

Level-1 Questions

1. Use for loop & while-loop to iterate from 0 to 100 and print only even numbers

Explanation: Even numbers are those divisible by 2. We can check this using the modulus operator % which gives the remainder. If a number % 2 == 0, it is even.

For Loop Code:

```
javascript
Copy code
// Using For Loop
for (let i = 0; i <= 100; i++) {
  if (i % 2 === 0) {
    console.log(i);
  }
}
```

While Loop Code:

```
javascript
Copy code
// Using While Loop
let i = 0;
while (i <= 100) {
  if (i % 2 === 0) {
    console.log(i);
  }
  i++;
}
```

Output:

```
Copy code
0 2 4 6 8 10 ... 100
```

2. Use for loop & while-loop to iterate from 0 to 100 and print only odd numbers

Explanation: Odd numbers are those not divisible by 2, meaning if a number % 2 != 0, it's odd.

For Loop Code:

```
javascript
Copy code
// Using For Loop
for (let i = 0; i <= 100; i++) {
  if (i % 2 !== 0) {
    console.log(i);
  }
}
```

While Loop Code:

```
javascript
Copy code
// Using While Loop
let i = 0;
while (i <= 100) {
  if (i % 2 !== 0) {
    console.log(i);
  }
  i++;
}
```

Output:

```
Copy code
1 3 5 7 9 11 ... 99
```

3. Use for loop & while-loop to iterate from 0 to 100 and print only prime numbers

Explanation: Prime numbers are numbers greater than 1 that have only two divisors: 1 and themselves.

For Loop Code:

```
javascript
Copy code
// Helper function to check if a number is prime
function isPrime(num) {
  if (num < 2) return false;
  for (let i = 2; i <= Math.sqrt(num); i++) {
    if (num % i === 0) return false;
  }
  return true;
}

// Using For Loop
for (let i = 0; i <= 100; i++) {
  if (isPrime(i)) {
    console.log(i);
  }
}
```

While Loop Code:

```
javascript
Copy code
// Using While Loop
let i = 0;
while (i <= 100) {
  if (isPrime(i)) {
    console.log(i);
  }
}
```

```
}  
  i++;  
}
```

Output:

Copy code

2 3 5 7 11 13 ... 97

4. Use for loop & while-loop to iterate from 0 to 100 and print the sum of all numbers

Explanation: We will initialize a sum variable and add each number from 0 to 100 to this variable.

For Loop Code:

javascript

Copy code

```
let sum = 0;  
for (let i = 0; i <= 100; i++) {  
  sum += i;  
}  
console.log("Sum of all numbers:", sum);
```

While Loop Code:

javascript

Copy code

```
let sum = 0;  
let i = 0;  
while (i <= 100) {  
  sum += i;  
  i++;  
}  
console.log("Sum of all numbers:", sum);
```

Output:

yaml

Copy code

Sum of all numbers: 5050

5. Use for loop & while-loop to iterate from 0 to 100 and print the sum of all evens and the sum of all odds

Explanation: We will maintain two sums, one for even numbers and one for odd numbers, and add them accordingly.

For Loop Code:

javascript

Copy code

```
let evenSum = 0, oddSum = 0;
for (let i = 0; i <= 100; i++) {
  if (i % 2 === 0) {
    evenSum += i;
  } else {
    oddSum += i;
  }
}
console.log("Sum of even numbers:", evenSum);
console.log("Sum of odd numbers:", oddSum);
```

While Loop Code:

javascript

Copy code

```
let evenSum = 0, oddSum = 0, i = 0;
while (i <= 100) {
  if (i % 2 === 0) {
    evenSum += i;
  } else {
    oddSum += i;
  }
  i++;
}
console.log("Sum of even numbers:", evenSum);
console.log("Sum of odd numbers:", oddSum);
```

Output:

yaml

Copy code

```
Sum of even numbers: 2550
Sum of odd numbers: 2500
```

6. Write a program that calculates the factorial of a given positive integer

Explanation: Factorial is the product of an integer and all the integers below it. For example, factorial of 5 is 5 * 4 * 3 * 2 * 1.

For Loop Code:

javascript

Copy code

```
let number = 5; // You can change this number
let factorial = 1;
```

```
for (let i = 1; i <= number; i++) {
  factorial *= i;
}
```

```
console.log(`Factorial of ${number} is ${factorial}`);
```

While Loop Code:

javascript

Copy code

```
let number = 5; // You can change this number
```

```
let factorial = 1;
```

```
let i = 1;
```

```
while (i <= number) {
```

```
    factorial *= i;
```

```
    i++;
```

```
}
```

```
console.log(`Factorial of ${number} is ${factorial}`);
```

Output:

csharp

Copy code

Factorial of 5 is 120

Level-2 Questions

1. Print the numbers 0 - 20, one number per line.

Explanation: We will use a for loop to iterate from 0 to 20 and print each number on a new line.

For Loop Code:

javascript

Copy code

```
// Using For Loop
```

```
for (let i = 0; i <= 20; i++) {
```

```
    console.log(i);
```

```
}
```

Output:

Copy code

0

1

2

3

4

5

6

7

8

9

10
11
12
13
14
15
16
17
18
19
20

2. Print only the ODD values from 3 - 29, one number per line.

Explanation: We will iterate through the numbers from 3 to 29, checking if a number is odd and printing it.

For Loop Code:

```
javascript
Copy code
// Using For Loop
for (let i = 3; i <= 29; i++) {
  if (i % 2 !== 0) {
    console.log(i);
  }
}
```

Output:

```
Copy code
3
5
7
9
11
13
15
17
19
21
23
25
27
29
```

3. Print the EVEN numbers 12 down to -14 in descending order, one number per line.

Explanation: We'll start from 12 and decrement down to -14, checking if the number is even before printing it.

For Loop Code:

javascript

Copy code

```
// Using For Loop
for (let i = 12; i >= -14; i--) {
  if (i % 2 === 0) {
    console.log(i);
  }
}
```

Output:

diff

Copy code

```
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
```

4. Print the numbers 50 down to 20 in descending order, but only if the numbers are multiples of 3.

Explanation: We will start from 50 and decrement to 20, printing numbers that are multiples of 3.

For Loop Code:

javascript

Copy code

```
// Using For Loop
for (let i = 50; i >= 20; i--) {
  if (i % 3 === 0) {
    console.log(i);
  }
}
```

Output:

Copy code

```
48
45
42
39
36
```

33
30
27
24
21

5. Initialize two variables to hold the string 'LaunchCode' and the array [1, 5, 'LC101', 'blue', 42], then construct for loops to accomplish the following tasks:

- **Print each element of the array to a new line.**

Explanation: We will iterate through the array and print each element.

Code:

```
javascript
Copy code
const str = 'LaunchCode';
const arr = [1, 5, 'LC101', 'blue', 42];

// Print each element of the array
for (let i = 0; i < arr.length; i++) {
  console.log(arr[i]);
}
```

Output:

```
Copy code
1
5
LC101
blue
42
```

- **Print each character of the string---in reverse order---to a new line.**

Explanation: We will iterate through the string from the last character to the first.

Code:

```
javascript
Copy code
// Print each character of the string in reverse order
for (let i = str.length - 1; i >= 0; i--) {
  console.log(str[i]);
}
```

Output:

mathematica

Copy code

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6. Construct a for loop that sorts the array [2, 3, 13, 18, -5, 38, -10, 11, 0, 104] into two new arrays:

Explanation: We'll create two arrays, one for even numbers and one for odd numbers, and categorize each element accordingly.

Code:

javascript

Copy code

```
const numbers = [2, 3, 13, 18, -5, 38, -10, 11, 0, 104];
```

```
const evens = [];
```

```
const odds = [];
```

```
// Sort the numbers into evens and odds
```

```
for (let i = 0; i < numbers.length; i++) {
```

```
  if (numbers[i] % 2 === 0) {
```

```
    evens.push(numbers[i]);
```

```
  } else {
```

```
    odds.push(numbers[i]);
```

```
  }
```

```
}
```

```
// Print the arrays
```

```
console.log("Evens:", evens);
```

```
console.log("Odds:", odds);
```

Output:

makefile

Copy code

```
Evens: [ 2, 18, 38, -10, 0, 104 ]
```

```
Odds: [ 3, 13, -5, 11 ]
```

7. Define three variables for the shuttle: the starting fuel level, the number of astronauts aboard, and the altitude the shuttle reaches.

Explanation: We will use while loops to gather user input for the fuel level and the number of astronauts. Then we will monitor fuel levels and altitude.

Code:

javascript

Copy code

```
let fuelLevel;
let astronauts;
let altitude = 0;

// Prompt for starting fuel level
while (true) {
  fuelLevel = parseInt(prompt("Enter starting fuel level (between 5000 and 30000):"));
  if (fuelLevel > 5000 && fuelLevel < 30000) {
    break;
  }
}

// Prompt for number of astronauts
while (true) {
  astronauts = parseInt(prompt("Enter number of astronauts (1 to 7):"));
  if (astronauts >= 1 && astronauts <= 7) {
    break;
  }
}

// Monitor fuel status and altitude
while (fuelLevel >= 100) {
  fuelLevel -= 100 * astronauts;
  altitude += 50;
  console.log(`Current fuel level: ${fuelLevel}, Altitude: ${altitude} km`);
}
```

Output (example simulation):

yaml

Copy code

Enter starting fuel level (between 5000 and 30000): 15000

Enter number of astronauts (1 to 7): 5

Current fuel level: 149500, Altitude: 50 km

Current fuel level: 149400, Altitude: 100 km

...

(Note: The outputs will vary depending on the fuel level and astronaut input.)

This concludes the **Level-2** questions with explanations, code, and output. If you're ready, we can move on to the **Level-3** questions next! Let me know!

4o mini

You said:

now i need level-3 all Question u r not expaling each question with output i need explanation alsowhat u did like priviouse one code with output thank you do the same with this question level-3 Write a JS code to print a pattern using for loop /* 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5 1 2 3 4 5 6 1 2 3 4 5 6 7 1 2 3 4 5 6 7 8 */ write a js code to print Square Star Pattern . write a js code to print Hollow Square Pattern . write a js code to print Right Triangle Pattern in Javascript. write a js code to print left Triangle Pattern in Javascript. write a js code to print Downward Triangle Star Pattern write a js code to print Pyramid Pattern write a js code to print reverse Pyramid Pattern write a js code to print Diamond Pattern in Javascript

Level-3 Questions

1. Write a JS code to print a pattern using a for loop.

Pattern:

Copy code

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
1 2 3 4 5 6
1 2 3 4 5 6 7
1 2 3 4 5 6 7 8
```

Explanation: We will use nested loops. The outer loop will iterate over the rows, and the inner loop will print numbers from 1 to the current row number.

Code:

javascript

Copy code

```
// Print the pattern
for (let i = 1; i <= 8; i++) {
  let row = "";
  for (let j = 1; j <= i; j++) {
    row += j + ' ';
  }
  console.log(row.trim());
}
```

Output:

Copy code

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
1 2 3 4 5 6
1 2 3 4 5 6 7
1 2 3 4 5 6 7 8
```

2. Write a JS code to print Square Star Pattern.

Pattern:

markdown

Copy code

```
*****
*****
*****
*****
*****
```

Explanation: We'll use a nested loop where the outer loop represents rows and the inner loop prints stars for each row.

Code:

javascript

Copy code

```
const size = 5; // Size of the square
```

```
// Print square star pattern
```

```
for (let i = 0; i < size; i++) {
  let row = "";
  for (let j = 0; j < size; j++) {
    row += '*';
  }
  console.log(row);
}
```

Output:

markdown

Copy code

```
*****
*****
*****
*****
*****
```

3. Write a JS code to print Hollow Square Pattern.

Pattern:

markdown

Copy code

```
*****
*  *
*  *
```

```
* *  
*****
```

Explanation: In this pattern, the first and last rows are filled with stars, while the middle rows have stars at the start and end, with spaces in between.

Code:

```
javascript  
Copy code  
const size = 5; // Size of the hollow square  
  
// Print hollow square star pattern  
for (let i = 0; i < size; i++) {  
  let row = "";  
  for (let j = 0; j < size; j++) {  
    if (i === 0 || i === size - 1 || j === 0 || j === size - 1) {  
      row += '*';  
    } else {  
      row += ' ';  
    }  
  }  
  console.log(row);  
}
```

Output:

```
markdown  
Copy code  
*****  
* *  
* *  
* *  
*****
```

4. Write a JS code to print Right Triangle Pattern in JavaScript.

Pattern:

```
markdown  
Copy code  
*  
**  
***  
****  
*****
```

Explanation: The outer loop controls the number of rows, while the inner loop prints stars equal to the current row number.

Code:

javascript

Copy code

```
const height = 5; // Height of the triangle
```

```
// Print right triangle star pattern
```

```
for (let i = 1; i <= height; i++) {  
  let row = "";  
  for (let j = 1; j <= i; j++) {  
    row += '*';  
  }  
  console.log(row);  
}
```

Output:

markdown

Copy code

```
*  
**  
***  
****  
*****
```

5. Write a JS code to print Left Triangle Pattern in JavaScript.

Pattern:

markdown

Copy code

```
*****  
****  
***  
**  
*
```

Explanation: Here, we start from the maximum number of stars and decrease by one star for each subsequent row.

Code:

javascript

Copy code

```
const height = 5; // Height of the triangle
```

```
// Print left triangle star pattern
```

```
for (let i = height; i >= 1; i--) {  
  let row = "";  
  for (let j = 1; j <= i; j++) {  
    row += '*';  
  }  
  console.log(row);  
}
```

```
}
```

Output:

markdown

Copy code

```
*****
****
***
**
*
```

6. Write a JS code to print Downward Triangle Star Pattern.

Pattern:

markdown

Copy code

```
*****
*****
*****
*****
***
*
```

Explanation: This pattern starts from a certain number of stars and decreases by 2 stars each time.

Code:

javascript

Copy code

```
const height = 5; // Half the height
```

```
// Print downward triangle star pattern
for (let i = height * 2 - 1; i >= 1; i -= 2) {
  let row = "";
  for (let j = 1; j <= i; j++) {
    row += '*';
  }
  console.log(row);
}
```

Output:

markdown

Copy code

```
*****
*****
*****
****
***
```

*

7. Write a JS code to print Pyramid Pattern.

Pattern:

markdown

Copy code

```
*
***
*****
*****
*****
```

Explanation: The pyramid pattern requires spaces before the stars to center them properly. The number of spaces decreases while the number of stars increases.

Code:

javascript

Copy code

```
const height = 5; // Height of the pyramid

// Print pyramid star pattern
for (let i = 1; i <= height; i++) {
  let row = ''.repeat(height - i); // Adding spaces
  for (let j = 1; j <= (2 * i - 1); j++) { // Stars
    row += '*';
  }
  console.log(row);
}
```

Output:

markdown

Copy code

```
*
***
*****
*****
*****
```

8. Write a JS code to print reverse Pyramid Pattern.

Pattern:

markdown

Copy code

```
*****
*****
```



```
*****
***
*
```

Explanation: This pattern is similar to the pyramid but inverted. The stars decrease while the spaces increase.

Code:

```
javascript
Copy code
const height = 5; // Height of the pyramid

// Print reverse pyramid star pattern
for (let i = height; i >= 1; i--) {
  let row = ''.repeat(height - i); // Adding spaces
  for (let j = 1; j <= (2 * i - 1); j++) { // Stars
    row += '*';
  }
  console.log(row);
}
```

Output:

```
markdown
Copy code
*****
*****
*****
***
*
```

9. Write a JS code to print Diamond Pattern in JavaScript.

Pattern:

```
markdown
Copy code
*
***
*****
*****
*****
*****
***
*
```

Explanation: The diamond pattern consists of a pyramid followed by an inverted pyramid.

Code:

javascript

Copy code

```
const height = 5; // Half the height of the diamond
```

```
// Print diamond star pattern
```

```
for (let i = 1; i <= height; i++) {  
  let row = ''.repeat(height - i);  
  for (let j = 1; j <= (2 * i - 1); j++) {  
    row += '*';  
  }  
  console.log(row);  
}
```

```
for (let i = height - 1; i >= 1; i--) {  
  let row = ''.repeat(height - i);  
  for (let j = 1; j <= (2 * i - 1); j++) {  
    row += '*';  
  }  
  console.log(row);  
}
```

Output:

markdown

Copy code

```
*  
  
***  
  
*****  
  
*****  
  
*****  
  
*****  
  
*****  
  
***  
  
*
```

This concludes the **Level-3** questions with explanations, code, and output. If you need further assistance or have more questions, feel free to ask!

4o mini

You said:

now i need level-3 all Question u r not expaling each question with output i need explanation alsowhat u did like priviouse one code with output thank you do the same with this question level-2 level-2 Construct for loops that accomplish the following tasks: Print the numbers 0 - 20, one number per line. Print only the ODD values from 3 - 29, one number per line. Print the EVEN numbers 12 down to -14 in descending order, one number per line. Print the numbers 50 down to 20 in descending order, but only if the numbers are multiples of 3. Initialize two variables to hold the string 'LaunchCode' and the array [1, 5, 'LC101', 'blue', 42], then construct for loops to accomplish the following tasks: Print each element of the array to a new line. Print each character of the string---in reverse order---to a new line Construct a for loop that sorts the array [2, 3, 13, 18, -5, 38, -10, 11, 0, 104] into two new arrays: Define an empty evens array to hold the even numbers and an odds array for

the odd numbers. In the loop, determine if each number is even or odd, then put that number into evens or odds, as appropriate. Print the arrays to confirm the results. Print evens first. Example: `console.log(evens)`; Construct a for loop that sorts the array `[2, 3, 13, 18, -5, 38, -10, 11, 0, 104]` into two new arrays: Define an empty evens array to hold the even numbers and an odds array for the odd numbers. In the loop, determine if each number is even or odd, then put that number into evens or odds, as appropriate. Print the arrays to confirm the results. Print evens first. Example: `console.log(evens)`; Define three variables for the socialprachar for the starting fuel level, another for the number of astronauts aboard, and the third for the altitude the shuttle reaches. Construct while loops to do the following: Prompt the user to enter the starting fuel level. The loop should continue until the user enters a positive value greater than 5000 but less than 30000. Use a second loop to query the user for the number of astronauts (up to a maximum of 7). Validate the entry by having the loop continue until the user enters an integer from 1 - 7. Use a final loop to monitor the fuel status and the altitude of the shuttle. Each iteration, decrease the fuel level by 100 units for each astronaut aboard. Also, increase the altitude by 50 kilometers. (Hint: The loop should end when there is not enough fuel to boost the crew another 50 km, so the fuel level might not reach 0).

Level-2 Questions

1. Print the numbers 0 - 20, one number per line.

Explanation: We will use a for loop that starts from 0 and goes up to 20, printing each number.

Code:

```
javascript
Copy code
// Print numbers from 0 to 20
for (let i = 0; i <= 20; i++) {
  console.log(i);
}
```

Output:

Copy code

```
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
```

18
19
20

2. Print only the ODD values from 3 - 29, one number per line.

Explanation: This code uses a for loop that starts at 3 and goes up to 29, incrementing by 2 to get only odd numbers.

Code:

```
javascript  
Copy code  
// Print odd values from 3 to 29  
for (let i = 3; i <= 29; i += 2) {  
    console.log(i);  
}
```

Output:

```
Copy code  
3  
5  
7  
9  
11  
13  
15  
17  
19  
21  
23  
25  
27  
29
```

3. Print the EVEN numbers 12 down to -14 in descending order, one number per line.

Explanation: Here, we will use a for loop that starts from 12 and decrements by 2 until it reaches -14.

Code:

```
javascript  
Copy code  
// Print even numbers from 12 down to -14  
for (let i = 12; i >= -14; i -= 2) {  
    console.log(i);  
}
```

Output:

diff
Copy code
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14

4. Print the numbers 50 down to 20 in descending order, but only if the numbers are multiples of 3.

Explanation: We will iterate from 50 to 20, checking if each number is a multiple of 3 using the modulus operator.

Code:

```
javascript  
Copy code  
// Print multiples of 3 from 50 down to 20  
for (let i = 50; i >= 20; i--) {  
  if (i % 3 === 0) {  
    console.log(i);  
  }  
}
```

Output:

Copy code
48
45
42
39
36
33
30
27
24
21

5. Print each element of the array to a new line.

Variables:

javascript

Copy code

```
const launchCode = 'LaunchCode';  
const arr = [1, 5, 'LC101', 'blue', 42];
```

Explanation: This code uses a for loop to iterate through the array and print each element.

Code:

javascript

Copy code

```
// Print each element of the array  
for (let i = 0; i < arr.length; i++) {  
    console.log(arr[i]);  
}
```

Output:

Copy code

```
1  
5  
LC101  
blue  
42
```

6. Print each character of the string---in reverse order---to a new line.

Explanation: We'll iterate over the string in reverse using a for loop and print each character.

Code:

javascript

Copy code

```
// Print each character of the string in reverse order  
for (let i = launchCode.length - 1; i >= 0; i--) {  
    console.log(launchCode[i]);  
}
```

Output:

```
r  
Copy code  
e  
d  
o  
c  
n  
au  
L
```

7. Construct a for loop that sorts the array [2, 3, 13, 18, -5, 38, -10, 11, 0, 104] into two new arrays.

Explanation: This code initializes two empty arrays, evens and odds, then checks each number to see if it's even or odd.

Code:

```
javascript
Copy code
const numbers = [2, 3, 13, 18, -5, 38, -10, 11, 0, 104];
const evens = [];
const odds = [];

// Sort numbers into evens and odds
for (let i = 0; i < numbers.length; i++) {
  if (numbers[i] % 2 === 0) {
    evens.push(numbers[i]);
  } else {
    odds.push(numbers[i]);
  }
}

// Print the arrays
console.log("Evens:", evens);
console.log("Odds:", odds);
```

Output:

```
makefile
Copy code
Evens: [ 2, 18, 38, -10, 0, 104 ]
Odds: [ 3, 13, -5, 11 ]
```

8. Define three variables for the starting fuel level, number of astronauts, and altitude. Construct while loops to validate user input.

Explanation: We'll prompt the user for input and validate the conditions using while loops.

Code:

```
javascript
Copy code
let fuelLevel = 0;
let astronauts = 0;
let altitude = 0;

// Prompt for starting fuel level
while (fuelLevel <= 5000 || fuelLevel >= 30000) {
  fuelLevel = parseInt(prompt("Enter starting fuel level (between 5000 and 30000):"));
}
```

```
// Prompt for number of astronauts
while (astronauts < 1 || astronauts > 7) {
  astronauts = parseInt(prompt("Enter number of astronauts (1 - 7):"));
}

// Monitor fuel status and altitude
while (fuelLevel > 0) {
  fuelLevel -= astronauts * 100; // Decrease fuel level
  altitude += 50; // Increase altitude
  console.log(`Current fuel level: ${fuelLevel}, Current altitude: ${altitude} km`);

  if (fuelLevel < 100) break; // End if not enough fuel for next boost
}
```

Note: The above code uses prompt(), which is typically used in a browser environment.

This completes the **Level-2** questions with explanations, code, and output. If you have any more questions or need further assistance, feel free to ask!

4o mini

You said:

u r not expaling each question with output i need explanation alsowhat u did like priviouse one code with output thank you do the same with this question level-1 Use for loop & while-loop to iterate from 0 to 100 and print only even numbers Use for loop & while-loop to iterate from 0 to 100 and print only odd numbers Use for loop & while-loop to iterate from 0 to 100 and print only prime numbers Use for loop & while-loop to iterate from 0 to 100 and print the sum of all numbers. Use for loop & while-loop to iterate from 0 to 100 and print the sum of all evens and the sum of all odds Write a program that calculates the factorial of a given positive integer now i need level-1 all Question u r not expaling each question with output i need explanation alsowhat u did like priviouse one code with output thank you do the same with this question

ChatGPT said:

ChatGPT

Here are the solutions for each of the **Level-1** questions with detailed explanations, code examples, and expected outputs.

Level-1 Questions

1. Use a for loop & while-loop to iterate from 0 to 100 and print only even numbers.

Explanation: We will use both a for loop and a while loop to print even numbers between 0 and 100. An even number is defined as a number that is divisible by 2.

Using For Loop:

javascript

Copy code

```
console.log("Even numbers using for loop:");  
for (let i = 0; i <= 100; i++) {  
  if (i % 2 === 0) { // Check if the number is even  
    console.log(i);  
  }  
}
```

Output:

arduino

Copy code

Even numbers using for loop:

0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60
62
64
66
68
70
72
74

76
78
80
82
84
86
88
90
92
94
96
98
100

Using While Loop:

javascript

Copy code

```
console.log("Even numbers using while loop:");  
let j = 0;  
while (j <= 100) {  
  if (j % 2 === 0) { // Check if the number is even  
    console.log(j);  
  }  
  j++;  
}
```

Output:

arduino

Copy code

Even numbers using while loop:

0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38

40
42
44
46
48
50
52
54
56
58
60
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94
96
98
100

2. Use a for loop & while-loop to iterate from 0 to 100 and print only odd numbers.

Explanation: Similarly, we will iterate from 0 to 100 and print only odd numbers, which are numbers that are not divisible by 2.

Using For Loop:

```
javascript
Copy code
console.log("Odd numbers using for loop:");
for (let i = 0; i <= 100; i++) {
  if (i % 2 !== 0) { // Check if the number is odd
    console.log(i);
  }
}
```

Output:

arduino

Copy code

Odd numbers using for loop:

1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47
49
51
53
55
57
59
61
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99

Using While Loop:

javascript

Copy code

```
console.log("Odd numbers using while loop:");  
let k = 1;  
while (k <= 100) {  
  if (k % 2 !== 0) { // Check if the number is odd  
    console.log(k);  
  }  
  k++;  
}
```

Output:

arduino

Copy code

Odd numbers using while loop:

```
1  
3  
5  
7  
9  
11  
13  
15  
17  
19  
21  
23  
25  
27  
29  
31  
33  
35  
37  
39  
41  
43  
45  
47  
49  
51  
53  
55  
57  
59  
61  
63  
65  
67
```

69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99

3. Use a for loop & while-loop to iterate from 0 to 100 and print only prime numbers.

Explanation: A prime number is a natural number greater than 1 that cannot be formed by multiplying two smaller natural numbers. We will check each number from 2 to 100 to see if it is prime.

Using For Loop:

```
javascript
Copy code
console.log("Prime numbers using for loop:");
for (let num = 2; num <= 100; num++) {
  let isPrime = true; // Assume the number is prime
  for (let i = 2; i <= Math.sqrt(num); i++) { // Check for factors
    if (num % i === 0) {
      isPrime = false; // Not a prime number
      break;
    }
  }
  if (isPrime) {
    console.log(num);
  }
}
```

Output:

```
arduino
Copy code
Prime numbers using for loop:
2
3
5
7
11
13
```

17
19
23
29
31
37
41
43
47
53
59
61
67
71
73
79
83
89
97

Using While Loop:

javascript

Copy code

```
console.log("Prime numbers using while loop:");
let num = 2;
while (num <= 100) {
  let isPrime = true; // Assume the number is prime
  let i = 2;
  while (i <= Math.sqrt(num)) { // Check for factors
    if (num % i === 0) {
      isPrime = false; // Not a prime number
      break;
    }
    i++;
  }
  if (isPrime) {
    console.log(num);
  }
  num++;
}
```

Output:

arduino

Copy code

Prime numbers using while loop:

2
3
5
7
11

13
17
19
23
29
31
37
41
43
47
53
59
61
67
71
73
79
83
89
97

4. Use a for loop & while-loop to iterate from 0 to 100 and print the sum of all numbers.

Explanation: We'll accumulate the sum of all numbers from 0 to 100 using both loop types.

Using For Loop:

```
javascript
Copy code
let sumForLoop = 0;
for (let i = 0; i <= 100; i++) {
  sumForLoop += i; // Add the current number to the sum
}
console.log("Sum of all numbers using for loop:", sumForLoop);
```

Output:

```
arduino
Copy code
Sum of all numbers using for loop: 5050
```

Using While Loop:

```
javascript
Copy code
let sumWhileLoop = 0;
let j = 0;
while (j <= 100) {
  sumWhileLoop += j; // Add the current number to the sum
  j++;
}
```



```
console.log("Sum of all numbers using while loop:", sumWhileLoop);
```

Output:

arduino

Copy code

Sum of all numbers using while loop: 5050

5. Use a for loop & while-loop to iterate from 0 to 100 and print the sum of all evens and the sum of all odds.

Explanation: We will maintain two sums: one for even numbers and one for odd numbers, iterating from 0 to 100.

Using For Loop:

javascript

Copy code

```
let evenSumFor = 0;
let oddSumFor = 0;
for (let i = 0; i <= 100; i++) {
  if (i % 2 === 0) {
    evenSumFor += i; // Sum of even numbers
  } else {
    oddSumFor += i; // Sum of odd numbers
  }
}
console.log("Sum of evens using for loop:", evenSumFor);
console.log("Sum of odds using for loop:", oddSumFor);
```

Output:

arduino

Copy code

Sum of evens using for loop: 2550

Sum of odds using for loop: 2500

Using While Loop:

javascript

Copy code

```
let evenSumWhile = 0;
let oddSumWhile = 0;
let k = 0;
while (k <= 100) {
  if (k % 2 === 0) {
    evenSumWhile += k; // Sum of even numbers
  } else {
    oddSumWhile += k; // Sum of odd numbers
  }
  k++;
}
```

```
}  
console.log("Sum of evens using while loop:", evenSumWhile);  
console.log("Sum of odds using while loop:", oddSumWhile);
```

Output:

```
arduino  
Copy code  
Sum of evens using while loop: 2550  
Sum of odds using while loop: 2500
```

6. Write a program that calculates the factorial of a given positive integer.

Explanation: A factorial of a positive integer n is the product of all positive integers less than or equal to n . We can calculate it using a loop.

Using For Loop:

```
javascript  
Copy code  
function factorial(n) {  
    let result = 1;  
    for (let i = 1; i <= n; i++) {  
        result *= i; // Multiply the current number  
    }  
    return result;  
}  
  
const number = 5; // Change this to calculate factorial of any positive integer  
console.log(`Factorial of ${number} using for loop:`, factorial(number));
```

Output:

```
arduino  
Copy code  
Factorial of 5 using for loop: 120
```

Using While Loop:

```
javascript  
Copy code  
function factorialWhile(n) {  
    let result = 1;  
    let i = 1;  
    while (i <= n) {  
        result *= i; // Multiply the current number  
        i++;  
    }  
    return result;  
}
```

```
console.log(`Factorial of ${number} using while loop:`, factorialWhile(number));
```

Output:

arduino

Copy code

Factorial of 5 using while loop: 120

Feel free to change the values of number in the factorial examples to compute the factorial of any other positive integer! If you have any further questions or need additional explanations, let me know!

4o mini