

## Day 3

### Java Flow Control Part 2 (1)

#### Java for Loop

In computer programming, loops are used to repeat a block of code. For example, if you want to show a message 100 times, then rather than typing the same code 100 times, you can use a loop.

In Java, there are three types of loops.

1. for loop
2. while loop
3. do...while loop

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Slide 74 of 408

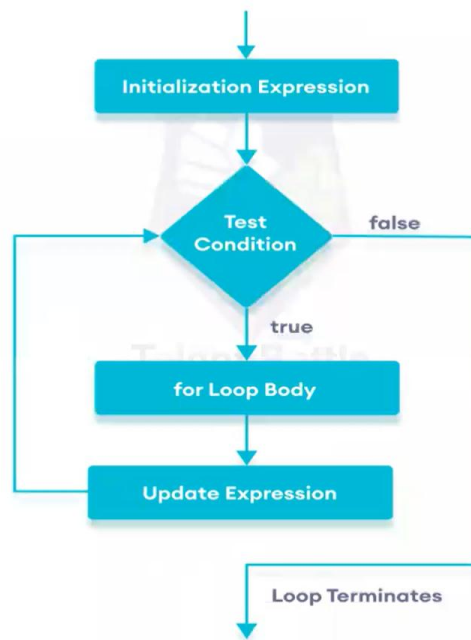
#### Java for Loop

Java for loop is used to run a block of code for a certain number of times.  
The syntax of for loop is:

```
for (initialExpression; testExpression; updateExpression) {  
    // body of the loop  
}
```

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Slide 75 of 408



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Slide 76 of 408

## Java for-each Loop

The Java for loop has an alternative syntax that makes it easy to iterate through arrays and collections. For example,

// print array elements

```
class Main {  
    public static void main(String[] args) {  
        // create an array  
        int[] numbers = {3, 7, 5, -5};  
        // iterating through the array  
        for (int number: numbers) {  
            System.out.println(number);  
        }  
    }  
}
```

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Slide 79 of 408

## for-each Loop Syntax

The syntax of the Java for-each loop is:

```
for(dataType item : array) {  
    ...  
}
```

Here,

array - an array or a collection

item - each item of array/collection is assigned to this variable

dataType - the data type of the array/collection

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## for loop Vs for-each loop

```
class Main {  
    public static void main(String[] args) {  
  
        char[] vowels = {'a', 'e', 'i', 'o', 'u'};  
  
        // iterating through an array using a  
        for loop  
        for (int i = 0; i < vowels.length; ++ i) {  
            System.out.println(vowels[i]);  
        }  
    }  
}
```

```
class Main {  
    public static void main(String[] args) {  
  
        char[] vowels = {'a', 'e', 'i', 'o', 'u'};  
  
        // iterating through an array using the for-  
        each loop  
        for (char item: vowels) {  
            System.out.println(item);  
        }  
    }  
}
```

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Slide 82 of 408

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## Java while and do...while Loop

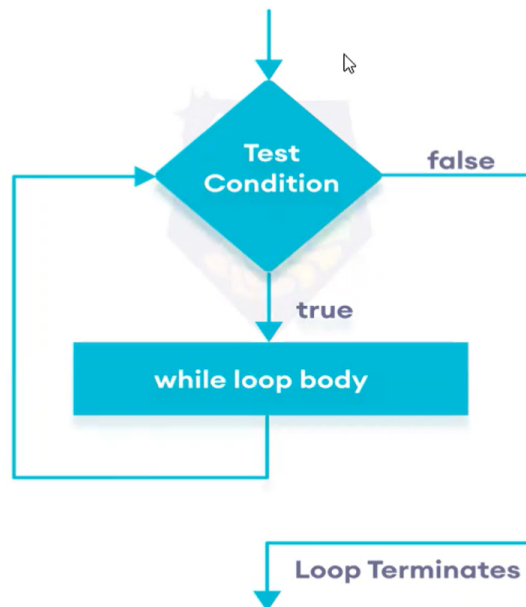
### Java while loop

Java while loop is used to run a specific code until a certain condition is met.  
The syntax of the while loop is:

```
while (testExpression) {  
    // body of loop  
}
```

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Slide 83 of 408



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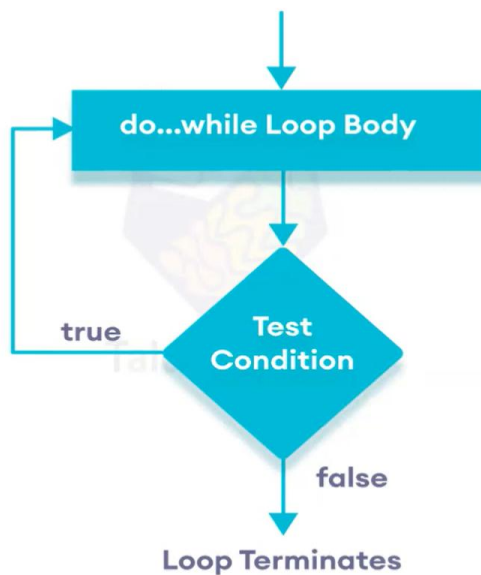
Slide 84 of 408

## Java do...while loop

The do...while loop is similar to while loop. However, the body of do...while loop is executed once before the test expression is checked. For example,

```
do {  
    // body of loop  
} while(textExpression)
```

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## for and while loops

The for loop is used when the number of iterations is known. For example,

```
for (let i = 1; i <=5; ++i) {  
    // body of loop  
}
```

And while and do...while loops are generally used when the number of iterations is unknown. For example,

```
while (condition) {  
    // body of loop  
}
```

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Slide 90 of 408

## Java break Statement

While working with loops, it is sometimes desirable to skip some statements inside the loop or terminate the loop immediately without checking the test expression.

In such cases, **break** and **continue** statements are used.

The **break** statement in Java terminates the loop immediately, and the control of the program moves to the next statement following the loop.

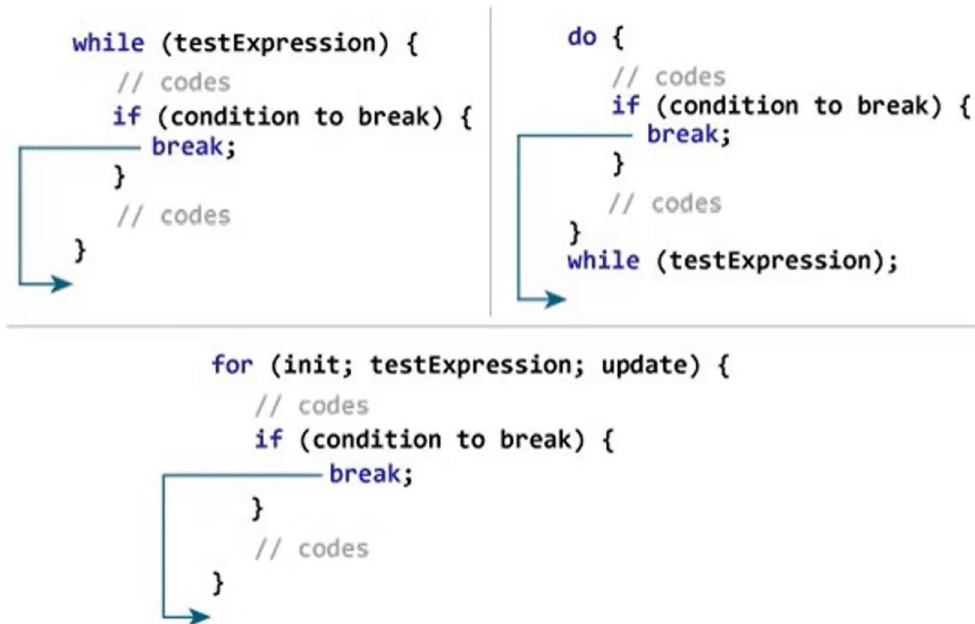
It is almost always used with decision-making statements (Java if...else Statement).

Here is the syntax of the break statement in Java:

```
break;
```

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Slide 91 of 408



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Slide 92 of 408

```
while (testExpression) {
    // codes
    second:
    while (testExpression) {
        // codes
        while(testExpression) {
            // codes
            break second;
        }
    }
    // control jumps here
}
```

In the above example, when the statement `break second;` is executed, the while loop labeled as `second` is terminated. And, the control of the program moves to the statement after the `second` while loop.

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Slide 95 of 408



```
class LabeledBreak {  
    public static void main(String[] args) {  
        // the for loop is labeled as first  
        first:  
        for( int i = 1; i < 5; i++) {  
            // the for loop is labeled as second  
            second:  
            for(int j = 1; j < 3; j ++ ) {  
                System.out.println("i = " + i + "; j = " + j);  
  
                // the break statement breaks the first for loop  
                if ( i == 2)  
                    break first;  
            }  
        }  
    }  
}
```

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Slide 96 of 408

## Java continue Statement

The **continue** statement skips the current iteration of a loop (for, while, do...while, etc).

After the continue statement, the program moves to the end of the loop. And, test expression is evaluated (update statement is evaluated in case of the for loop).

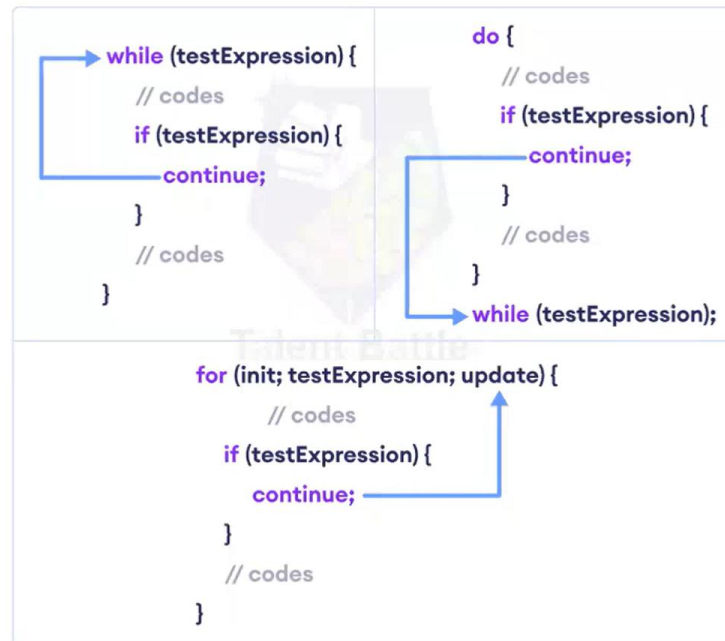
Here's the syntax of the continue statement.

```
continue;
```

Note: The continue statement is almost always used in decision-making statements (if...else Statement).

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Slide 98 of 408

## Labeled continue Statement

Till now, we have used the unlabeled continue statement. However, there is another form of continue statement in Java known as labeled continue.

It includes the label of the loop along with the continue keyword. For example,  
`continue label;`

Here, the continue statement skips the current iteration of the loop specified by label.

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```

label:
while (testExpression) {
    // codes
    while (testExpression) {
        // codes
        if (testExpression) {
            continue label;
        }
        // codes
    }
    // codes
}

```



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```

class Main {
    public static void main(String[] args) {

        // outer loop is labeled as first
        first:
        for (int i = 1; i < 6; ++i) {

            // inner loop
            for (int j = 1; j < 5; ++j) {
                if (i == 3 || j == 2)

                    // skips the current iteration of outer loop
                    continue first;
                System.out.println("i = " + i + "; j = " + j);
            }
        }
    }
}

```

Note: The use of labeled continue is often discouraged as it makes your code hard to understand. If you are in a situation where you have to use labeled continue, refactor your code and try to solve it in a different way to make it more readable.

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1. Java Program to Check Leap Year
2. Java Program to Check Whether a Number is Positive or Negative
3. Java Program to Check Whether a Character is Alphabet or Not
4. Java Program to Calculate the Sum of Natural Numbers
5. Java Program to Find Factorial of a Number
6. Java Program to Generate Multiplication Table
7. Java Program to Display Fibonacci Series
8. Java Program to Find GCD of two Numbers
9. Java Program to Find LCM of two Numbers
10. Java Program to Display Alphabets (A to Z) using loop
11. Java Program to Count Number of Digits in an Integer
12. Java Program to Reverse a Number
13. Java Program to Calculate the Power of a Number
14. Java Program to Check Palindrome
15. Java Program to Check Whether a Number is Prime or Not
16. Java Program to Display Prime Numbers Between Two Intervals
17. Java Program to Check Armstrong Number
18. Java Program to Display Armstrong Number Between Two Intervals
19. Java Program to Display Factors of a Number
20. Java Program to Make a Simple Calculator Using switch...case
21. Java Program to Count the Number of Vowels and Consonants in a Sentence
22. Java Program to Sort Elements in Lexicographical Order (Dictionary Order)
23. Java Code To Create Pyramid and Pattern

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