Week1

1. What is database normalization?

Normalization is a database design technique which organizes tables in a manner that reduces redundancy and dependency of data.

2. What is the first normal form?

1NF is a property of a relation(table) in a relational database. A table is in first normal form if and only if the domain of each attribute contains only atomic(invisible) values, and the value of each attribute contains only a single value from that domain.
Rules : each table cell should contain a single value and
Each record needs to be unique.

3. What are indexes in SQL?

Indexes are used to retrieve data from the database very fast. The users cannot see the indexes, they are just used to speed up searches/queries.

Note: Updating a table with indexes takes more time than updating a table without (because indexes also need an update). So, only create indexes on columns that will be frequently searched against.

CREATE INDEX Syntax :

Create an index on the table. Duplicate values are allowed:

```
CREATE INDEX index_name
ON table_name (column1, column2, ...);
```

4. What is a subquery?

One (or more) select statement whose return values are used in filtering conditions of the main query is called
Subquery.
A subquery is a SQL query nested inside a main query.
A subquery may occur in :

- A SELECT clause
- A FROM clause
- A WHERE clause

A subquery is usually added within the WHERE clause of another SQL SELECT statement.

You can use the comparison operators, such as > , < , or = . The comparison operator can also be a multiple-row operator, such as IN , ANY , or ALL .
A subquery is also called an inner query or inner select, while the statement containing a subquery is also called an outer query or outer select.
The inner query executes first before its parent query so that the results of an inner query can be passed to the outer query.

5. Can you join a table to itself?

Yes. The operation is called self join.
Self JOIN Syntax

```
SELECT column_name(s)
FROM table1 T1, table1 T2
WHERE condition;
```

6. What are different JOINS used in SQL?

There are several types of joins:

SQL INNER JOIN Keyword
The INNER JOIN keyword selects records that have matching values in both tables.

SQL LEFT JOIN Keyword
The LEFT JOIN keyword returns all records from the left table (table1), and the matched records from the right table (table2). The result is NULL from the right side, if there is no match.

SQL RIGHT JOIN Keyword
The RIGHT JOIN keyword returns all records from the right table (table2), and the matched records from the left table (table1). The result is NULL from the left side, when there is no match.

SQL FULL OUTER JOIN Keyword
The FULL OUTER JOIN keyword returns all records when there is a match in either left (table1) or right (table2) table records.
Note: FULL OUTER JOIN can potentially return very large result-sets!

SQL Self JOIN
A self JOIN is a regular join, but the table is joined with itself.

SQL CROSS JOIN
The SQL CROSS JOIN produces a result set which is the number of rows in the first table multiplied by the number of rows in the second table if no WHERE clause is used along with CROSS JOIN .This kind of result is called a Cartesian Product.

If WHERE clause is used with CROSS JOIN , it functions like an INNER JOIN .

7. What is Git?

Git is a version control system for tracking changes in computer files and is used to help coordinate work among several people on a project while tracking progress over time. In other words, it's a tool that facilitates source code management in software development.

8. What do you understand by the term 'Version Control System'?

A version control system (VCS) records all the changes made to a file or set of data, so a specific version may be called later if needed.

9. What does git pull origin master do?

The git pull origin master fetches all the changes from the master branch onto the origin and integrates them into the local branch.
git pull = git fetch + git merge origin/ master

10. What does the git push command do?

The Git push command is used to push the content in a local repository to a remote repository. After a local repository has been modified, a push is executed to share the modifications with remote team members.

11. What is the difference between fork, branch, and clone?

Fork : The fork is the process when a copy of the repository is made. It's usually experimentation in the project without affecting the original project. They're used to advise changes or take inspiration from someone else's project.

Branch: Git branches refer to individual projects within a git repository. If there are several branches in a repository, then each branch can have entirely different files and folders.

Clone :Git clone refers to creating a clone or a copy of an existing git repository in a new directory. Cloning automatically creates a connection that points back to the original repository, which makes it very easy to interact with the central repository.

12. What is forward Engineering?

The process of designing the ERD first and then creating the database is called forward engineering. MYSQL workbench provides us with an easy way to actually create a database easily from the ERD we created.

13. What is Reverse engineering?

Reverse engineering a database is the process of creating a visual model of an existing database.

14. How can you use Python with MySQL?

Python can be used with MySQL in a number of ways. One way is to use the mysql-connector-python library, which is a MySQL driver written in Python. This library can be used to connect to a MySQL database and perform various operations, such as creating and executing SQL queries.

15. Explain how to connect to MySQL using Python?

There are a few different ways that you can connect to MySQL using Python. One way is to use the mysql.connector module. This module provides a Python API for connecting to MySQL databases. Another way is to use the pymysql module. This module is a pure Python implementation of a MySQL client.
To connect to MySQL using the mysql.connector module, you will need to create a Connection object. To do this, you will need to pass in the host, user, password, and database parameters. Once you have created the Connection object, you can then call the connect() method to connect to the database.
To connect to MySQL using the pymysql module, you will need to create a Connection object and pass in the host, user, password, and database parameters. Once you have created the Connection object, you can then call the connect() method to connect to the database.