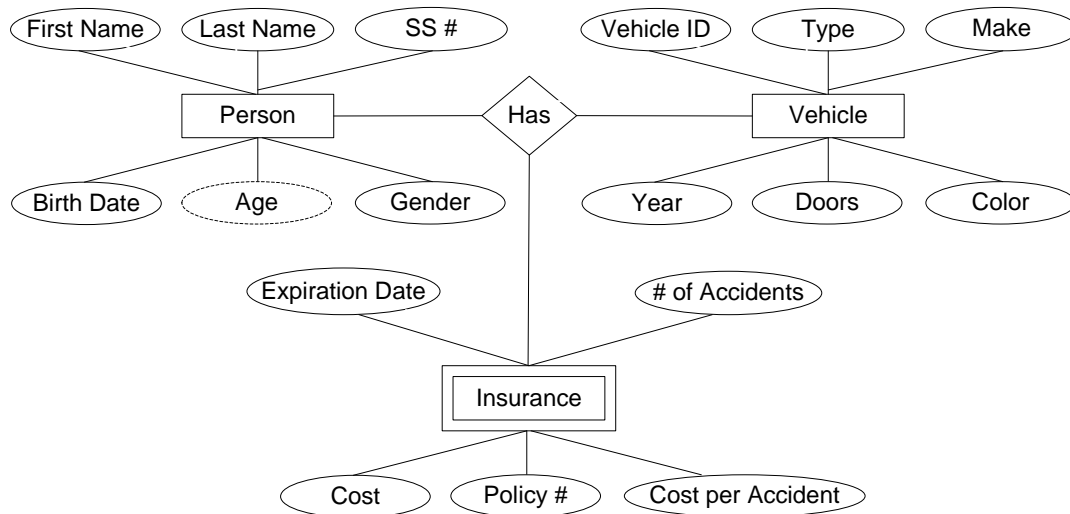
Question 16

Explain the difference between a weak and strong entity set.

Question 17

The Entity Relationship Diagram below shows that a Person owns a number of cars and each vehicle is insured by an insurance company. The Insurance policy may insure more than one car, which makes the Insurance Entity a weak entity.

- Create the Relational Tables for the EER Diagram.
- Provide the set of Candidate keys and Primary keys for each Relational Table.



Question 18

What information does *Specialization* provide in an E-R diagram?

Question 19

Is SQL a procedural or non-procedural language? Explain your answer.

Question 20

Provide the Create SQL statement for the given entity below. Assume all attributes are of type varchar(50).

Company (CompanyName, Division, City)

Question 21

Consider the database schema below.

Assume the natural join is not implemented in the database.

Provide SQL queries for the following:

- Find the names of all employees who work for the FBC division.
- Find the names of those employees who work for FBC and have a salary less than \$48,000. Sort the data by the employee's last name.
- Provide a 5% pay increase to **all** employees with a salary greater than \$64,000, and provide a 7% pay increase to all other employees.

Employee (SS#, FirstName, LastName, Title, LaborGrade, Salary)

Works (SS#, CompanyName, Division,)

Company (CompanyName, Division, City, State, Zip)

Manages (SS#, ManagerSS#)

Question 22

Consider the database schema in Question #21.

Using the natural join, provide the SQL query for the following:

- Provide the FirstName, LastName, LaborGrade, City, State, and Zip code for those employees working at the CI division.

Question 23

Consider the database schema in Question #21.

Provide a list of employee names that work in Orlando and have Mary Brown as manager.

Question 24

Consider the database schema below.

Determine the Primary Key for each entity.

Branch (BranchName, BranchCity, Assets)

Customer (CustomerName, SS#, Street, City, State, ZipCode)

Account (AccountNumber, BranchName, Balance)

Loan (LoanNumber, BranchName, Amount)

Depositor (SS#, AccountNumber)

Borrower (SS#, LoanNumber)

Question 25

Consider the database schema provided in Question #24.
Provide the SQL queries for the following:

- a) Find the names of all branches in the loan relations.
- b) Find all customers that have a loan and an account at the same branch name.

Question 26

Consider the database schema provided in Question #24.
Find the loan number of those loans with loan amounts between \$30,000 and \$50,000.

Question 27

Consider the database schema provided in Question #24.
List in alphabetic order the names of all customers having a loan in the Orlando branch

Question 28

Consider the database schema provided in Question #24.
Find all customers who have a loan, an account, or both. Sort the data in ascending order by customer's last name.

Question 29

Consider the database schema provided in Question #24.
Find the average account balance at the Orlando branch.

Question 30

Consider the database schema provided in Question #24.
Provide a gift of \$50 to all customers who have an account at the Orlando branch.

Question 31

Show the results of a left outer join.

<u>Loan Number</u>	<u>Branch Name</u>	<u>Amount</u>	<u>Customer Name</u>	<u>Loan Number</u>
L170	DownTown	3000	Jones	L170
L230	Redwood	4000	Smith	L230
L260	Perryrigde	1700	Hayes	L155

Question 32

Provide an example of a loss-less join decomposition. Ensure you provide an adequate explanation for your example.

Question 33

Suppose a relation schema R is decomposed into $\{R_1, R_2\}$. What conditions must hold true to ensure the decomposition is loss-less.

Question 34

Suppose a relation schema $R = \{A, B, C, D\}$ with functional dependencies $F = \{A \rightarrow B, A \rightarrow C, C \rightarrow D\}$ is decomposed into $R_1 = \{A, B, C\}$ and $R_2 = \{C, D\}$.

The functional dependencies for R_1 is $F_1 = \{A \rightarrow B, A \rightarrow C\}$ and the functional dependency for R_2 is $F_2 = \{C \rightarrow D\}$.

Is the decomposition $R = \{R_1, R_2\}$ a loss-less join decomposition, Yes or No?

Provide an explanation for your answer.

Question 35

- a) Define first normal form (1NF).
- b) Define second normal form (2NF).
- c) Define third normal form (3NF).

Question 36

Convert the database schema below into 3rd Normal Form.

Employee (SS#, Project-Number, First-Name, Last-Name, Street, Zip, Project-Name, Project-Location)

Address (Zip, City, County, State)