SE-UML

1-> What do you mean by UML?

Ans:-

Unified Modeling Language (UML) is a general purpose modelling language. The main aim of UML is to define a standard way to **visualize** the way a system has been designed. It is quite similar to blueprints used in other fields of engineering.
UML is **not a programming language**, it is rather a visual language. We use UML diagrams to portray the **behavior and structure** of a system. UML helps software engineers, businessmen and system architects with modelling, design and analysis. The Object Management Group (OMG) adopted Unified Modelling Language as a standard in 1997. Its been managed by OMG ever since. International Organization for Standardization (ISO) published UML as an approved standard in 2005. UML has been revised over the years and is reviewed periodically.

2-> What is the use of UML?

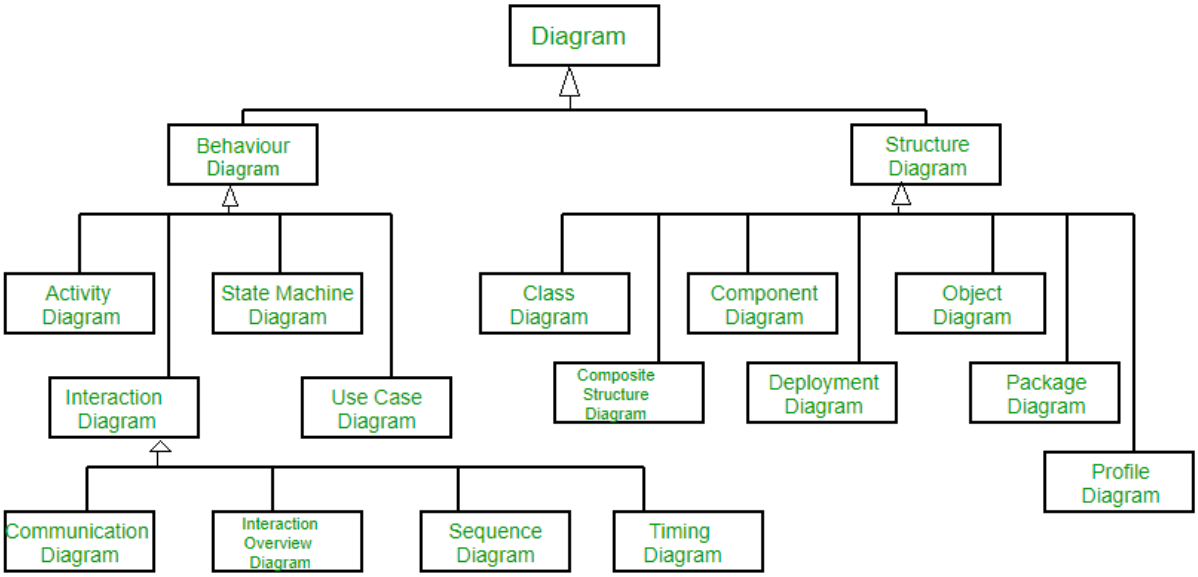
Ans:-

Complex applications need collaboration and planning from multiple teams and hence require a clear and concise way to communicate amongst them.
Businessmen do not understand code. So UML becomes essential to communicate with non programmers essential requirements, functionalities and processes of the system.
A lot of time is saved down the line when teams are able to visualize processes, user interactions and static structure of the system.

UML is linked with **object oriented** design and analysis. UML makes the use of elements and forms associations between them to form diagrams. Diagrams in UML can be broadly classified as:

Structural Diagrams – Capture static aspects or structure of a system. Structural Diagrams include: Component Diagrams, Object Diagrams, Class Diagrams and Deployment Diagrams.
Behavior Diagrams – Capture dynamic aspects or behavior of the system. Behavior diagrams include: Use Case Diagrams, State Diagrams, Activity Diagrams and Interaction Diagrams.

The image below shows the hierarchy of diagrams according to UML 2.2



3-> What are various Object Oriented Concepts Used in UML?

Ans:-

Class – A class defines the blue print i.e. structure and functions of an object.
Objects – Objects help us to decompose large systems and help us to modularize our system. Modularity helps to divide our system into understandable components so that we can build our system piece by piece. An object is the fundamental unit (building block) of a system which is used to depict an entity.
Inheritance – Inheritance is a mechanism by which child classes inherit the properties of their parent classes.
Abstraction – Mechanism by which implementation details are hidden from user.
Encapsulation – Binding data together and protecting it from the outer world is referred to as encapsulation.
Polymorphism – Mechanism by which functions or entities are able to exist in different forms.

4-> Define Agile Model ?

Ans:-

Agile SDLC model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile Methods break the product into small incremental builds. These builds are provided in iterations. Each iteration typically lasts from about one to three weeks. Every iteration involves cross functional teams working simultaneously on various areas like −

Planning

Requirements Analysis

Design

Coding

Unit Testing and

Acceptance Testing.

Que. 5 - What is state chart diagram ?

Ans: A state diagram, also known as a state machine diagram or statechart diagram, is an illustration of the states an object can attain as well as the transitions between those states in the Unified Modeling Language (UML). In this context, a state defines a stage in the evolution or behavior of an object, which is a specific entity in a program or the unit of code representing that entity.

SQL (structured query language)

1-> What is sql?

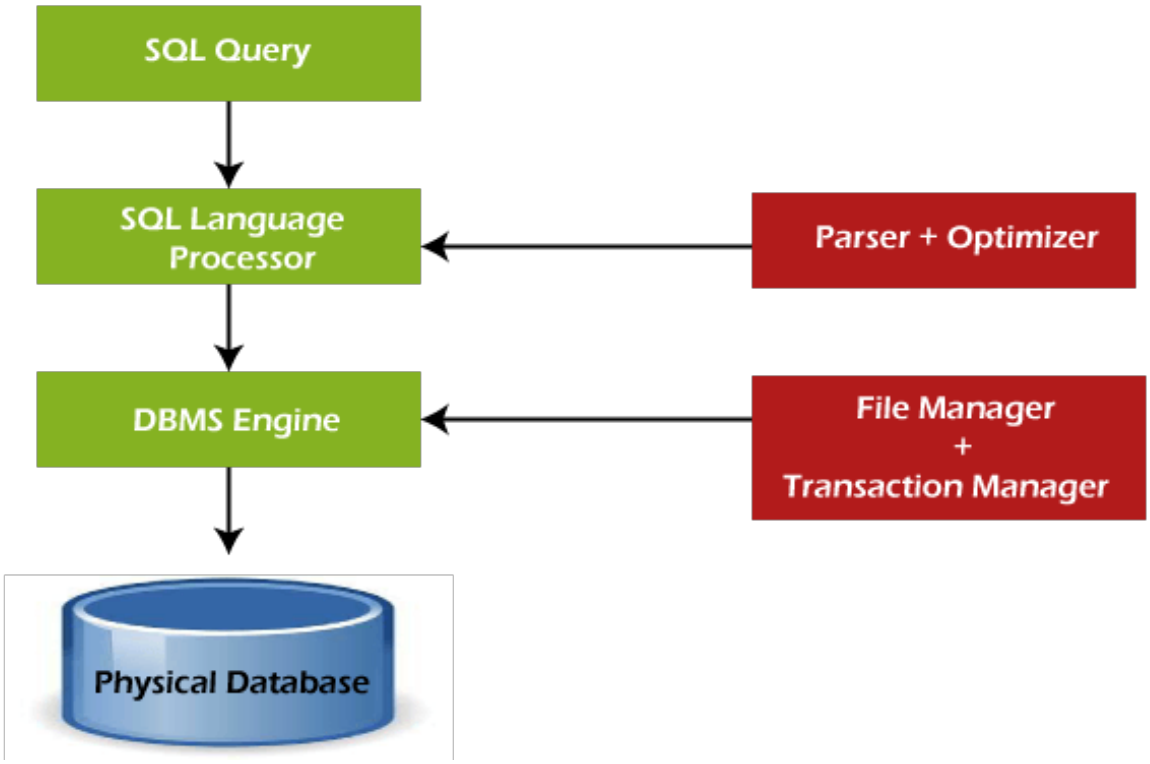
Ans:-

SQL is a short-form of the structured query language, and it is pronounced as S-Q-L or sometimes as See-Quell.
This database language is mainly designed for maintaining the data in relational database management systems. It is a special tool used by data professionals for handling structured data (data which is stored in the form of tables). It is also designed for stream processing in RDSMS. You can easily create and manipulate the database, access and modify the table rows and columns, etc. This query language became the standard of ANSI in the year of 1986 and ISO in the year of 1987.
If you want to get a job in the field of data science, then it is the most important query language to learn. Big enterprises like Facebook, Instagram, and LinkedIn, use SQL for storing the data in the back-end.

2->Describe Process of SQL
When we are executing the command of SQL on any Relational database management system, then the system automatically finds the best routine to carry out our request, and the SQL engine determines how to interpret that particular command.
Structured Query Language contains the following four components in its process:

- Query Dispatcher
- Optimization Engines
- Classic Query Engine
- SQL Query Engine, etc.

A classic query engine allows data professionals and users to maintain non-SQL queries. The architecture of SQL is shown in the following diagram:



3-> Describe Some SQL Commands
The SQL commands help in creating and managing the database. The most common SQL commands which are highly used are mentioned below:

1. CREATE command
2. UPDATE command
3. DELETE command
4. SELECT command
5. DROP command
6. INSERT command

CREATE Command
This command helps in creating the new database, new table, table view, and other objects of the database.

UPDATE Command
This command helps in updating or changing the stored data in the database.
DELETE Command
This command helps in removing or erasing the saved records from the database tables. It erases single or multiple tuples from the tables of the database.
SELECT Command
This command helps in accessing the single or multiple rows from one or multiple tables of the database. We can also use this command with the WHERE clause.

DROP Command
This command helps in deleting the entire table, table view, and other objects from the database.
INSERT Command
This command helps in inserting the data or records into the database tables. We can easily insert the records in single as well as multiple rows of the table.
Ans:- Single row function in SQL are the ones who work on a single row and return one output per row.
Single row function in SQL can be character, numeric, date, and conversion functions. these functions are used to modify data items. These functions need one or more input and operate on each row, thereby returning one output value for each row.

4 -> Write join query in SQL ?

Ans:-

A JOIN clause is used to combine rows from two or more tables, based on a related column between them.

```
SELECT Orders.OrderID, Customers.CustomerName, Orders.OrderDate
FROM Orders
INNER JOIN Customers ON Orders.CustomerID=Customers.CustomerID;
```

5 -> What are dmlcommands ?

Ans :-

The SQL commands that deals with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements. It is the component of the SQL statement that controls access to data and to the database. Basically, DCL statements are grouped with DML statements.

List of DML commands:

INSERT : It is used to insert data into a table.
UPDATE: It is used to update existing data within a table.
DELETE : It is used to delete records from a database table.
LOCK: Table control concurrency.
CALL: Call a PL/SQL or JAVA subprogram.
EXPLAIN PLAN: It describes the access path to data.

Topic : PLSQL

1-> What is PLSQL?

Ans :-

PL/SQL is a block structured language that enables developers to combine the power of SQL with procedural statements.All the statements of a block are passed to oracle engine all at once which increases processing speed and decreases the traffic.

2 -> What are the features of PLSQL?

Ans:-

Features of PL/SQL:

1. PL/SQL is basically a procedural language, which provides the functionality of decision making, iteration and many more features of procedural programming languages.

2. PL/SQL can execute a number of queries in one block using single command.

One can create a PL/SQL unit such as procedures, functions, packages, triggers, and types, which are stored in the database for reuse by applications.

3. PL/SQL provides a feature to handle the exception which occurs in PL/SQL block known as exception handling block.

4. Applications written in PL/SQL are portable to computer hardware or operating system where Oracle is operational.

5. PL/SQL Offers extensive error checking.

3 -> What is control structure of PLSQL ?

Ans:-

IF-THEN Statement

The simplest form of IF statement associates a condition with a sequence of statements enclosed by the keywords THEN and END IF (not ENDIF), as follows:

IF condition THEN

sequence_of_statements

END IF;

IF-THEN-ELSE Statement

The second form of IF statement adds the keyword ELSE followed by an alternative sequence of statements, as follows:

```
IF condition THEN
  sequence_of_statements1
ELSE
  sequence_of_statements2
END IF;
```

4 ->What is cursor in PLSQL?

Ans :-

A cursor is a named control structure used by an application program to point to and select a row of data from a result set. Instead of executing a query all at once, you can use a cursor to read and process the query result set one row at a time.

5-> List down Advantages of SQL

Ans:-

SQL provides various advantages which make it more popular in the field of data science. It is a perfect query language which allows data professionals and users to communicate with the database. Following are the best advantages or benefits of Structured Query Language:
1. No programming needed
SQL does not require a large number of coding lines for managing the database systems. We can easily access and maintain the database by using simple SQL syntactical rules. These simple rules make the SQL user-friendly.
2. High-Speed Query Processing
A large amount of data is accessed quickly and efficiently from the database by using SQL queries. Insertion, deletion, and updation operations on data are also performed in less time.
3. Standardized Language

SQL follows the long-established standards of ISO and ANSI, which offer a uniform platform across the globe to all its users.
4. Portability
The structured query language can be easily used in desktop computers, laptops, tablets, and even smartphones. It can also be used with other applications according to the user's requirements.
5. Interactive language
We can easily learn and understand the SQL language. We can also use this language for communicating with the database because it is a simple query language. This language is also used for receiving the answers to complex queries in a few seconds.
6. More than one Data View
The SQL language also helps in making the multiple views of the database structure for the different database users.

Core Java

Que. 1- Define Java Programming Language?

Ans:

Introduction to Java programming

JAVA was developed by Sun Microsystems Inc in 1991, later acquired by Oracle Corporation. It was developed by James Gosling and Patrick Naughton. It is a simple programming language. Writing, compiling and debugging a program is easy in java. It helps to create modular programs and reusable code.

Java terminology

Before we start learning Java, lets get familiar with common java terms.

Java Virtual Machine (JVM)

This is generally referred as JVM. Before, we discuss about JVM lets see the phases of program execution. Phases are as follows: we write the program, then we compile the program and at last we run the program.

Java Development Kit(JDK)

While explaining JVM and bytecode, I have used the term JDK. Let's discuss about it. As the name suggests this is complete java development kit that includes JRE (Java Runtime Environment), compilers and various tools like JavaDoc, Java debugger etc.

In order to create, compile and run Java program you would need JDK installed on your computer.

Java Runtime Environment(JRE)

JRE is a part of JDK which means that JDK includes JRE. When you have JRE installed on your system, you can run a java program however you won't be able to compile it. JRE includes JVM, browser plugins and applets support. When you only need to run a java program on your computer, you would only need JRE.

Java is a platform independent language

Compiler(javac) converts source code (.java file) to the byte code(.class file). As mentioned above, JVM executes the bytecode produced by compiler. This byte code can run on any platform such as Windows,

Linux, Mac OS etc. Which means a program that is compiled on windows can run on Linux and vice-versa. Each operating system has different JVM, however the output they produce after execution of bytecode is same across all operating systems. That is why we call java as platform independent language.

Que. 2- What is OOPs in Java ?

Ans:

The main ideas behind Java's Object-Oriented Programming, OOP concepts include abstraction, encapsulation, inheritance and polymorphism. Basically, Java OOP concepts let us create working methods and variables, then re-use all or part of them without compromising security. Grasping OOP concepts is key to understanding how Java works.

Java defines OOP concepts as follows:

Abstraction: Using simple things to represent complexity. We all know how to turn the TV on, but we don't need to know how it works in order to enjoy it. In Java, abstraction means simple things like objects, classes and variables represent more complex underlying code and data. This is important because it lets you avoid repeating the same work multiple times.

Encapsulation: The practice of keeping fields within a class private, then providing access to those fields via public methods. Encapsulation is a protective barrier that keeps the data and code safe within the class itself. We can then reuse objects like code components or variables without allowing open access to the data system-wide.

Inheritance: A special feature of Object-Oriented Programming in Java, Inheritance lets programmers create new classes that share some of the attributes of existing classes. Using Inheritance lets us build on previous work without reinventing the wheel.

Polymorphism: Allows programmers to use the same word in Java to mean different things in different contexts. One form of polymorphism is method overloading. That's when the code itself implies different meanings. The other form is method overriding. That's when the values of the supplied variables imply different meanings. Let's delve a little further.

Que. 3- What is Java API ?

Ans:

An application programming interface (API), in the context of Java, is a collection of prewritten packages, classes, and interfaces with their respective methods, fields and constructors. Similar to a user interface, which facilitates interaction between humans and computers, an API serves as a software program interface facilitating interaction.

In Java, most basic programming tasks are performed by the API's classes and packages, which are helpful in minimizing the number of lines written within pieces of code.

Java Development Kit (JDK) is comprised of three basic components, as follows:

Java compiler

Java Virtual Machine (JVM)

Java Application Programming Interface (API).

Que. 4- What Is Functional Programming?

Ans. -

Basically, functional programming is a style of writing computer programs that treat computations as evaluating mathematical functions.

In mathematics, a function is an expression that relates an input set to an output set.

Importantly, the output of a function depends only on its input. More interestingly, we can compose two or more functions together to get a new function.

LambdaCalculus :

To understand why these definitions and properties of mathematical functions are important in programming, we'll have to go back in time a bit.

In the 1930s, mathematician Alonzo Church developed a formal system to express computations based on function abstraction. This universal model of computation came to be known as lambda calculus.

The Java API, included with the JDK, describes the function of each of its components. In Java programming, many of these components are pre-created and commonly used. Thus, the programmer is able to apply prewritten code via the Java API. After referring to the available API classes and packages, the programmer easily invokes the necessary code classes and packages for implementation.

Que. 5- What is a Java Collection Framework?

Ans. -

A Java collection framework provides an architecture to store and manipulate a group of objects. A Java collection framework includes the following:

Interfaces

Classes

Algorithm

Let’s learn about them in detail:

Interfaces:

Interface in Java refers to the abstract data types. They allow Java collections to be manipulated independently from the details of their representation. Also, they form a hierarchy in object-oriented programming languages.

Classes:

Classes in Java are the implementation of the collection interface. It basically refers to the data structures that are used again and again.

Algorithm:

Algorithm refers to the methods which are used to perform operations such as searching and sorting, on objects that implement collection interfaces. Algorithms are polymorphic in nature as the same method can

be used to take many forms or you can say perform different implementations of the Java collection interface.

The Java collection framework provides the developers to access prepackaged data structures as well as algorithms to manipulate data. Next, let us move to the Java collections framework hierarchy and see where these interfaces and classes reside.

List :

A List is an ordered Collection of elements which may contain duplicates. It is an interface that extends the Collection interface. Lists are further classified into the following:

ArrayList

LinkedList

Vectors

Let's go into detail on each one of them:

Array list:

ArrayList is the implementation of List Interface where the elements can be dynamically added or removed from the list. Also, the size of the list is increased dynamically if the elements are added more than the initial size.

Syntax:

ArrayList object = new ArrayList ();

Linked List:

Linked List is a sequence of links which contains items. Each link contains a connection to another link.

Syntax: Linkedlist object = new Linkedlist();

Java Linked List class uses two types of Linked list to store the elements:

Singly Linked List

Doubly Linked List

Singly Linked List:

In a singly Linked list, each node in this list stores the data of the node and a pointer or reference to the next node in the list. Refer to the below image to get a better understanding of single Linked list.

Doubly Linked List:

In a doubly Linked list, it has two references, one to the next node and another to the previous node. You can refer to the below image to get a better understanding of doubly linked list.

Vectors :

Vectors are similar to arrays, where the elements of the vector object can be accessed via an index into the vector. Vector implements a dynamic array. Also, the vector is not limited to a specific size, it can shrink or grow automatically whenever required. It is similar to ArrayList, but with two differences :

Vector is synchronized.

Vector contains many legacy methods that are not part of the collections framework.

Syntax:

Vector object = new Vector(size,increment);

Queue :

Queue in Java follows a FIFO approach i.e. it orders the elements in First In First Out manner. In a queue, the first element is removed first and last element is removed in the end. Each basic method exists in two forms: one throws an exception if the operation fails, the other returns a special value.

JDBC

Que.1- What is JDBC in Java

Ans:JDBC is an application programming interface (API) included in the Java™ platform that enables Java programs to connect to a wide range of databases.

JDBC stands for Java Database Connectivity, which is a standard Java API for database-independent connectivity between the Java programming language and a wide range of databases.

The JDBC library includes APIs for each of the tasks mentioned below that are commonly associated with database usage.

Basics of JEE

Que. 1- What is JEE in Java ?

Ans: The Java EE stands for Java Enterprise Edition, which was earlier known as J2EE and is currently known as Jakarta EE. It is a set of specifications wrapping around Java SE (Standard Edition). The Java EE provides a platform for developers with enterprise features such as distributed computing and web services. Java EE applications are usually run on reference run times such as microservers or application servers. Examples of some contexts where Java EE is used are e-commerce, accounting, banking information systems.

Que. 2- What is JSP in Java ?

Ans: Java Server Pages (JSP) is a server-side programming technology that enables the creation of dynamic, platform-independent method for building Web-based applications. JSP have access to the entire family of Java APIs, including the JDBC API to access enterprise databases. This tutorial will teach you how to use Java Server Pages to develop your web applications in simple and easy steps.

JavaServer Pages often serve the same purpose as programs implemented using the Common Gateway Interface (CGI). But JSP offers several advantages in comparison with the CGI.

Performance is significantly better because JSP allows embedding Dynamic Elements in HTML Pages itself instead of having separate CGI files.

Que. 3- What is JSTL in Java?

Ans: The JavaServer Pages Standard Tag Library (JSTL) is a collection of useful JSP tags which encapsulates the core functionality common to many JSP applications.

JSTL has support for common, structural tasks such as iteration and conditionals, tags for manipulating XML documents, internationalization tags, and SQL tags. It also provides a framework for integrating the existing custom tags with the JSTL tags.

Install JSTL Library :

To begin working with JSP pages you need to first install the JSTL library. If you are using the Apache Tomcat container, then follow these two steps −

Step 1 − Download the binary distribution from Apache Standard Taglib and unpack the compressed file.

Step 2 − To use the Standard Taglib from its Jakarta Taglibs distribution, simply copy the JAR files in the distribution's 'lib' directory to your application's webapps\ROOT\WEB-INF\lib directory.

To use any of the libraries, you must include a <taglib> directive at the top of each JSP that uses the library.

Que. 4- What is Servlet in Java ?

Ans: Java Servlets are programs that run on a Web or Application server and act as a middle layer between a requests coming from a Web browser or other HTTP client and databases or applications on the HTTP server.

Using Servlets, you can collect input from users through web page forms, present records from a database or another source, and create web pages dynamically.

Java Servlets often serve the same purpose as programs implemented using the Common Gateway Interface (CGI). But Servlets offer several advantages in comparison with the CGI.

Que. 5- What is HttpServlet in Java ?

Ans: HttpServlet class

The HttpServlet class extends the GenericServlet class and implements Serializable interface. It provides http specific methods such as doGet, doPost, doHead, doTrace etc.

Methods of HttpServlet class

There are many methods in HttpServlet class. They are as follows:

1. public void service(ServletRequestreq,ServletResponse res) dispatches the request to the protected service method by converting the request and response object into http type.

2. protected void service(HttpServletRequest req, HttpServletResponse res) receives the request from the service method, and dispatches the request to the doXXX() method depending on the incoming http request type.

Topic : HTML5

Que. 1 - what do you mean by HTML5?

Ans: Hypertext Markup Language revision 5 (HTML5) is markup language for the structure and presentation of World Wide Web contents. HTML5 supports the traditional HTML and XHTML-style syntax and other new features in its markup, New APIs, XHTML and error handling.

Que. 2 - How to build a web page using HTML5?

Ans: With your editor open, you can copy and paste the following HTML5 code into a new HTML page.

```
<!DOCTYPE html>

<html>

<head>

<title>Your web page title</title>

</head>

<body>

The content you want to display to users.

</body>

</html>
```

CSS

1. What is CSS?

Cascading **S**tyle **S**heets fondly referred to as **CSS**, is a simply designed language intended to simplify the process of making web pages presentable. CSS allows you to apply styles to web pages. More importantly, CSS enables you to do this independent of the HTML that makes up each web page.
CSS is easy to learn and understood, but it provides powerful control over the presentation of an HTML document.

2. Why do we use CSS?

We use CSS because of the following reasons:

CSS saves time: You can write CSS once and reuse the same sheet on multiple HTML pages.
Easy Maintenance: To make a global change simply change the style, and all elements in all the webpages will be updated automatically.
Search Engines: CSS is considered a clean coding technique, which means search engines won't have to struggle to "read" its content.

Superior styles to HTML: CSS has a much wider array of attributes than HTML, so you can give a far better look to your HTML page in comparison to HTML attributes.
Offline Browsing: CSS can store web applications locally with the help of an offline cache. Using of this we can view offline websites.

3. What are the advantages of CSS?

CSS plays an important role, by using CSS you simply got to specify a repeated style for an element once & use it multiple times because CSS will automatically apply the required styles.
The main advantage of CSS is that style is applied consistently across a variety of sites. One instruction can control several areas which are advantageous.
Web designers need to use a few lines of programming for every page improving site speed.
Cascading sheet not only simplifies website development but also simplifies maintenance as a change of one line of code affects the whole website and maintenance time.
It is less complex therefore the effort is significantly reduced.
It helps to form spontaneous and consistent changes.
CSS changes are device friendly. With people employing a batch of various range of smart devices to access websites over the web, there's a requirement for responsive web design.
It has the power for re-positioning. It helps us to determine the changes within the position of web elements that are there on the page.
These bandwidth savings are substantial figures of insignificant tags that are indistinct from a mess of pages.
Easy for the user to customize the online page
It reduces the file transfer size.

4. What are the disadvantages of CSS?

CSS, CSS 1 up to CSS3, result in creating confusion among web browsers.
With CSS, what works with one browser might not always work with another. The web developers need to test for compatibility, running the program across multiple browsers.
There exists a scarcity of security.
After making the changes we need to confirm the compatibility if they appear. A similar change affects all the browsers.
The programing language world is complicated for non-developers and beginners. Different levels of CSS i.e. CSS, CSS 2, CSS 3 are often quite confusing.
Browser compatibility (some style sheets are supported and some are not).
CSS works differently on different browsers. IE and Opera support CSS as different logic.
There might be cross-browser issues while using CSS.
There are multiple levels that create confusion for non-developers and beginners.

5-> In how many ways we can add css to HTML?

Ans:-

Cascading Style Sheet(CSS) is used to set the style in web pages that contain HTML elements. It sets the background color, font size, font family, color, … etc properties of elements on a web page.
There are three types of CSS which are given below:

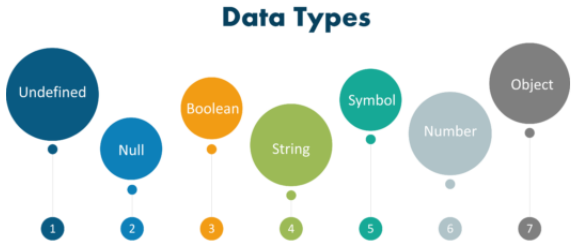
Inline CSS: Inline CSS contains the CSS property in the body section attached with the element known as inline CSS. This kind of style is specified within an HTML tag using the style attribute.
Internal or Embedded CSS: This can be used when a single HTML document must be styled uniquely. The CSS ruleset should be within the HTML file in the head section i.e the CSS is embedded within the HTML file.
External CSS: External CSS contains a separate CSS file which contains only style property with the help of tag attributes (For example class, id, heading, … etc). CSS property is written in a separate file with .css extension and should be linked to the HTML document using the **link** tag. This means that for each element, style can be set only once and that will be applied across web pages.

Java script

1-> What is JavaScript?
JavaScript is a **lightweight**, **interpreted** programming language with object-oriented capabilities that allows you to build interactivity into otherwise static HTML pages. The general-purpose core of the language has been embedded in Netscape, Internet Explorer, and other web browsers.

2-> What are the data types supported by JavaScript?
The **data types** supported by JavaScript are:

- Undefined
- Null
- Boolean
- String
- Symbol
- Number
- Object



3-> What are the features of JavaScript?

Following are the **features** of JavaScript:

- It is a lightweight, interpreted programming language.
- It is designed for creating **network-centric** applications.
- It is complementary to and **integrated** with Java.
- It is an **open** and **cross-platform** scripting language.

4-> Is JavaScript a case-sensitive language?

Yes, JavaScript is a **case sensitive** language. The language keywords, variables, function names, and any other identifiers must always be typed with a consistent capitalization of letters.

5-> What are the advantages of JavaScript?

Following are the **advantages** of using JavaScript –

- **Less server interaction** – You can validate user input before sending the page off to the server. This saves server traffic, which means less load on your server.
- **Immediate feedback to the visitors** – They don't have to wait for a page reload to see if they have forgotten to enter something.
- **Increased interactivity** – You can create interfaces that react when the user hovers over them with a mouse or activates them via the keyboard.
- **Richer interfaces** – You can use JavaScript to include such items as drag-and-drop components and sliders to give a Rich Interface to your site visitors.