**Loop and Strings**

**Loop:** Loops are used to execute a piece of code again & again (for loop, while loop and do while loop, for-of loop)

Syntax:

//1. for loop:

for (initialization; condition; increment) {

    // code block

}

//2. while loop:

//initialization part

while (condition) {

    // code block

    //increment part

}

//3. do while loop:

//initialization part

do {

    // code block

    //increment part

} while (condition);

// for loop

console.log("1.Yasin");

console.log("2.Yasin");

console.log("3.Yasin");

console.log("4.Yasin");

console.log("5.Yasin");

console.log("6.Yasin");

console.log("7.Yasin");

console.log("8.Yasin");

console.log("9.Yasin");

console.log("10.Yasin");

console.log("\n\n");

for (let i=1; i<=10; i++){

    console.log(i+". Imran");

}console.log("\n\n");

* **How it works:** Initializes i, checks the condition (i <= 10), runs the code block, then increments i.
* **Use case:** Best when the number of iterations is known in advance.

//while loop:

let i = 1;

while (i <= 10) {

    console.log(i + ". Al-Amin");

    i++;

}console.log("\n\n");

* **How it works:** Repeatedly checks the condition before running the code block. Runs as long as the condition is true.
* **Use case:** Ideal when the number of iterations is unknown and depends on a condition

//do while loop

let j = 1;

do {

    console.log(j + ". Tahsin");

    j++;

} while (j <= 10);

console.log("\n\n");

* **How it works:** Runs the code block once before checking the condition, then continues if the condition is true.
* **Use case:** Useful when the code block must run at least once, regardless of the condition.

**Differences:**

* **For Loop:** Predefined iterations.
* **While Loop:** Condition checked before the loop; may not run at all.
* **Do-While Loop:** Condition checked after the loop; runs at least once.

**Infinite Loop:**

for (let i = 1; i>0 ; i++) {

    console.log("Imran");

}

let i = 1;

while (true) {

    console.log("Al-Amin");

}

let j = 1;

do {

    console.log("Tahsen");

} while (true);

**4. for-of loop:** work for arrays, and strings.

* **Use:** Iterates directly through values of arrays and strings.
* **Advantages:** Simpler and more readable. No need for index management.

Syntax:

for (let item of iterable) {

    // code block

}

Example:

let fruits = ["apple", "banana", "cherry"];

let len=0;

for (let fruit of fruits) { // iterator--> string array

    console.log(fruit);

    len++;

}console.log("Size of string-array: ", len,"\n\n");

let str="Tahsin Ahemed Al-Amin";

let size=0;

for (let i of str ){ //iterator--> character

    console.log("i: ",i);

    size++;

}console.log("Size of string: ", size,"\n\n");

**5. for-in loop:** work for object.

* **Use:** Iterates over enumerable properties of an object.
* **Advantages:** Useful for accessing property names and their values in an object.

syntax:

for (const key in object) {

    // code block

}

Example:  
const person = {

name: "Alice",

    age: 25,

    city: "New York",

    country: "Bangladesh"

};

let ob\_size=0;

for (const key in person) {

    console.log(key + ": " + person[key]);

    ob\_size++;

}console.log("Size of ob\_size: ", ob\_size,"\n\n");

**Problem-1:** Print all even or odd numbers from 0 to 100.

for (let i=0; i<=10; i++){

    if(i%2==0){

        console.log("Even number: ", i);

    }

    // else{

    //     console.log("Odd number: ", i);

    // }

}

**Problem-2:** Create a game where you start with any random game number. Ask the user to keep guessing the game number until the user enters the correct value.

let player1 = prompt("Player1: ");

console.log("Player1: ", player1);

let chance = prompt("Chance: "); // Convert chance to a number

console.log("Chance: ", chance,"\n\n");

let player2 = prompt("Player2: ");

console.log("Player2: ", player2);

while (player1 !== player2 && chance > 0) {

    console.log("Loss! You entered the number: " + player2 + ". Try Again.");

    chance--;

    console.log("Left chance: " + chance,"\n\n");

    if (chance > 0) {

        player2 = prompt("Player2: ");

        console.log("Player2: ", player2);

    } else {

        console.log("No chances left. You lost!");

        break; // Exit the loop if no chances are left

    }

}

if (player1 === player2) {

    console.log("Win! You entered the number: " + player2);

}

**Stings:** String is a sequence of characters that is used to represent text.

* Strings are for **storing text**
* Strings are written with quotes, and s zero or more characters written inside quotes