**Task 3: JavaScript Programming Basics**

**1.Explain the difference between var, let, and const. Provide examples.**

**1. var:**

* **Scope**: var is function-scoped or globally-scoped. If declared outside of any function, it has global scope. If declared inside a function, it is limited to the function.
* **Hoisting**: Variables declared with var are hoisted to the top of their scope and are initialized with undefined.
* **Reassignment**: The value of a variable declared with var can be reassigned.
* **Use Case**: var was used traditionally in JavaScript before the introduction of let and const. It’s rarely used in modern JavaScript because of its quirks.
* function exampleVar() {
* var x = 1;
* if (true) {
* var x = 2; // same variable
* console.log(x); // 2
* }
* console.log(x); // 2
* }
* exampleVar();

### 2. let:

* **Scope**: let is block-scoped, meaning it is limited to the block (enclosed by {}) in which it is defined (e.g., inside a loop, an if statement, etc.).
* **Hoisting**: Variables declared with let are hoisted, but they are not initialized until the declaration is encountered. This means accessing them before the declaration results in a ReferenceError (temporal dead zone).
* **Reassignment**: The value of a variable declared with let can be reassigned.
* **Use Case**: let is preferred over var for modern JavaScript because of its block scoping and safer handling.
* function exampleLet() {
* // console.log(x); // ReferenceError: Cannot access 'x' before initialization
* let x = 10;
* console.log(x); // 10
* }
* exampleLet();

### 3. const:

* **Scope**: const is block-scoped, like let.
* **Hoisting**: Like let, const is hoisted, but it is also in the "temporal dead zone" until it is initialized.
* **Reassignment**: The value of a variable declared with const **cannot be reassigned**. However, if the value is an object or array, the contents (properties or elements) can be modified.
* **Use Case**: const is used when the variable should not be reassigned, ensuring that the variable's binding remains constant.
* function exampleConst() {
* const x = 1;
* if (true) {
* const x = 2; // different variable
* console.log(x); // 2
* }
* console.log(x); // 1
* }
* exampleConst();

**2. Write a for loop to print all even numbers between 1 and 10.**

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

    if (i % 2 === 0) {

        console.log(i);

    }

}

**3. Write a while loop that keeps doubling a number**

**(starting from 1) until it is greater than or equal to 100.**

let number = 1;

while (number < 100) {

    number \*= 2;

    console.log(number);

}

**Output:**

**2**

**4**

**8**

**16**

**32**

**64**

**128**