**For web development mainly 3 things plays a key role.**

**1**. **FRONTEND** : HTML, CSS, Java Script, Bootstrap (USER INTERFACE)

**2**. **BACKEND** : Programming languages – Python

Frameworks - Django, flask, fastapi

**3.** **DATABASE**:

**RELATIONAL** **DATABASE**- Mysql, Postgresql, oracle. Data stored in table format

**NO** **RELATIONAL** **DATABASE** - MONGODB, CASSANDRA . Data stored in json format

**CLOUD DATABASE**- aws(amazon web services)

***For Testing role includes:***

1. core python

2. concepts of manual, automation

A document which can be displayed in a web browser such as Firefox, Google Chrome,Opera, Microsoft Internet Explorer or Edge, or Apple's Safari. These are also often called just "pages."

**WEBSITE:** A collection of web pages which are grouped together and usually connectedtogether in various ways. Often called a "web site" or a "site."

**WEB BROWSER:** A computer that hosts a website on the Internet.

**WEB DEVELOPMENT:** Web development refers to the building, creating, and maintaining of websites.

It includes aspects such as

***1. WEB DESIGN:*** Architecture, outlook it refers to the design of websites that are displayed on the internet.

***2. WEB PUBLISHING:*** Web publishing is the process of publishing original contenton the Internet.

***3. WEB PROGRAMMING:*** Web programming refers to the writing, mark up and codinginvolved in Web development, which includes Web content, Web client and serverscripting and network security.

***4.DATA BASE MANAGAMENT:*** It is the creation of an application that works over the internet i.e. websites.

The word Web Development is made up of two words, that is:

**WEB:** It refers to websites, web pages or anything that works over the internet.

**DEVELOPMENT:** Building the application from scratch.

Web Development can be classified into two ways:

1.Frontend Development - HTML, CSS, JS.

2.Backend Development - JAVA, PYTHON, PHP, GOLANG.

3.Database (storage, persistence)- Mysql, postgresql, oracle, mongodb.

**FRONTEND DEVELOPMENT:** The part of a website that the user interacts directly is termed as front end.It is also referred to as the ‘client side’ of the application.

**FRONTEND ROADMAP**: Frontend Development Roadmap

**1.HTML:** HTML stands for HyperText Markup Language. It is used to design the front end portion of web pages using markup language. It acts as a skeleton for a website since it is used to make the structure of a website.

**2.CSS:** Cascading Style Sheets fondly referred to as CSS is a simply designedlanguage intended to simplify the process of making web pages presentable.It is used to style our website.

**3.JAVASCRPIT:** JavaScript is a scripting language used to provide a dynamic behavior to our website.

**4.BOOTSTRAP:** Bootstrap is a free and open-source tool collection for creating responsive websitesand web applications. It is the most popular CSS framework for developing responsive,mobile-first websites. Now a days, the websites are perfect for all the browsers (IE, Firefox, and Chrome) and for all sizes of screens (Desktop, Tablets,and Phones).

Bootstrap 4,Bootstrap 5.

***Frontend Frameworks and Libraries:***

AngularJS, React.js, VueJS, jQuery, Bootstrap, Material UI, Tailwind CSS, jQuery UI.

Some other libraries and frameworks are: Handlebar.js Backbone.js, Ember.js etc.

**BACKEND DEVELOPMENT:** Backend is the server side of a website. It is the part of the website thatusers cannot see and interact. It is the portion of software that does not comein direct contact with the users. It is used to store and arrange data.

**BACKEND ROADMAP:** Backend Design roadmap

**PHP:** PHP is a server-side scripting language designed specifically for web development.

**JAVA:** Java is one of the most popular and widely used programming language.It is highly scalable.

**PYTHON:** Python is a programming language that lets you work quickly and integrate systemsmore efficiently.

**NODE JS:** Node js is an open source and cross-platform runtime environment for executingJavaScript code outside a browser.

***Back End Frameworks:*** The list of back end frameworks are:

Django, Flask, fastapi,pyramid,Express,Rails,Laravel,Spring, etc.

**DATABASE MANAGEMENT SYSTEM: 1. Relational:** mysql, postgresql, oracle, maria db, PL/sql - table

**2. Norelational database:** mongodb, cassandra - json format

**3. cloud database:** AWS, oracle clouddb - object, file, block

**What is Data?**

Data is a collection of a distinct small unit of information. It can be used in a variety of forms like text, numbers, media, bytes, etc. It can be stored in pieces of paper or electronic memory, etc.

**What is Database?**

A database is an organized collection of data, so that it can be easily accessed and managed. You can organize data into tables, rows, columns, and index it to make it easier to find relevant information. Database handlers create a database in such a way that only one set of software program provides access of data to all the users. The main purpose of the database is to operate a large amount of information by storing, retrieving, and managing data. There are many dynamic websites on the World Wide Web now a days which are handled through databases. There are many databases available like MySQL, Sybase, Oracle, MongoDB, Informix, PostgreSQL, SQL Server, PL/SQLetc.

**DATABASE MANAGAMENT SYSTEM (DBMS):** Modern databases are managed by the database management system (DBMS). SQL or Structured Query Language is used to operate on the data stored in a database.SQL depends on relational database.

Relational database model has two main terminologies called

**1.Instance:** The instance is a table with rows or columns.

**2.Schema:** Schema specifies the structure like name of the relation,type of each column and name. This model uses some mathematical concept like set theory and predicate logic.

The first internet database application had been created in 1995. During the era of the relational database, many more models had introduced like object-oriented model, object-relational model, etc.

**CLOUD DATABASE:** Cloud database facilitates you to store, manage, and retrieve their structured,unstructured data via a cloud platform. This data is accessible over the Internet.Cloud databases are also called a database as service (DBaaS) because they areoffered as a managed service.

***Some best cloud options are:*** AWS (Amazon Web Services), Snowflake Computing, Oracle Database Cloud Services, Microsoft SQL server, Google cloud spanner.

**Advantages of cloud database:**

1. Lower costs.

2. Generally, company provider does not have to invest in databases. It can maintain and support one or more data centers.

3. Automated.

4. Cloud databases are enriched with a variety of automated processes such as recovery, failover, and auto-scaling.

5. Increased accessibility.

6. You can access your cloud-based database from any location, anytime. All you need is just an internet connection.

**NoSQL Database NORELATIONAL database:**

A NoSQL database is an approach to design such databases that can accommodate a wide variety of data models. NoSQL stands for "Not Only SQL."

It is an alternative to traditional relational databases in which data is placed in tables, and data schema is perfectly designed before the database is built.

NoSQL databases are useful for a large set of distributed data.

***Some examples of NoSQL database system with their category are:*** MongoDB, cassandra, CouchDB, Cloudant (Document-based)

Memcached, Redis, Coherence (key-value store)

HBase, Big Table, Accumulo (Tabular)

***Advantages of NoSQL:***

1 .High Scalability

2. NoSQL can handle an extensive amount of data because of scalability.

3. If the data grows, NoSQL database scale it to handle that data in an efficient manner.

4. High Availability

5. NoSQL supports auto replication. Auto replication makes it highly available because, in case of any failure, data replicates itself to the previous consistent state.

***Disadvantage of NoSQL:***

1. Open source.

2. NoSQL is an open-source database, so there is no reliable standard for NoSQL yet.

3. Management challenge.

4. Data management in NoSQL is much more complicated than relational databases. It is very challenging to install and even more hectic to manage daily.

5. GUI(Graphical user Interface) is not available.

6. GUI tools for NoSQL database are not easily available in the market.

**BACKUP:** Backup is a great weak point for NoSQL databases. Some databases, like MongoDB,have no powerful approaches for data backup.

**Graph** **Databases:** A graph database is a NoSQL database. It is a graphical representation of data. It contains nodes and edges. A node represents an entity, and each edge represents a relationship between two edges. Every node in a graph database represents a unique identifier. Graph databases are beneficial for searching the relationship between data because they highlight the relationship between relevant data.

**DBMS: (Data Base Management System)** Database management System is software which is used to store and retrieve the database.

For example: Oracle, MySQL, etc.; these are some popular DBMS tools.

* DBMS provides the interface to perform the various operations like creation, deletion, modification, etc.
* DBMS allows the user to create their databases as per their requirement.
* DBMS accepts the request from the application and provides specific data through

the operating system.

* DBMS contains the group of programs which acts according to the user instruction.

It provides security to the database.

***Advantage of DBMS:***

1. Controls redundancy.2.It stores all the data in a single database file, so it can control data redundancy. 3.Data sharing4.An authorized user can share the data among multiple users.5.It providesBackup and recovery subsystem. This recovery system creates automaticdata from system failure and restores data if required.6.Multiple user interfaces7.It provides a different type of user interfaces like GUI, application interfaces.

***Disadvantage of DBMS:***

1. Size

2. It occupies large disk space and large memory to run efficiently.

3. Cost

4. DBMS requires a high-speed data processor and larger memory to run DBMS software, so it is costly.

5. Complexity

6. DBMS creates additional complexity and requirements.