# Lambda Expressions in Java 8

Difficulty Level : Medium  Last Updated : 13 Aug, 2018

Lambda expressions basically express instances of functional interfaces (An interface with single abstract method is called functional interface. An example is java.lang.Runnable). lambda expressions implement the only abstract function and therefore implement functional interfaces

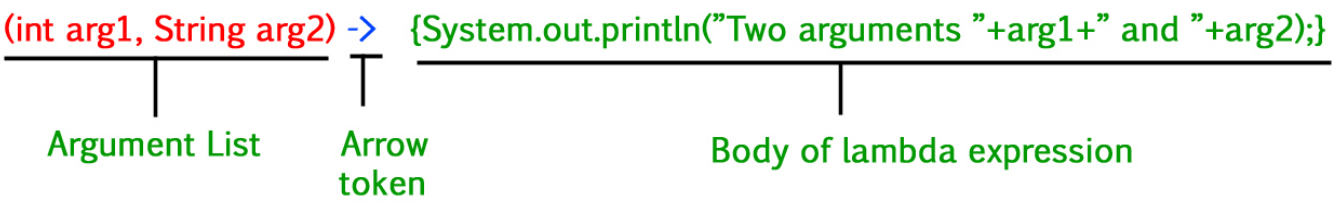
lambda expressions are added in Java 8 and provide below functionalities.

- Enable to treat functionality as a method argument, or code as data.
- A function that can be created without belonging to any class.
- A lambda expression can be passed around as if it was an object and executed on demand.

```
// Java program to demonstrate lambda expressions
// to implement a user defined functional interface.

// A sample functional interface (An interface with
// single abstract method
interface FuncInterface
{
    // An abstract function
    void abstractFun(int x);

    // A non-abstract (or default) function
    default void normalFun()
    {
       System.out.println("Hello");
    }
}

class Test
{
    public static void main(String args[])
    {
        // lambda expression to implement above
        // functional interface. This interface
        // by default implements abstractFun()
        FuncInterface fobj = (int x)->System.out.println(2*x);

        // This calls above lambda expression and prints 10.
        fobj.abstractFun(5);
    }
}
```

Output:

```
10
```




**Syntax:**

```
lambda operator -> body
```

where lambda operator can be:

- **Zero parameter:**

  ```
  () -> System.out.println("Zero parameter lambda");
  ```

- **One parameter:**–

  ```
  (p) -> System.out.println("One parameter: " + p);
  ```

  It is not mandatory to use parentheses, if the type of that variable can be inferred from the context

- **Multiple parameters :**

  ```
  (p1, p2) -> System.out.println("Multiple parameters: " + p1 + ", " + p2);
  ```

Please note: Lambda expressions are just like functions and they accept parameters just like functions.

```
// A Java program to demonstrate simple lambda expressions
import java.util.ArrayList;
```

```
class Test
{
    public static void main(String args[])
    {
        // Creating an ArrayList with elements
        // {1, 2, 3, 4}
        ArrayList<Integer> arrL = new ArrayList<Integer>();
        arrL.add(1);
        arrL.add(2);
        arrL.add(3);
        arrL.add(4);

        // Using lambda expression to print all elements
        // of arrL
        arrL.forEach(n -> System.out.println(n));

        // Using lambda expression to print even elements
        // of arrL
        arrL.forEach(n -> { if (n%2 == 0) System.out.println(n); });
    }
}
```

Output :

```
1
2
3
4
2
4
```

Note that lambda expressions can only be used to implement functional interfaces. In the above example also, the lambda expression implements Consumer Functional Interface.

A Java program to demonstrate working of lambda expression with two arguments.

```
// Java program to demonstrate working of lambda expressions
public class Test
{
    // operation is implemented using lambda expressions
    interface FuncInter1
    {
        int operation(int a, int b);
    }
```

```
    // sayMessage() is implemented using lambda expressions
    // above
    interface FuncInter2
    {
        void sayMessage(String message);
    }

    // Performs FuncInter1's operation on 'a' and 'b'
    private int operate(int a, int b, FuncInter1 fobj)
    {
        return fobj.operation(a, b);
    }

    public static void main(String args[])
    {
        // lambda expression for addition for two parameters
        // data type for x and y is optional.
        // This expression implements 'FuncInter1' interface
        FuncInter1 add = (int x, int y) -> x + y;

        // lambda expression multiplication for two parameters
        // This expression also implements 'FuncInter1' interface
        FuncInter1 multiply = (int x, int y) -> x * y;

        // Creating an object of Test to call operate using
        // different implementations using lambda Expressions
        Test tobj = new Test();

        // Add two numbers using lambda expression
        System.out.println("Addition is " +
                           tobj.operate(6, 3, add));

        // Multiply two numbers using lambda expression
        System.out.println("Multiplication is " +
                           tobj.operate(6, 3, multiply));

        // lambda expression for single parameter
        // This expression implements 'FuncInter2' interface
        FuncInter2 fobj = message ->System.out.println("Hello "
                                                       + message);
        fobj.sayMessage("Geek");
    }
}
```

Output:

```
Addition is 9
Multiplication is 18
Hello Geek
```

**Important points:**

- The body of a lambda expression can contain zero, one or more statements.
- When there is a single statement curly brackets are not mandatory and the return type of the anonymous function is the same as that of the body expression.
- When there are more than one statements, then these must be enclosed in curly brackets (a code block) and the return type of the anonymous function is the same as the type of the value returned within the code block, or void if nothing is returned.

Please see this. for an application.

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