

# Beginners Book: Java Basics

## Lesson 9: for Loop In Java

### **for Loop:**

A for loop is a control flow statement that iterates a part of the programs multiple times.

There are four steps to a for loop:

In the first step initialization happens first and only one time, which means that the initialization part of the for loop only executes once.

In the second step the condition in for loop is evaluated on each iteration, if the condition is true then the statements inside for loop body gets executed. Once the condition returns false, the statements in for loop does not execute and the control gets transferred to the next statement in the program after for loop.

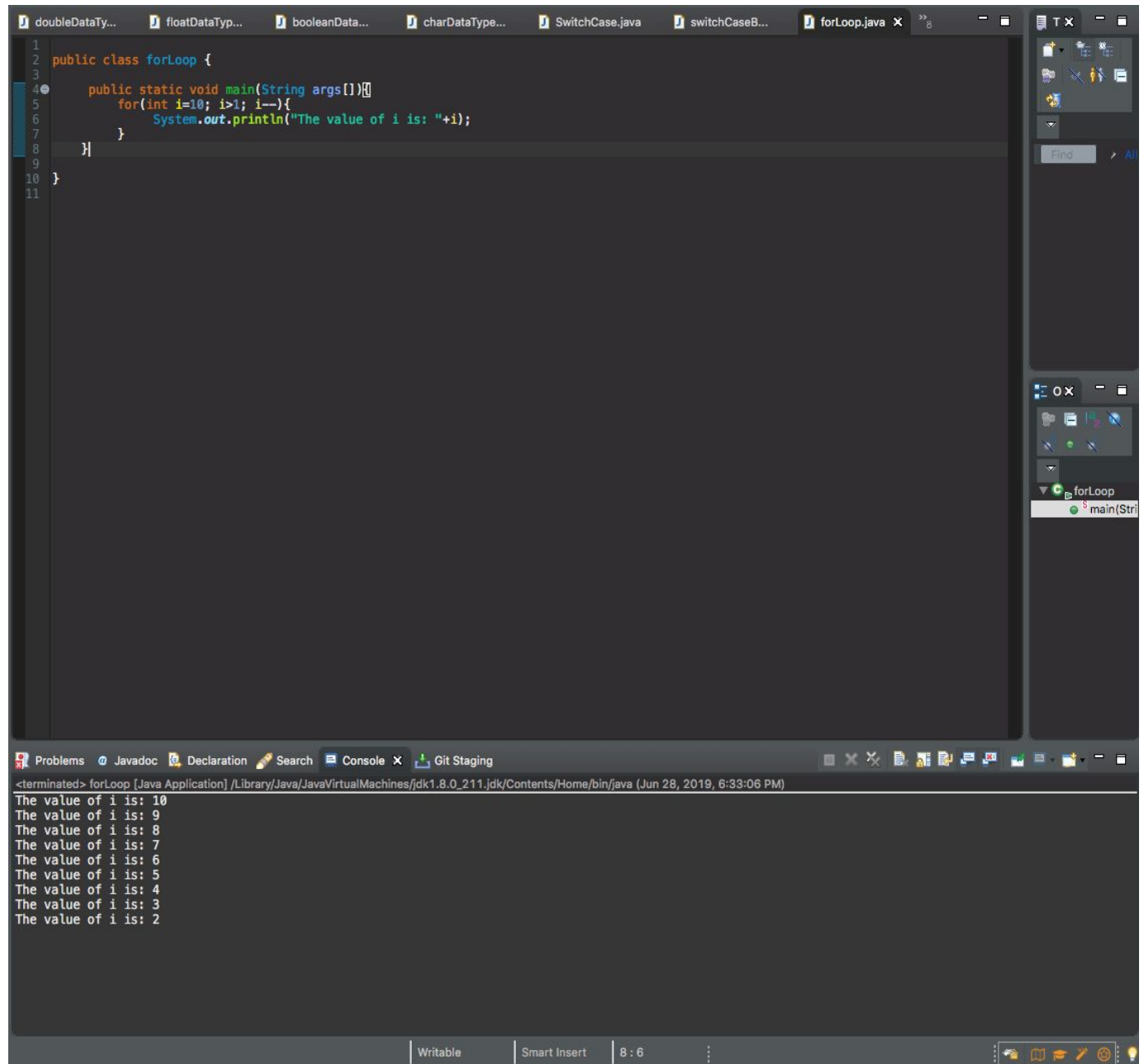
In the third step, after every execution of for loop's body, the increment/decrement part of for loop executes that updates the loop counter.

In the fourth step the control jumps to the second step and condition is re-evaluated.

### **for Loop Syntax:**

```
for(initialization; condition ; increment/decrement)  
{  
    statement(s);  
}
```

## Example:



The screenshot shows an IDE with a Java file named `forLoop.java`. The code defines a public class `forLoop` with a `main` method. Inside the `main` method, a `for` loop iterates from `i=10` down to `i=2`, printing the value of `i` in each iteration. The console output shows the values 10, 9, 8, 7, 6, 5, 4, 3, and 2, each preceded by the text "The value of i is: ". The IDE interface includes a top toolbar, a right sidebar with a "Find" search bar, and a bottom toolbar with icons for "Writable", "Smart Insert", and a status bar showing "8 : 6".

```
1 public class forLoop {  
2  
3     public static void main(String args[]) {  
4         for(int i=10; i>1; i--){  
5             System.out.println("The value of i is: "+i);  
6         }  
7     }  
8 }  
9  
10  
11 }
```

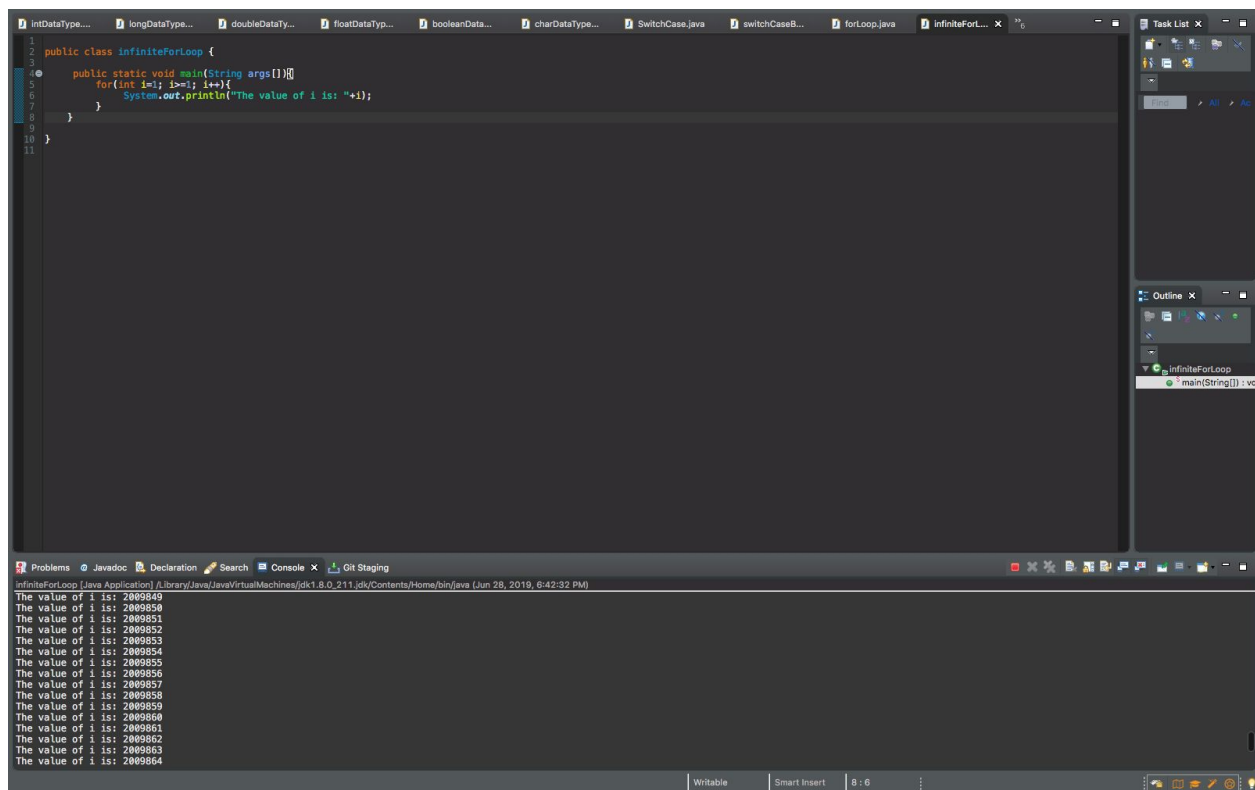
Problems Javadoc Declaration Search Console x Git Staging  
<terminated> forLoop [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0\_211.jdk/Contents/Home/bin/java (Jun 28, 2019, 6:33:06 PM)  
The value of i is: 10  
The value of i is: 9  
The value of i is: 8  
The value of i is: 7  
The value of i is: 6  
The value of i is: 5  
The value of i is: 4  
The value of i is: 3  
The value of i is: 2  
Writable Smart Insert 8 : 6

## Infinite for Loop:

In an infinite for loop the condition would never return false. The initialization step is setting up the value of variable *i* to 1, since we are incrementing the value of *i*, it would always be greater than 1 (the Boolean expression: *i*>1) so it would never return false. This would eventually lead to the infinite loop condition. Thus it is important to see the coordination between Boolean expression and increment/decrement operation to determine whether the loop would terminate at some point of time or not.

In the first step initialization happens first and only one time, which means that the initialization part of the for loop only executes once.

## Example:



```
1 public class InfiniteForLoop {
2
3
4     public static void main(String args[]) {
5         for(int i=1; i>1; i++){
6             System.out.println("The value of i is: "+i);
7         }
8     }
9 }
10
11
```

The console output shows the following sequence of values for *i*:

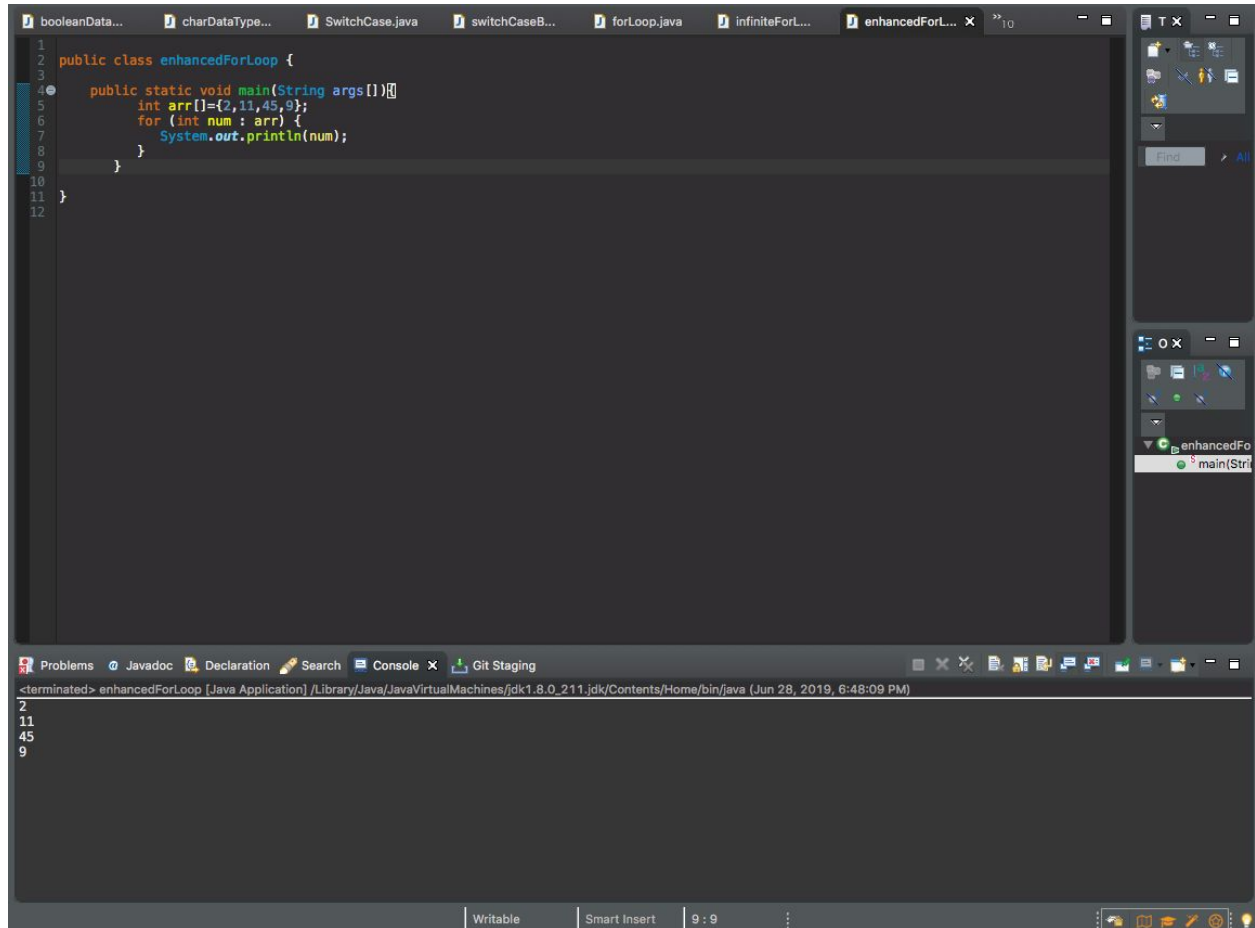
```
The value of i is: 2809849
The value of i is: 2809850
The value of i is: 2809851
The value of i is: 2809852
The value of i is: 2809853
The value of i is: 2809854
The value of i is: 2809855
The value of i is: 2809856
The value of i is: 2809857
The value of i is: 2809858
The value of i is: 2809859
The value of i is: 2809860
The value of i is: 2809861
The value of i is: 2809862
The value of i is: 2809863
The value of i is: 2809864
```

**\*\***The program continues to print the value of the variable *i* because the condition will never return the boolean value false.

## Enhanced for Loop:

An enhanced for loop is useful when you want to iterate Array/Collections, it is easy to write and understand.

## Example:



The screenshot shows an IDE with a Java file named `enhancedForLoop.java`. The code defines a public class `enhancedForLoop` with a `main` method. Inside `main`, an integer array `arr` is initialized with values `{2, 11, 45, 9}`. An enhanced for loop `for (int num : arr)` is used to iterate over each element of the array, and `System.out.println(num);` is called for each iteration. The IDE's console at the bottom shows the output of the program: `2`, `11`, `45`, and `9` on separate lines. The status bar at the bottom indicates the file is writable and the cursor is at line 9, column 9.

```
1 public class enhancedForLoop {
2
3
4     public static void main(String args[]) {
5         int arr[]={2,11,45,9};
6         for (int num : arr) {
7             System.out.println(num);
8         }
9     }
10
11
12 }
```

Problems Javadoc Declaration Search Console x Git Staging  
<terminated> enhancedForLoop [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0\_211.jdk/Contents/Home/bin/java (Jun 28, 2019, 6:48:09 PM)  
2  
11  
45  
9

Writable Smart Insert 9 : 9