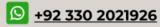# Class No: 03

# Control Flow – Conditions & Loops

## Conditional Statements in JavaScript:

Conditional statements in JavaScript are used to make **decisions based on conditions**. If a condition is true, a specific block of code is **executed**; otherwise, another block of code runs.

## If-Else Statement

This is the most basic conditional statement. If a condition is true, one block of code will execute; otherwise, another block will execute.
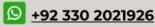
**Example:**

```javascript
let age = 18;

if (age >= 18) {
    console.log("You are an adult.");
} else {
    console.log("You are a minor.");
}
```

# Else-If Ladder

The else if statement allows you to test multiple conditions.

## Example:

```javascript
let marks = 85;
if (marks >= 90) {
    console.log("Grade: A+");
} else if (marks >= 75) {
    console.log("Grade: A");
} else if (marks >= 60) {
    console.log("Grade: B");
} else {
    console.log("Grade: C");
}
```

## Ternary Operator

The ternary operator is a shorthand way of writing an if-else statement.

**Syntax:**

condition ? expression_if_true : expression_if_false

**Example:**

```
let age = 18;
let result = (age >= 18) ? "Adult" : "Minor";
console.log(result);                    // Adult
```

# Loops in JavaScript

**What are Loops?**

Loops allow you to repeat a <span style="color:red">block of code</span> multiple times until a specific condition is met.

## 1. For Loop

A for loop repeats a block of code a fixed number of times.

**Syntax:**

```
for (initialization; condition; increment) {
        // Code to execute
}
```

**Example:**

```
for (let i = 0; i < 5; i++) {
    console.log(i);              // Prints 0 to 4
}
```

## While Loop

A while loop repeats a block of code as long as the condition is true.

**Syntax:**

```
while (condition) {
    // Code to execute
}
```

**Example:**

```
let i = 1;
while (i < 5) {
    console.log(i);          // Prints 0 to 4
    i++;
}
```

## Do-While Loop

A do-while loop is similar to a while loop, except that it executes the block at least once, even if the condition is false.
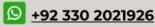
**Syntax:**

```
do {
    // Code to execute
} while (condition);
```

**Example:**

```
let i = 0;   0
do {
    console.log(i);              // Prints 0 to 4
    i++;
} while (i < 5);
```
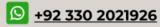
# Activity-Based Task

## Activity: Number Guessing Game

**Task Description:**

We will create a simple **Number Guessing Game** in class.

- The program will generate a random number between 1 and 10.
- Students will use a loop to guess the number until they get it right.

**Code for the Activity**:

```javascript
let randomNumber = Math.floor(Math.random() * 10) + 1;
let guess;

do {
    guess = Number(prompt("Guess a number between 1 and 10:"));
    if (guess > randomNumber) {
        console.log("Too high! Try again.");
    } else if (guess < randomNumber) {
        console.log("Too low! Try again.");
    }
} while (guess !== randomNumber);

console.log("Congratulations! You guessed the correct number: " + randomNumber);
```

## Key Differences Between Loops

| Loop Type | Description | Example Use Case |
|---|---|---|
| **For Loop** | Repeats a block a fixed number of times. | Iterating over an array. |
| **While Loop** | Repeats a block as long as a condition is true. | Validating user input. |
| **Do-While Loop** | Executes the block at least once. | Asking for input until it's valid. |

## Home Task 3

- What is a conditional statement?
- Write a program to check if a number is positive, negative, or zero.
- What is the difference between if-else and ternary operator?
- Write a script to print all even numbers from 1 to 10 using a for loop.
- Write a JavaScript program to check if a number is divisible by 5 using a while loop.
- Explain the difference between while and do-while loops with examples.
- Write a program that prints the multiplication table of a number using a for loop.
- Create a program to count the number of digits in a given number using a while loop.
- Write a program to print numbers from 10 to 1 using a for loop (reverse order).
- Write a script that asks the user to input numbers until the sum of all entered numbers is greater than 100.