JavaScript Loop

JavaScript Loop with Examples

In this article, I am going to discuss **JavaScript Loop** with Examples. Please read our previous article where we discussed **JavaScript Conditional Statements** in Detail. At the end of this article, you will understand **what is JavaScript Loop** and **when and how to use Loop in JavaScript** with examples.

What is JavaScript Loop?

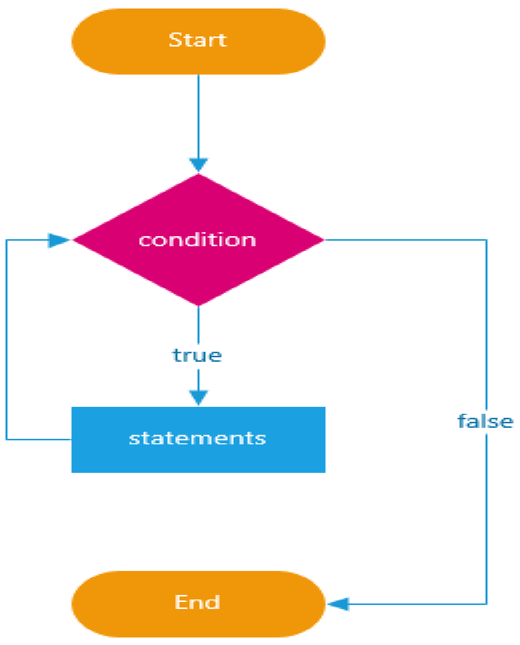
Loop is a JavaScript control statement which executes blocks of code repeatedly. **A code block or block of code is a code between {and}.** Types of loops in JavaScript are:

- while loop
- do-while loop
- for loop
- for…in loop

Nested loops – a composition of loops

While Loop in JavaScript

The **while** loop executes a block of code repeatedly i.e. it execute the code block until the given condition is true else the loop gets terminated.
We use a variable to check the condition. The variable meets the condition at the entrance of the **while** loop. If the variable does not meet the condition then the loop will not get executed not even for a single time. Due to this, it is possible that statements inside the **while** loop is never executed. The following flowchart describes the **while** loop statement.



Syntax of JavaScript While Loop:

```
while(condition){ block of code to be executed }
```

Example of While Loop in JavaScript:

In the below code, the value of the **counter** variable is initially **0**, the condition with the loop is **while** the counter variable is less than 10, the statement within the while block is going to be executed. Here, counter++ means counter=counter+1, so the counter will get incremented with 1 every time. As soon as the counter becomes 10 the loop gets terminated.

```
<script type="text/javascript"> var counter = 0; while (counter < 10) {

console.log('Number : ' + counter); counter++; } </script>
```

How does the while loop work in JavaScript?

The while loop in JavaScript works exactly in the same as the while loop works in other programming languages such as C, Java, C#, etc. as follows:

1. The While loop first check the condition
2. If the given condition is true, then the statement block within the while loop are executed
3. This process is going to be repeated as long as the condition evaluates to true.
4. Once the condition false, then loop terminates.
5.

What is infinite loops?

If you forgot to update the variable which is evaluates in the condition, then it will create a never ending loop which is also called as an infinite loop. For example, if you notice in the below code, we have commented the line which updates the counter variable. As a result of this, the counter variable is always ZERO and the condition in the while loop is always going to be true. In other words, we can say that, the condition will never become false, and we have an infinite while loop.

```
<script type="text/javascript"> var counter = 0; while (counter < 10) {

console.log('Number : ' + counter); //counter++; } </script>
```

How to solve the problem?

We can solve the problem by using break statement within the while loop in JavaScript.

The break statement in JavaScript

As we have seen in the earlier chapter of JavaScript Condition for switch statements where the **break** statement is used. There it was used to “come out” of the switch statements. The **break** statement can also be used in the loop to “comes out” of the loop by exiting the inner-most loop where it is declared.
As the name suggests the **break** statement is used in JavaScript to break or terminate the loop in between and continues executing the code placed after the loop if there is any.

Example to understand JavaScript break statement:

Let us understand the use of break statement in a while loop with an example. Now we want the while loop to terminate or break when the counter variable becomes 5. If you notice in the below code, we use a if statement to check the counter variable and when the counter variable becomes 5, the if condition becomes true and this will execute the break statement, which will terminate the execution of the while loop.

```
<script type="text/javascript">
var counter = 0;
while (counter < 10) {
if (counter == 5)
break;//break loop only if counter==5
console.log('Number : ' + counter);
counter++;
}
</script>
```

Output:

```
Number:0
Number:1
Number:2
Number:3
Number: 4
```

The Continue Statement in JavaScript

The **continue** statements will break the current loop where it is defined and continues with the next iteration in the loop. In others words we can say that, the continue statement tells the JavaScript interpreter to skip remaining code that is present after this statement and start the next iteration of the loop.

Example to understand the JavaScript Continue Statement:

Let us understand the use of JavaScript Continue statement with an example. The following example prints all the numbers between 1 and 10 except 5. In this case, when the counter variable becomes 5, the if condition becomes true, which cause the continue statement to execute.

```
<script type="text/javascript">
var counter = 0;
while (counter < 10) {
counter++;
if (counter == 5)
continue;//skip the code in loop only if counter==5
console.log('Number : ' + counter);
}</script>
```

Output:
Number:1
Number:2
Number:3
Number:4
Number:6
Number:7
Number:8
Number:9
Number: 10

The Label Statement in JavaScript:

In JavaScript, we can label a statement for using it later. The label can be any valid identifier.

Syntax: label: statement;
We can reference the label by using the **break** or **continue** statement. Typically, we use the label with a nested loop such as for, do-while, and while loop.
Example to understand the JavaScript label statement:

```
outer: for (let i = 0; i <= 5; i++) {
console.log(i);
}
```

Above example labels the loop using the **outer** label.

Using label with break and continue statement

Syntax:
break
labelname;
continue labelname;

Using JavaScript break with label

Example:

```
<script type="text/javascript">
var counter = 0;
check: while (counter < 10) {
if (counter == 5)
break check;//break loop only if counter==5
console.log('Number : ' + counter);
counter++;
}
</script>
```

Using JavaScript continue with label

Example:

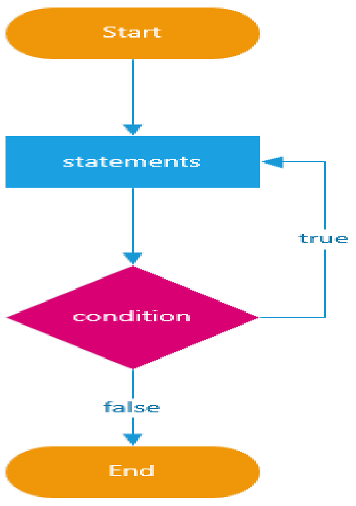
```
<script type="text/javascript">
var counter = 0;
skiptest: while (counter < 10) {
if (counter == 5)
continue skiptest;//skip the code in loop only if counter==5
console.log('Number : ' + counter);
counter++;
}
</script>
```

Do-while Loop in JavaScript

The **do-while** loop executes the block of code repeatedly i.e. in a loop until the given condition is found true else the loop gets terminated.

The difference between **do while** and **while** loop is that even the condition is found false, the do while loop executes the block of code **ONCE**, and then it will repeat the loop until the specified condition is true. Whereas **while** loop gets terminated at the initial stage if the condition is false. The reason for this is, while loop checks the condition at the beginning, where as do…while… loop checks the condition at the end of the loop

Note: If we want to execute the statement or code at least once and check the condition after each iteration, then you should use the **do-while** loop.
The following flowchart describes the **do-while** loop statement:

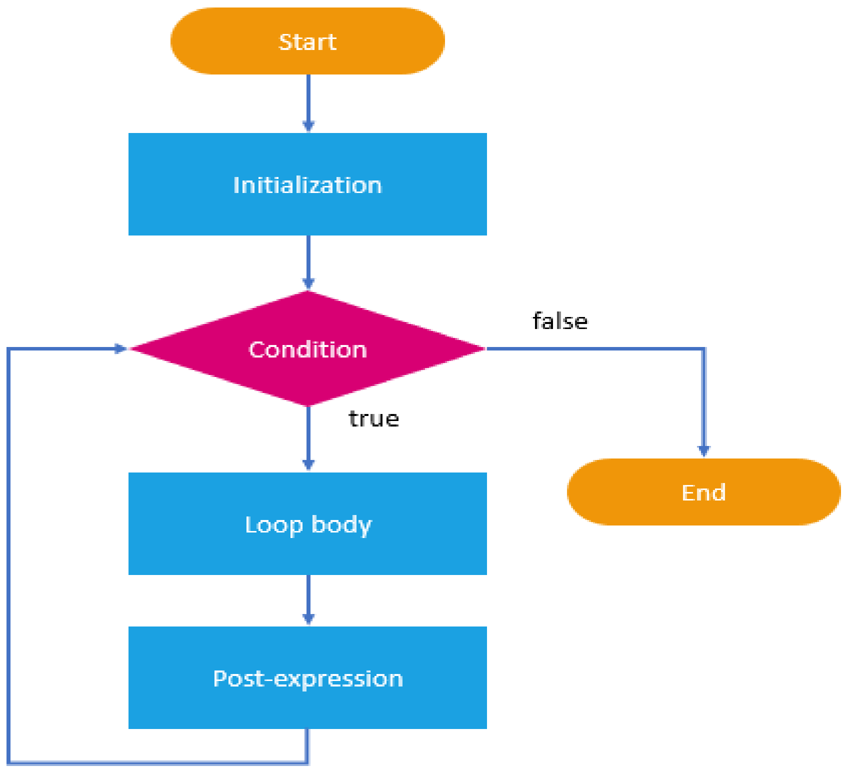


Syntax:
Example:

```
<script type="text/javascript">
var i = 0;
do {
document.write(i + " ");
i++; // incrementing i by 1
} while (i < 5);
</script>
```

JavaScript for Loop

The **for** loop repeats the elements for the fixed number of times. It is used when we already know how many times the script should run. The following flowchart describes the **for** loop:



Syntax:

```
for (initialization; condition; increment/decrement) {
// block of code to be executed--body
}
```

This loop contains the initial value, condition, increment/decrement value in a single line, which in on other looping are used in a separate line, the scope of a for loop is inside the curly brackets used with it.
Initialization: The **initialization** expression initializes the loop. It is executed once, just before the execution of the block of code

Condition: The **condition** is an expression that is checked before each iteration of the loop (based on loop condition)

Increment/decrement: The **increment/decrement** segments are executed every time after the block of code has been executed, till the condition remains true.

Body: The code that will be executed at each iteration
Example:

```
<script type="text/javascript">
for (var number = 0; number < 10; number++) {
console.log(number);
}
</script>
```

Complex for Loop

Complex for loop may have several counter variables
Example:

```
<script type="text/javascript">
for (var i = 1, sum = 1; i <= 128; i = i * 2, sum += i) {
console.log('i = ' + i + ', sum = ' + sum);
}
</script>
```

Output:

```
i = 1, sum = 1
i = 2, sum = 3
i = 4, sum = 7
i = 8, sum = 15
…
```

for…in Loop in JavaScript

The JavaScript **for…in** Loop statement iterates the properties of an object. This loop is used with arrays and objects, to access their elements and properties respectively.

- For arrays / strings iterates over their indexes (**0**…**length-1**)
- For any other object, for-in iterates over its properties

In for..in looping the variable value starts from zero and increases itself with one until it reach to the length of array.

Syntax:

```
for (variablename in object) {
statement or block to execute
}
```

Iterating over the elements of an array / string

Example:

```
<script type="text/javascript">
var arr = [10, 20, 30, 40, 50];
for (var index in arr) { console.log(arr[index]) }// 10, 20, 30, 40, 50
var str = "welcome";
for (var index in str) { console.log(str[index]) }// w, e, l, c, o, m, e
</script>
```

Iterating over the properties of an object:

Example:

```
<script type="text/javascript">
var obj = { name: 'Steve', age: 23, location: 'Sofia' };
for (var key in obj) { console.log(obj[key]); }// Steve, 23 , Sofia
</script>
```

Nested Loop

Nested loop is a loop inside another loop

Syntax:

```
for (initialization; condition; increment/decrement) {
for (initialization; condition; increment/decrement) {
statements;
}
...
}
```

JavaScript Conditional Statements

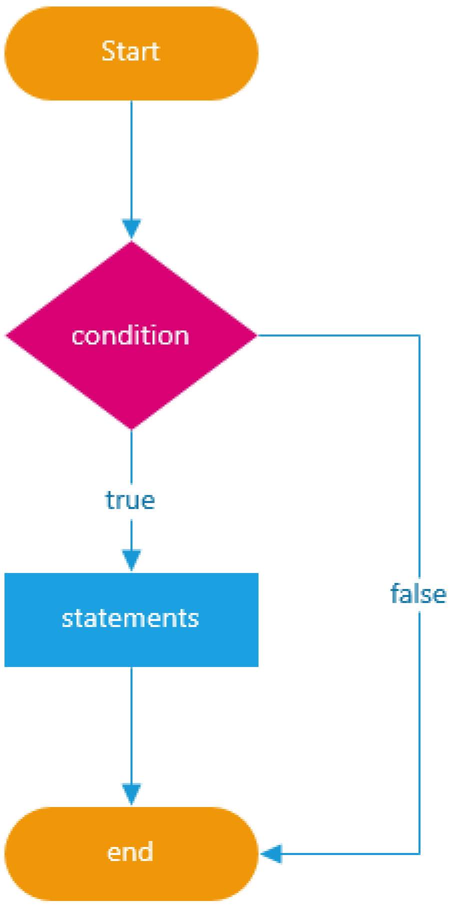
What are JavaScript Conditional Statements?

Condition is test for something. It's a very important for programming in a several ways. The Condition is all about making decision. Conditional statements are used to execute the code based on different conditions. If a condition is true, we can perform one action and if the condition is false, we can perform another action.
Conditional statements in JavaScript are:

- if statement
- if…else statement
- if…else if statement
- switch statement

if statement in JavaScript

Use if statement, if we want to execute a set of code in case the given condition is true. The following flowchart describes the **if statement**.



Syntax to use if statement in javaScript:

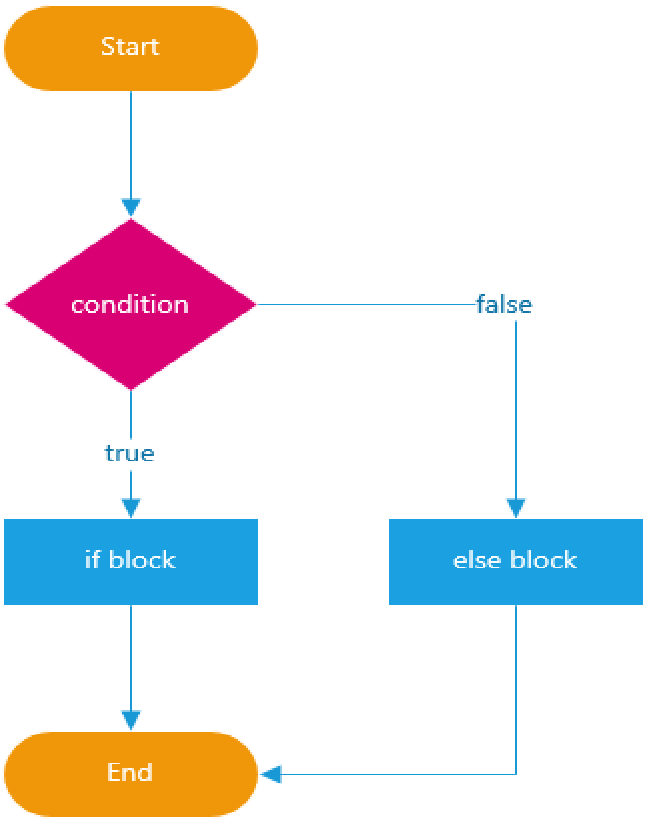
Following is the syntax to use the if conditional statement in JavaScript.

```
if(condition)
{
code to be executed if condition is true
}
```

If Statement Example in JavaScript:

if…else statement in JavaScript

Use if…else statement, if we want to execute a set of code in case the given condition is true and other code in case of given condition is false. The following flowchart describes the **if else statement**.



Syntax:

```
if(condition)
{
code to be executed if condition is true
}
else
{
code to be executed if condition is false
}
```

Example:

```
<script type="text/javascript">
var a, b;
a = 60
b = 30
document.write("<br>Value of a " + a);
document.write("<br>Value of b " + b);
if (a > b) {
document.write("<br>value of a is greater than b");
}
else {
document.write("<br>value of a is less than b");
}
</script>
```

Note: Always use {… } even if there is only one statement to be executed, this makes code look good, easier to read and avoid any ambiguity

if…else if statement

Use this if we want to execute a bunch of codes.

Syntax:

```
if(condition1)
{
code to be executed if condition1 is true
}
else if(condition2)
{
code to be executed if condition1 is false and condition2 one is true
}
else
{
code to be executed if both condition1 and condition2 is false
}
```

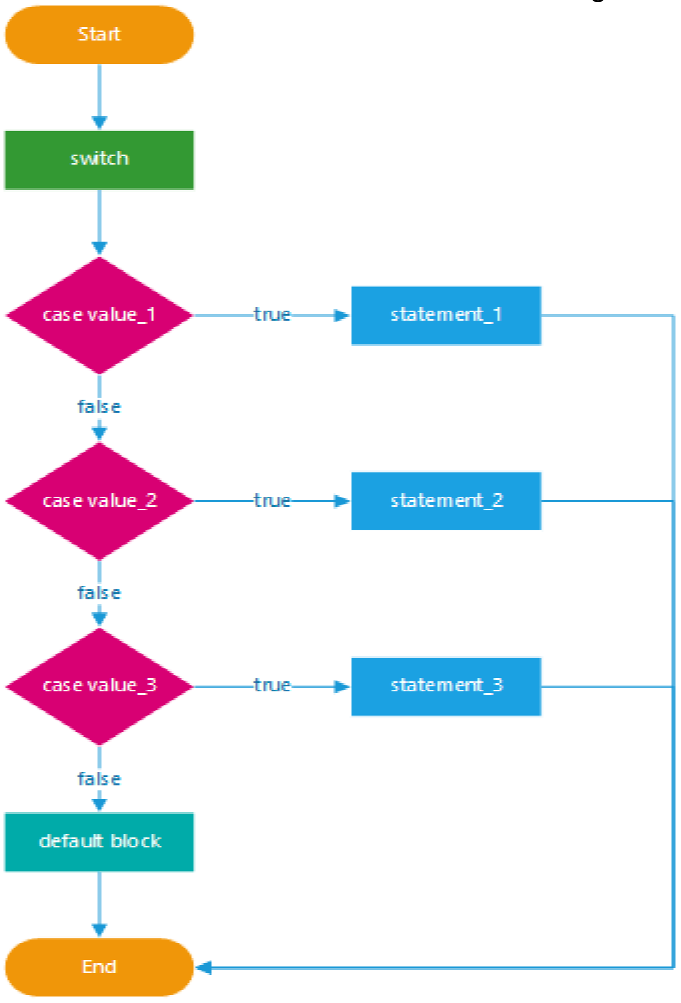
Example:

```
<script type="text/javascript">
var a, b;
a = 60
b = 30
```

```
document.write("<br>Value of a " + a);
document.write("<br>Value of b " + b);
if (a > b) {
document.write("<br>value of a is greater than b");
}
else if (a < b) {
document.write("<br>value of a is less than b");
}
else {
document.write("<br>value of a is equal to b");
}
</script>
```

Switch statement in JavaScript

Use this, if we want to execute bunch of codes for different condition. The switch statement is similar to if…else statement. The following flowchart describes the **switch statement**.



Syntax:

```
switch(expression)
{
case 1 :
code to be executed
break
case 2 :
code to be executed
break
case 3 :
code to be executed
break
default :
code to be executed if none of the above given cases are true
}
```

How switch-case works?

1. The expression is evaluated
2. When one of the constants specified in a case label is equal to the expression
    - The statement that corresponds to that case is executed
3. If no case is equal to the expression
    - If there is default case, it is executed
    - Otherwise the control is transferred to the end point of the switch statement
4. The break statement exits the switch-case statement

Example:

```
<script type="text/javascript">
var day;
weekday = parseInt(prompt("Enter Weekday", ""))
switch (weekday) {
case 1:
day = "Sunday";
break
case 2:
day = "Monday";
break
case 3:
day = "Tuesday";
break
case 4:
day = "Wednesday";
break
case 5:
day = "Thursday";
break
case 6:
day = "Friday";
break
case 7:
day = "Saturday";
break
default:
day = "Invalid weekday";
}
</script>
```

Rules of varibles

In programming, variables are symbolic names that represent some value or data stored in the computer's memory. Here are some general rules regarding variables in most programming languages:

1. **Naming Convention**:
    - Variable names should start with a letter (a-z, A-Z) or an underscore (_).
    - After the first character, variable names can also contain numbers (0-9).
    - Variable names cannot contain spaces or special characters like !, @, #, $, %, etc. except for underscore (_).
2. **Case Sensitivity**:
    - Most programming languages are case-sensitive, meaning `variable`, `Variable`, and `VARIABLE` would be considered three different variables.
3. **Reserved Words**:
    - You can't use reserved words (keywords) of the programming language as variable names. For example, in Python, you can't use `if`, `else`, `for`, `while`, etc., as variable names.
4. **Length Limitation**:

- There may be a limit on the length of variable names in some programming languages. It varies from language to language.

5. **Meaningful Names**:
    - It's good practice to choose variable names that are descriptive and meaningful. This makes your code easier to understand and maintain.
6. **Type Declaration**:
    - Some languages require you to declare the type of the variable before using it (e.g., int, float, string). Others, like Python, infer the type based on the assigned value.
7. **Scope**:
    - Variables have a scope, which defines where in the code they can be accessed. Variables declared within a function may not be accessible outside of it, for instance.
8. **Initialization**:
    - It's often necessary to initialize a variable (assign an initial value) before using it. Using a variable without initializing it can lead to unexpected behavior.
9. **Data Type Compatibility**:
    - You need to ensure that the data type of the variable matches the type of data it's supposed to hold. Mixing incompatible data types can result in errors or unexpected behavior.
10. **Lifetime**:
    - Variables have a lifetime, which is the duration for which they exist in memory. Local variables typically exist only within the scope they are declared, while global variables may persist throughout the program's execution.