DBMS Assignment

**1. What is SQL, and why is it essential in database management?**

SQL (Structured Query Language) is a standard language used to store, manage, and retrieve data from a database.

It is essential because it allows users to:

* Create and manage databases.
* Insert, update, and delete data.
* Retrieve useful information using queries.
* Control access to data (security).

**2. Explain the difference between DBMS and RDBMS.**

DBMS: Database Management System – software that manages databases.

RDBMS: Relational Database Management System – manages databases in a table format.

Differences:

* DBMS stores data as files; RDBMS stores data in related tables.
* DBMS has no relations; RDBMS uses keys to relate tables.
* Examples: DBMS → MS Access; RDBMS → MySQL, Oracle.

**3. Describe the role of SQL in managing relational databases.**

SQL defines, manipulates, and queries data. Roles include:

* Defining data structures (CREATE, ALTER, DROP).
* Manipulating data (INSERT, UPDATE, DELETE).
* Querying data (SELECT).
* Controlling access (GRANT, REVOKE). - Maintaining integrity (constraints).

**4. What are the key features of SQL?**

* Easy to learn and use.
* Allows data definition and manipulation.
* Supports security and integrity.
* Works with relational databases.
* Provides transaction management.

**5. What are the basic components of SQL syntax?**

* Keywords (SELECT, INSERT).
* Identifiers (table/column names).
* Clauses (WHERE, ORDER BY).
* Expressions (salary+bonus).
* Statements (SELECT \* FROM table\_name;).

1. **Write the general structure of an SQL SELECT statement.**

SELECT column1, column2, ...

FROM table\_name

WHERE condition

GROUP BY column\_name

HAVING condition

ORDER BY column\_name;

1. **Explain the role of clauses in SQL statements.**

Clauses refine SQL queries:

* WHERE → filters rows.
* GROUP BY → groups rows.
* HAVING → applies conditions on groups.
* ORDER BY → sorts results.

1. **What are constraints in SQL? List and explain the different types of constraints.**

Constraints maintain data accuracy and integrity.

Types: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE, CHECK, DEFAULT.

1. **How do PRIMARY KEY and FOREIGN KEY constraints differ?**

* PRIMARY KEY: Uniquely identifies records within a table.
* FOREIGN KEY: Links rows between two tables.

**10. What is the role of NOT NULL and UNIQUE constraints?**

* NOT NULL: Column must always have a value.
* UNIQUE: Ensures all values are different (no duplicates).

1. **Define the SQL Data Definition Language (DDL).**

DDL defines and manages database structures.

Examples: CREATE, ALTER, DROP, TRUNCATE.

1. **Explain the CREATE command and its syntax.**

Used to create database/table.

Syntax:

CREATE TABLE table\_name ( column1 datatype constraint, column2 datatype constraint

);

1. **What is the purpose of specifying data types and constraints during table creation?**

* Data types ensure correct type of data.
* Constraints maintain integrity (no duplicates, no nulls).

1. **What is the use of the ALTER command in SQL?**

ALTER modifies an existing table without deleting it.

1. **How can you add, modify, and drop columns from a table using ALTER?**

Add: ALTER TABLE table ADD column\_name datatype;

Modify: ALTER TABLE table MODIFY column\_name datatype;

Drop: ALTER TABLE table DROP COLUMN column\_name;

1. **What is the function of the DROP command in SQL?**

DROP permanently deletes a table, database, or object.

1. **What are the implications of dropping a table from a database?**

* Table and data permanently removed.
* Relationships broken.
* Cannot be undone without backup.

**18. Define the INSERT, UPDATE, and DELETE commands in SQL.**

* INSERT: Adds new rows.
* UPDATE: Changes existing data.
* DELETE: Removes rows.

1. **What is the importance of the WHERE clause in UPDATE and DELETE operations?**

WHERE ensures only specific rows are affected. Without it, all rows change.

1. **What is the SELECT statement, and how is it used to query data?**

SELECT retrieves data from tables.

Example: SELECT name, age FROM students WHERE age > 18;

1. **Explain the use of the ORDER BY and WHERE clauses in SQL queries.**

* WHERE filters rows.
* ORDER BY sorts results (ASC/DESC).

**22. What is the purpose of GRANT and REVOKE in SQL?**

* GRANT gives permissions.
* REVOKE removes permissions.

1. **How do you manage privileges using these commands?**

GRANT SELECT ON students TO user1;

REVOKE SELECT ON students FROM user1;

1. **What is the purpose of the COMMIT and ROLLBACK commands in SQL?**

* COMMIT saves changes permanently.
* ROLLBACK cancels changes.

1. **Explain how transactions are managed in SQL databases.**

Transactions group SQL operations. End with COMMIT or ROLLBACK. Ensures ACID properties.

1. **Explain the concept of JOIN in SQL. What is the difference between INNER JOIN, LEFT JOIN, RIGHT JOIN, and FULL OUTER JOIN?**

JOIN combines data from multiple tables.

* INNER: matching rows only.
* LEFT: all left + matches.
* RIGHT: all right + matches.
* FULL OUTER: all rows, NULL where no match.

1. **How are joins used to combine data from multiple tables?**

Joins use keys (PK, FK) to merge rows.

Example:

SELECT s.name, c.course\_name FROM students s INNER JOIN courses c ON s.course\_id=c.course\_id;

1. **What is the GROUP BY clause in SQL? How is it used with aggregate functions?**

GROUP BY groups rows by column values. Often with aggregates like COUNT, SUM, AVG.

1. **Explain the difference between GROUP BY and ORDER BY.**

* GROUP BY groups rows.
* ORDER BY sorts rows.

1. **What is a stored procedure in SQL, and how does it differ from a standard SQL query?**

Stored procedure = saved block of SQL code, reusable. Standard query runs once.

1. **Explain the advantages of using stored procedures.**

* Reusable code.
* Better performance.
* Security.
* Reduces redundancy.

1. **What is a view in SQL, and how is it different from a table?**

View = virtual table created from query.

Table stores actual data; view shows data.

1. **Explain the advantages of using views in SQL databases.**

* Simplifies queries.
* Provides security.
* Consistent data presentation.

1. **What is a trigger in SQL? Describe its types and when they are used.**

Trigger = automatic action when INSERT/UPDATE/DELETE happens. Types: BEFORE, AFTER, INSTEAD OF.

1. **Explain the difference between INSERT, UPDATE, and DELETE triggers.**

* INSERT: fires on new rows. - UPDATE: fires on changes.
* DELETE: fires on removals.