

Conditional Statements and Looping in JavaScript

Module 5 - Introduction to For Loop in JavaScript



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Loops in JavaScript are used to execute a block of code repeatedly as long as a specified condition is true. They are essential for performing repetitive tasks like iterating over arrays, processing data, or automating sequences.



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There are times when we would want to perform a certain operation a certain number of times, like if we have a list of employees with their salaries and we have to calculate their income tax. Now the formula for getting the income tax is the same for all employees, so we can have a loop and execute the code statements with different inputs.



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Similarly, for a use case like printing the mathematical table of a number like 2, we can simply have a loop in place to keep on multiplying the number with 1, 2, 3, 4, and so on till 10, incrementing the multiplication factor every time.



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In JavaScript, there are various types of loops.

- for loop
- while loop
- do-while loop



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JavaScript FOR Loop



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If you want to execute statements for a specific number of times then you can use the JavaScript for loop, which lets you iterate the statements for a fixed number of times.



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The for loop consists of three statements to work:

- **initialization:** here, the loop counter is initialized with its initial value.
- **condition:** here, the condition statement is provided which is checked each time with respect to the value of the counter to continue the iteration.
- **iteration:** this statement lets you decide whether you want to increase or decrease the initial counter value also known as increment/decrement.



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JavaScript for Loop: Syntax

Following is the syntax for the for loop:



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```
for(initialization; condition; iteration)
{
    // statements
}
```

The idea here is to initialize a counter, set a condition until which the loop will run, and keep on incrementing or decrementing the counter so that after certain iteration the condition fails, and the loop exits. If the condition never fails, the loop will keep on executing infinitely.

Solved Example 1: For Loop with Iteration of 1

Ques: Create an HTML document that demonstrates the use of a for loop in JavaScript. Follow these requirements:

- Add a background color of #f0e68c (light khaki) to the webpage.
- Use a for loop to:
 - Initialize a variable a to 0.
 - Run the loop while a is less than 10.
 - Increment a by 1 on each iteration.
 - During each iteration, display the current value of a on the webpage using document.write() along with a line break (
).

Solution:

```
<!DOCTYPE html>
<html>
  <body bgcolor="#f0e68c">
    <script>
      // for loop example
      for(let a = 0; a < 10; a++) {
        document.write("Current value : " + a);
        document.write("<br />");
      }
    </script>
  </body>
</html>
```

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OUTPUT:

```
Current value : 0
Current value : 1
Current value : 2
Current value : 3
Current value : 4
Current value : 5
Current value : 6
Current value : 7
Current value : 8
Current value : 9
```

For Loop Output

Solved Example 2: For Loop with Iteration of 2

Ques: Create an HTML document that uses a for loop to print even numbers between 0 and 20 (inclusive). Follow these steps:

- Set the background color of the webpage to #add8e6 (light blue).
- Use a for loop where:
 - The variable starts at 0.
 - The loop continues as long as the variable is less than or equal to 20.
 - The variable increments by 2 in each iteration.
- Display each value on the webpage using document.write() along with a line break (
).

Solution:

```
<!DOCTYPE html>
<html>
  <body bgcolor="#add8e6">
    <script>
      // for loop with iteration of 2
      for(let i = 0; i <= 20; i += 2) {
        document.write("Current value: " + i);
        document.write("<br />");
      }
    </script>
  </body>
</html>
```

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OUTPUT:

```
Current value: 0
Current value: 2
Current value: 4
Current value: 6
Current value: 8
Current value: 10
Current value: 12
Current value: 14
Current value: 16
Current value: 18
Current value: 20
```

**For Loop Output
"Even Numbers"**

Solved Example 3: For Loop with Iteration of 2

Ques: Create an HTML document that uses a for loop to count down from 10 to 0 (inclusive) in reverse order. Follow these steps:

- Set the background color of the webpage to #ffb6c1 (light pink).
- Use a for loop where:
 - The variable starts at 10.
 - The loop continues as long as the variable is greater than or equal to 0.
 - The variable decrements by 1 in each iteration.
- Display each value on the webpage using document.write() along with a line break (
).

Solution:

```
<!DOCTYPE html>
<html>
  <body bgcolor="#ffb6c1">
    <script>
      // for loop with negative iteration
      for(let i = 10; i >= 0; i--) {
        document.write("Current value: " + i);
        document.write("<br />");
      }
    </script>
  </body>
</html>
```

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OUTPUT:

Exact Value using For Loop: 10
Exact Value using For Loop: 9
Exact Value using For Loop: 8
Exact Value using For Loop: 7
Exact Value using For Loop: 6
Exact Value using For Loop: 5
Exact Value using For Loop: 4
Exact Value using For Loop: 3
Exact Value using For Loop: 2
Exact Value using For Loop: 1
Exact Value using For Loop: 0

For Loop Output
"Decreasing Numbers"

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Assignment

Ques 1: Print Multiples of a Number

Write a JavaScript program using a for loop to print the first 10 multiples of a number.

Instructions:

- Use a for loop where the variable iterates from 1 to 10.
- Multiply each iteration number by 5 and display the result using document.write().
- Set the background color to #e0ffff (light cyan).

Ques 2: Countdown Timer

Write a JavaScript program to create a countdown timer from 20 to 1.

Instructions:

- Use a for loop where the variable starts at 20 and decrements by 1 until it reaches 1.
- Display each number on the webpage using document.write().
- Add a line break (
) after each number.

Ques 3: Display Numbers in Reverse Order

Write a JavaScript program to display numbers in reverse order from a user-defined starting number.

Instructions:

- Prompt the user to enter the starting number.
- Use a for loop to count down from the entered number to 1.

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- Display each number using document.write().
- If the user enters a negative number or leaves it empty, display an error message.

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Ques 4: Sum of First N Natural Numbers

Write a JavaScript program to calculate and display the sum of the first N natural numbers.

Instructions:

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- Prompt the user to enter a value for N.
- Use a for loop to calculate the sum of numbers from 1 to N.
- Display the final sum using document.write().
- If the user enters a non-numeric value or cancels the input, display an error message.

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