********** lecture-1**********

1 - What is JavaScript?
--> javascript is a programming language. We Use it to give instructions to the computer.

Input ---> Computer ---> Output

2 - Our 1st js code
--> Console.log is used to log (print) a message to the console.

console.log(" my name is vihar");

3 - what is variables in javascript?
---> variables are containers for data.

-> three type of variables :

-> 1 - var :- variable can be re-declared & updated. A global scope variable.

-> 2 - let :- variable cannot be re-declared but can be updated. A block scope variable.

-> 3 - const :- variable cannot be re-declared or updated. A block scope variable
const me object ho to re-declared kar sakte hai

Variable Rules
:- variable names are case sensitive; "a" & "A" is different.
:- Only letters, digits, underscore(_)and $ is allowed.(not even space)
:- Only a letter, underscore(_) or $ should be 1st character.
:- Reserved words cannot be variable names.

3 - what is Data type in javascript?
--->two type of data type
1 -> primitive - 7
1 - Number :
Ex.
let b = 10
console.log(typeof b ,b);
output
typeof - Number

2 - String
Ex.
let name = "vihar"
console.log(typeof name ,name);
output
typeof - String

3 - Boolean
Ex.
let a = true;
console.log(typeof a ,a);
output
typeof - boolean

4 - Undefined
Ex.
let c;
console.log(typeof c ,c);

output
typeof - Undefined

5 - Null
Ex.
let y = null;
console.log(typeof y ,y);
output
typeof - 'object' - null

6 - Bigint
Ex.
let z = bigint("123");
console.log(typeof z ,z);
output
typeof - Bigint

7 - Symbol
Ex.
let d = Symbol(hello!)
console.log(typeof d ,d)
output
typeof - Symbol

2 -> non-primitive - 2
1 - object

Ex.
const student = {
fullname : "vihar barvaliya",
age : 18,
ispass : true
}
console.log(student);
console.log(typeof student ,student);
-> coll of key
console.log(student["age"]);
console.log(student.age);
-> re-ashin value
student["age"] = student["age"] + 2
console.log(student["age"]);
student["name"] = "Rahul Sharma";
console.log(student["name"]);

output
student -> {fullname: 'vihar barvaliya' , age: 18, ispass : true}
typeof - object
age - 18
age - 18
age - 20

second Ex.

const product = {
title : "ball pen",
rating : 4,
offer : 5,
price : 270,
};

□□console.log(product);
□output
□□product - {title : 'ball pen', rating : 4, offer : 5, price : □□□270}

threed Ex.
□□const instagramp = {
□□□username: "@vihar",
□□□isfollow: true,
□□□followers: 321,
□□□following: 213
□□};

□□console.log(typeof profile["username"]);
□output
□□typeof - string

□□********** lecture 2 ***********

1- Comments in javascript
-> Part of Code which is not executed

□// this is a single line comment
□/* this is a multi-line comment. */

2 - Operators in javascript
-> Used to perform some operation on data.

□Arithmetic Operators ->

□□+,-,*,/
□□
□□: modulus(%)

□□: Exponentiation(5^2)

□□: Increment(++)

□□: Decrement(--)

Arithmetic Operators (+) ->
□let a = 5;
□let b = 2;

  console.log("a + b = ", a + b);

Arithmetic Operators (-) ->
□let a = 5;
□let b = 2;

  console.log("a - b = ", a - b);

Arithmetic Operators (*) ->
□let a = 5;
□let b = 2;

  console.log("a * b = ", a * b);

Arithmetic Operators (/) ->

let a = 5;
let b = 2;

  console.log("a / b = ", a / b);

Arithmetic Operators (modulus(%)) ->
let a = 5;
let b = 2;

  console.log("a % b = ", a % b);

Arithmetic Operators (Exponentiation(5^2)) ->
let a = 5;
let b = 2;

  console.log("a ** b = ", a ** b);

// unary operators

: increment(++)
Ex.
a++(post)
++a(pre)
: Decrement(--)
Ex.
a--(post)
--a(pre)

// unary operators(increment(++)) ->
let a = 5;
let b = 2;

  console.log("a = ", a," & b = ", b);
// a = a + 1;
// a++;

unary operators(Decrement(--)) ->
let a = 5;
let b = 2;

  console.log("a = ", a," & b = ", b);
// a = a - 1;
// a--;

// unary operators(increment(a++)) ->
let a = 5;
let b = 2;

  console.log("a = ", a," & b = ", b);

console.log("a++ = ", a++); //5
console.log("a = ", a); //6

// unary operators(increment(++a)) ->
let a = 5;
let b = 2;

```
   console.log("a = ", a," & b = ", b);

console.log("++a = ", ++a); //6

unary operators(decrement(a--)) ->
let a = 5;
let b = 2;

   console.log("a = ", a," & b = ", b);

console.log("a-- = ", a--); //5
console.log("a = ", a); //4

// unary operators(decrement(--a)) ->
let a = 5;
let b = 2;

   console.log("a = ", a," & b = ", b);

console.log("--a = ", --a); //4


Assignment Operators ->

= , += , -= , *= , %= , **=

//Assignment Operators(+=) ->

let a = 5;
let b = 2;

a += 4; // a = a + 4
console.log("a = ", a); //9

//Assignment Operators(-=) ->

let a = 5;
let b = 2;

a -= 4; // a = a - 4
console.log("a = ", a); //1

//Assignment Operators(*=) ->

let a = 5;
let b = 2;

a *= 4; // a = a * 4
console.log("a = ", a); //20

//Assignment Operators(/=) ->

let a = 5;
let b = 2;

a /= 4; // a = a / 4
console.log("a = ", a); //1.25

//Assignment Operators(%=) ->
```

```
let a = 5;
let b = 2;

a %= 4; // a = a % 4
console.log("a = ", a); //1
```

//Assignment Operators(**=) ->

```
let a = 5;
let b = 2;

a **= 4; // a = a ** 4
console.log("a = ", a); //625
```

Comparison Operators ->

Equal to -> (==),
Not equal to -> (!=),
Equal to & type -> (===),
Not equal to & type -> (!==),

(>) , (>=) , (<) , (<=)

//Comparison Operators (Equal to(==))->

```
let a = 5;
let b = 2;

console.log("5 == 2", a == b); //false
```

Ex.

```
let a = 5;
let b = 5;

console.log("5 == 5", a == b); //true
```

//Comparison Operators (Not equal to(!=))->

```
let a = 5;
let b = 2;

console.log("5 != 2", a != b); //true
```

Ex.

```
let a = 5;
let b = 5;

console.log("5 != 5", a != b); //false
```

//Comparison Operators (Equal to & type(===))->

```
let a = 5;
let b = "5";

console.log("a === b", a === b); //false
```

//Comparison Operators(Not equal to & type(!==))->

```
let a = 5;
let b = "5";
```

```
console.log("a !== b", a !== b); //true

//Comparison Operators(>)->

let a = 5;
let b = 3;

console.log("a > b", a > b); //true

//Comparison Operators(<)->

let a = 5;
let b = 3;

console.log("a < b", a < b); //false

//Comparison Operators(<=)->

let a = 5;
let b = 5;

console.log("a <= b", a <= b); //true

//Comparison Operators(>=)->

let a = 5;
let b = 5;

console.log("a >= b", a >= b); //true


logical Operators ->

logical AND  &&
logical OR ||
logical Not  !

// logical Operators (logical AND  &&)->
let a = 6;
let b = 5;

let cond1 = a > b;
let cond2 = a === 6;
console.log("cond1 && cond2 = ", cond1 && cond2);

// logical Operators (logical OR ||)->
let a = 6;
let b = 5;
console.log("cond1 || cond2 = ", a < b || a === 6); //true

// logical Operators (logical NOT !)->
let a = 6;
let b = 5;
console.log("!(6<5) = ", !(a < b)); //true


********Conditional Statements********

(3) what is conditional statements in javascript?
```

-> to implement some condition in the code.

(1) if statiment
(2) if-else Statement
(3) else-if Statement

(1) if statiment ->

```
let color;
if(mode === "dark-mode"){
color = "black";
}
```

Ex.

```
let age = 18;

if (age >= 16) {
console.log("you can vote");
}

if (age < 18) {
console.log("you CANNOT vote");
}
```

Ex.

```
let mode = "dark";
let color;

if (mode === "dark") {
color = "black";
}

if (mode === "light") {
color = "white";
}

console.log(color);
```

(2) if-else Statement

```
let color;
if(mode === "dark-mode") {
color = "black";
} else {
color = "white";
```

Ex.

```
let mode = "blue";
let color;

if (mode === "dark") {
  color = "black";
} else {
  color = "white";
}

console.log(color);
```

Ex.

```
let age = 16;
```

```
if (age >= 18) {
  console.log("vote");
} else {
   console.log("not vote");
```

odd/even number

```
let num = 20;

if (num % 2 === 0){
  console.log(num, "is even");
} else {
  console.log(num, "is odd");
}
```

(3) else-if Statement

```
let age = 18

if(age < 18) {
    console.log("junior");
} else if(age > 60) {
    console.log("senior");
} else{
    console.log("middle");
}
```

Ex.

```
let mode = "silver";
let color;

if (mode === "dark"){
    color = "black";
} else if(mode === "blue") {
    color = "blue";
} else if(mode === "pink") {
    color = "pink";
} else {
    color = "white"

console.log(color);
```

(4) what is Ternary Operators in javascript?
-> condition ? true output : false output

Ternary Operators

```
let age = 16;
let result = age >= 18 ? "adult" : "not adult";
console.log(result);// not adult
```

Qs1. Get user to input a number using prompt(Enter a number is a multiple of 5 or not)

-->

```
let num = prompt("enter a number:");
```

```
if (num % 5 === 0) {
   console.log(num,"is a multiple of 3");
} else {
   console.log(num, "is NOT a multiple of 5");
```

Qs2. write a code which can give grades to students according to their scores:

: 80-100,A
: 70-89,B
: 60-69,C
: 50-59,D
: 0-49,F

Ex.

```
let score = 75; // prompt("enter your score (0-100):");
let grade;

if (score >= 90 && score <= 100){
  grade = "A";
} else if(score >= 70 && score <= 89){
  grade = "B";
} else if(score >= 60 && score <= 69){
  grade = "C";
} else if(score >= 50 && score <= 59){
  grade = "D";
} else{
  grade = "F";

console.log("according to your scores, your grade was : ",grade);
```

********** lecture-3 **********

Loop

(1) what is loops in javascript.
--> loop are used to execute a piece of code again & again.

for loop->

```
  for(let i = 1; i <= 5; i++){
  console.log("i am vihar");
  }
Ex.
  for(let count = 1; count <= 10; count++){
  console.log("i am vihar"); // 10 execute
  }

  console.log("loop has ended");

second Ex.

  let sum = 0;
  for(let i = 1; i <= 5; i++) {
  sum = sum + i; // sum = 15
```

```
}
console.log("sum = ", sum);
console.log("loop has ended");

threed Ex.

let sum = 0;
let n = 5
for(let i = 1; i <= n; i++) {
sum = sum + i;
}
console.log("sum = ", sum); // sum = 15
console.log("loop has ended");
```

Infinite loop : A Loop that never ends

while loop ->

```
while(condition){
// do same work
}
```

Ex.

```
let i = 1;
while (i <= 5) {
  console.log("i =", i);
  i++;
}
```

second Ex.

```
let i = 1;
while (i <= 5) {
  console.log("i am vihar");
  i++;
}
```

do while ->

Ex.

```
let i = 20;
do {
 console.log("vihar b");
 i++;
} while (i <= 10);
```

Second Ex.

```
let i = 1;
do {
 console.log("i =", i);
 i++;
} while (i <= 10);
```

for of loop ->

Ex.
let str = "i am vihar";

for(let i of str) {
console.log("i = ", i);
}

Second Ex.

let str = "i am vihar";

let size = 0;
for(let val of str) {
console.log("val = ", val);
size++;
}

console.log("string size = ", size); // 8

for in loop ->

let student = {
  name: "vihar b.",
  age: 20,
  cgpa: 7.5,
  isPass: true,
};

for (let key in student) {
console.log("key=", key, " value=", student[key]);
}

Qs3. print all even numbers from 0 to 100.

Ans.

for (let num = 0; num <= 100; num++) {
 if (num % 2 === 0) {
 // even number
  console,log("num =", num);
}

Ex.

for (let num = 0; num <= 100; num++) {
  console.log("num =", num);
}

second Ex.

for (let num = 0; num <= 100; num++) {

if (num % 2 !== 0) {
// odd number
console,log("num =", num);
}

Qs4. Create a game where you start with any random number. Ask the user to keep guessing the game number unti

Ans.

let gameNum = 25;
let userNum = prompt("Guess the number. guess again : ");

while(userNum != gameNum) {
userNum = prompt("your entered wrong number. Guess again : ");
}

console.log("congratulations, you entered the right number");

*****Strings*****

(1) what is string in javascript.

--> String is a sequence of characters used to represent text.

// Create String

let str = "vihar"
let str2 = 'vihar b'

// String length

let str = "vihar"
output

str.length // length=5

// String indices

let str = "vihar"

console.log(str[0]); // V

output

V

(2) what is template literals in javascript.

--> A way to have embedded expressions in strings.

//`this is a template literal`

(1) String interpolation.

--> to create strings by doing substitution of placeholders

// `string text${expression} string text`

Ans.

```
let obj = {
  item: "pen",
  price: 10,
};

let output = `the cost of ${obj.item} is ${obj.price} rupees`;
console.log(output);

    //console.log("the cost of", obj.item, "is", obj.price, "ruppes");
```

Ex.

```
let specialString = `this is a template literal`;
console.log(specialString); // type = string
```

output -> this is a template literal

(/n --> new line
/t --> teb space)

(3) String Methods in javascript.

--> these are built-in functions to manipulate a string

(1) str.toUpperCase()

Ex.

```
let str = "i am vihar";
str = str.toUpperCase();
console.log(str);
```

(2) str.tolowerCase()

Ex.

```
let str = "i am vihar";
str = str.toLowerCase();
console.log(str);
```

(3) str.trim() // removes whitespaces

Ex.

```
let str ="   i am vihar   ";
console.log(str.trim()); // srating and end ki space remove karke dega
```

(4) str.slice(start,end?) // returns part of string

Ex.

```
let str = "hello";
console.log(str.slice(0, 3));

output
hel

Ex.

let str = "hello";
console.log(str.slice(2));
output
llo


(5) str1.concat(str2) // joins str2 with str1

Ex.

let str1 = "apna";
let str2 = "college";

let res = str1.concat(str2);
console.log(res);
output
apnacollege


Ex.

let str1 = "apna";
let str2 = "college";

let res = str1 + str2;
console.log(res);
output
apnacollege

(6) str.replace(searchVal, newVal)

Ex.
let str = "hello";
console.log(str.replace("h","y"));

output

yello

Ex.
let str = "hellololo";
console.log(str.replaceAll("lo","p"));

output


(7) str.charAt(idx)

Ex.
let str = "i lovejs";
console.log(str.charAt(3)); //v
```

(string -> in mutebal)

Qs5. Prompt the user to enter their full name. Generate a username for them based on the input. Start username w
.

eg:user name = "viharbarvaliya" ,username should be "@viharbarvaliya12"

Ans.

let fullName = prompt("enter your fullname without spaces");

let username = "@" + fullName + fullName.length;
console.log(username);

**********Arrays**********

(1) what is Arrays in javascript.

--> Collections of items

(1) Create Array

let horoes=["ironman","hulk","thor","batman"];

let marks=[96,75,48,83,66];

let info=["rahul",86,"Delhi"];

Ex.

let marks = [97, 82, 75, 64, 36];
console.log(marks);
console,log(marks.length); // property

let horoes=["ironman","hulk","thor","batman"];

(2) Array indices

arr[0],arr[1],arr[2]....

Ex.

let marks = [97, 82, 75, 64, 36];
console.log(marks);

output

marks[0]
output -> 97

second Ex. index ki value seng

```
let marks = [97, 82, 75, 64, 36];
console.log(marks);

output

marks
(5) [97, 82, 75, 64, 36];

marks[0] = 66;
66

marks
(5) [66, 82, 75, 64, 36];
```

(Array -> muteble)

(2) looping over an Array.

--> print all elements of an array

Ex.(for loop array)

```
let horoes=["ironman","hulk","thor","batman"];

for (let i =0; i < heroes.length; i++) {
  console.log(heroes[i]);
}
```

second Ex.(for of loop array)

```
let horoes=["ironman","hulk","thor","batman"];

for (let hero of heroes) {
  console.log(hero);
}
```

threed Ex.

```
let cities = ["delhi", "ahmadabad", "surat", "mumbai"]

for (let city of cities) {
console.log(city.toUpperCase());
}
```

Qs6. for a given array with marks of students ->[85,97,44,37,76,60] find the average marks of the entire class.

Ans.

```
let marks = [85, 97, 44, 37, 76, 60];

let sum = 0;

for (let val of marks) {
```

```
    sum += val;
}

let avg = sum / marks.length;
console.log(`avg marks of the class = ${avg}`);
```

Qs7. for a given array with prices of 5 items->[250,645,300,900,50]All items have an offer of 10% off on them. Change

Ans.

```
let items = [250, 645, 300, 900, 50];

let i = 0;
for (let val of items) {
    console.log(`value at index ${i} = ${val}`);
    let offer = val / 10;
    items[i] = items[i] - offer;
    console.log(`value after offer = ${val}`);
    i++;
}
```

Ans2.

```
let items = [250, 645, 300, 900, 50];

for (let i =0; i < items.length; i++) {
    let offer = items[i] / 10;
    items[i] -= offer;
}

console.log(items);
```

(3) Array methods

(1)Push():add to end

Ex.

```
let foodItems = ["potato","apple","lichi","tomato"];

foodItems.push("chips", "burger","paneer");

console.log(foodItems);
```

(2)pop():delete from end & return

Ex.

```
let foodItems = ["potato","apple","lichi","tomato"];
console.log(foodItems);
foodItems.pop();
console.log(foodItems);
```

(3)toString():converts array to string

Ex.

let foodItems = ["potato","apple","lichi","tomato"];
console.log(foodItems);
console,log(foodItems.toString());
console.log(foodItems);

(4) Concat():joins multiple arrays & returns result

Ex.
let marvelheroes = ["thor","spiderman","ironman"];
let dcheroes = ["superman", "batman"];

let heroes = marvelheroes.concat(dcheroes);
console.log(heroes);

(5) unshift(): add to start

Ex.

let marvelheroes = ["thor","spiderman","ironman"];

marvelheroes.unshift("antman");

(6) shift(): delete from start & return

Ex.

let marvelheroes = ["thor","spiderman","ironman"];

marvelheroes.shift();
console.log("deleted ", val);

(7) Slice(): returns a piece of the array

slice(startidx, endidx)

Ex.

let marvelheroes = ["thor","spiderman","ironman","antman","Dr.Strange"];

console.log(marvelheroes);

console.log(marvelheroes.slice(1, 3));

output.

["spiderman","ironman"]

(8) Splice(): change original array (add,remove,replace)

splice(startidx,delCount,newEl1...)

Ex.
let arr = [1,2,3,4,5,6,7];

arr.splice(2,2,101,102);
output.

[1,2,101,102,5,6,7]

Second Ex. // Add Element

let arr = [1,2,3,4,5,6,7];

arr.splice(2,0,101);
output.

[1,2,101,3,4,5,6,7]

threed Ex. // delete element

let arr = [1,2,3,4,5,6,7];

arr.splice(3,1);
output.

[1,2,3,5,6,7]

fourth Ex. // replace Element

let arr = [1,2,3,4,5,6,7];

arr.splice(3, 1, 101);

Qs8. create an array to store companies -> "Boomberg","Microsoft","Uber","google","IBM","Netflix".
(a) Remove the first company from the array
(b) remove Uber & add ola in its place
(c) Add Amazon at the end

--> Ans.a

let companies = ["Boomberg","Microsoft","Uber","google","IBM","Netflix"];

companies.shift();

--> Ans.b

let companies = ["Boomberg","Microsoft","Uber","google","IBM","Netflix"];

companies.splice(2,1,"ola");

--> Ans.c

let companies = ["Boomberg","Microsoft","Uber","google","IBM","Netflix"];

companies.push("Amazon");

**********functions**********

(1)what is Functions in javascript.
--> Block of code that performs a specific task, can be invoked whenever needed.

**Function Definition->

```
function myfunctionname(){
console.log(" i am vihar")
}
```

**Function Call->

```
myfunctionname();
```

**Function - parameter and argument

```
function myfunction(msg){ // parameter
console.log(msg);
}

myfunction("i love js"); // argument
```

Ex. 2 number , sum in function

```
function sum(x, y) {
s = x + y;
console.log("good");
return s;
}

let val = sum(3, 4);
console.log(val);
```

---> function perameter is local variabals of function and block scope.

(2) what is arrow Functions.

--> Compact way of writing a function.

Ex.

```
coust arrowsum = (a, b)=> {
  console.log(a + b);
};
```

Qs9. Create a function using the "function" keyword that takes a String as an argument & returns the number of vow

Ans.

```
function countvowels(str) {

  let count = 0;
  for (const char of str) {
    if (
      char === "a" ||
      char === "e" ||
      char === "i" ||
      char === "o" ||
      char === "u"
    ) {
      count++;
    }
  }

  // console.log(count);
    return count;
};
```

Qs10. Create an arrow function to perform the same task.^

```
const countvow(str) => {

  let count = 0;
  for (const char of str) {
    if (
      char === "a" ||
      char === "e" ||
      char === "i" ||
      char === "o" ||
      char === "u"
    ) {
      count++;
    }
  }

  // console.log(count);
    return count;
};
```

(3) forEach loop in arrays.--> higher order function

```
Ex.
  let arr = [1,2,3,4,5];

  arr.forEach(function printVal(val){
    console.log(val);
  });

second Ex.
  let arr = [1,2,3,4,5];

  arr.forEach((val) => {
    console.log(val);
  });
```

threed Ex.
let arr = ["pune", "delhi", "mumbai"];

arr.forEach((val, idx, arr) => {
  console.log(val.toUpperCase(), idx, arr);
});

Qs11. For a given array of numbers, print the square of each value using the forEach loop.

Ans.

let nums = [2, 3, 4, 5, 6];

nums.forEach((num) => {
  console.log(num * num);//num**2
});

Ex.

let nums = [2, 3, 4, 5, 6];

let calcSquare = (num) => {
  console.log(num * num);
};

nums.forEach(calcsquare);

****Same More Array Methods****

(1) Map
--> Creates a new array with the results of some operation. the value its callback returns are used to from new array.

Ex.

let nums = [67, 52, 39];

nums.map((val) => {
  console.log(val);
});

second Ex.

let nums = [67, 52, 39];

let newarr = nums.map((val) => {
  return val * val;
});
console.log(newarr);

(2) Filter
--> Create a new array of elements that give true for a condition/filter.

Ex.

```
let arr = [1,2,3,4,5,6,7,8];

let evenArr = arr.filter((val) => {
    return val % 2 === 0;
});
console.log(evenArr);
```

second Ex.

```
let arr = [1,2,3,4,5,6,7,8];

let evenArr = arr.filter((val) => {
    return val % 2 !== 0;
    // return val > 3;
});
console.log(evenArr);
```

(3) Reduce
--> Performs some operations & reduces the array to a single value. it returns that single value.

Ex.

```
let arr = [1, 2, 3, 4];

const output = arr.reduce((res, curr) => {
    return res = curr;
});

console.log(output);
```

Ex.

```
let arr = [5,6,1,2,3,4];

const output = arr.reduce((prev, curr) => {
    return prev > curr ? prev : curr;
});

console.log(output); // 10
```

Qs12. We are given array of marks of students. filter our of the marks of students that scored 90+.

Ans.

```
let marks = [97, 64, 32, 49, 99, 96, 86];

let toppers = marks.filter((val) => {
    return val > 90;
});

console.log(toppers);
```

Qs14. Take a number n as input from user. Create an array of numbers from 1 to n.
Use the reduce method to calculate sum of all numbers in the array.

Use the reduce method to calculate product of all numbers in the array.

Ans.

```
let n = prompt(" enter a number : ");

let arr = [];

for (let i = 1; i <= n; i++) {
  arr[i - 1] = i;
}

console.log(arr);

let sum = arr.reduce ((res, curr) => {
   return res + curr;
});

console.log("sum =", sum);

let factorial = arr.reduce((res, curr) => {
   return res * curr;
});

console.log("factorial = ", factorial);
```