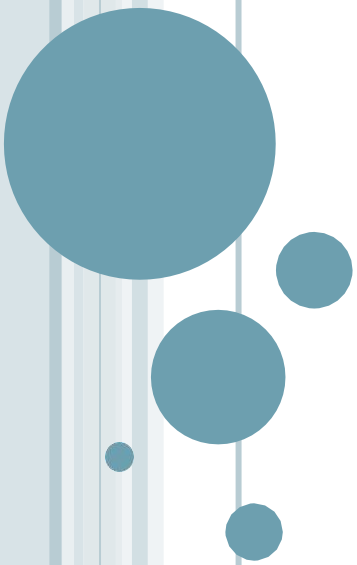
LAMBDA EXPRESSION



LAMBDA EXPRESSIONS

- The lambda expression was introduced first time in Java 8. Its main objective to increase the expressive power of the language.
- The Lambda expression is used to provide the implementation of an interface which has functional interface. It saves a lot of code.
- It provides a clear and concise way to represent one method interface using an expression.
- In case of lambda expression, we don't need to define the method again for providing the implementation. Here, we just write the implementation code.

LAMBDA EXPRESSIONS

- **What is Functional Interface?**

If a Java interface contains one and only one abstract method then it is termed as functional interface.
This only one method specifies the intended purpose of the interface.

For example, the Runnable interface from package java.lang; is a functional interface because it constitutes only one method i.e. run().

LAMBDA EXPRESSIONS

Define a Functional Interface in java

```
import java.lang.FunctionalInterface;
@FunctionalInterface
public interface MyInterface{
        // the single abstract method
        double getValue();

}
```

- Here, we have used the annotation @FunctionalInterface.
- The annotation forces the Java compiler to indicate that the interface is a functional interface. Hence, does not allow to have more than one abstract method

LAMBDA EXPRESSIONS

- Lambda expression is, essentially, an anonymous or unnamed method.
- The lambda expression does not execute on its own. Instead, it is used to implement a method defined by a functional interface.
- **How to define lambda expression in Java?**

- **(parameter list) -> lambda body**

LAMBDA EXPRESSIONS

- Lambda expression is, essentially, an anonymous or unnamed method. The lambda expression does not execute on its own. Instead, it is used to implement a method defined by a functional interface.
- **Java Lambda Expression Syntax**

- **(argument-list) -> {body}**
- Java lambda expression is consisted of three components.

- 1) Argument-list: It can be empty or non-empty as well.

- 2) Arrow-token: It is used to link arguments-list and body of expression.

- 3) Body: It contains expressions and statements for lambda expression.

LAMBDA EXPRESSIONS

- Following are the important characteristics of a lambda expression.

- **Optional type declaration** − No need to declare the type of a parameter. The compiler can inference the same from the value of the parameter.

- **Optional parenthesis around parameter** − No need to declare a single parameter in parenthesis. For multiple parameters, parentheses are required.

- **Optional curly braces** − No need to use curly braces in expression body if the body contains a single statement.

- **Optional return keyword** − The compiler automatically returns the value if the body has a single expression to return the value. **Curly braces are required to indicate that expression returns a value.**

LAMBDA EXPRESSIONS

- **No Parameter Syntax**
- **() -> {**
- **//Body of no parameter lambda**
- **}**

- **One Parameter Syntax**
- **(p1) -> {**
- **//Body of single parameter lambda**
- **}**

(n) -> (n % 2)==0

- **Two Parameter Syntax**
- **(p1,p2) -> {**
- **//Body of multiple parameter lambda**
- **}**

LAMBDA EXPRESSIONS

- **Suppose, we have a method like this:**
- **double getPiValue() {**
- **   return 3.1415;**
- **}**

- **We can write this method using lambda expression as:**

- **() -> 3.1415**

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- **Here, the method does not have any parameters.**
- **Hence, the left side of the operator includes an empty parameter.**
- **The right side is the lambda body that specifies the action of the lambda expression. In this case, it returns the value 3.1415.**

LAMBDA EXPRESSIONS

- **Types of Lambda Body**

- **In Java, the lambda body is of two types.**

- **1. A body with a single expression**

- **( ) -> System.out.println("Lambdas are great");**

- **This type of lambda body is known as the expression body.**

LAMBDA EXPRESSIONS

- **2. A body that consists of a block of code.**

- **( ) -> {**
- **double pi = 3.1415;**
- **return pi;**
- **};**

- **This type of the lambda body is known as a block body. The block body allows the lambda body to include multiple statements. These statements are enclosed inside the braces and you have to add a semi-colon after the braces.**

```java
interface MyInterface{

    // abstract method
    double getPiValue();
}

public class LambadaEx1 {

    public static void main( String[] args ) {

    // declare a reference to MyInterface
    MyInterface ref;

    // lambda expression
    ref = () -> 3.1415;

    System.out.println("Value of Pi = " + ref.getPiValue());
    }
}
```

LambdaDemo1.java
LambdaDemo2.java

LAMBDA EXPRESSIONS WITH PARAMETERS

```
interface Sayable{
    public String say(String name);
}

public class LambdaExpressionExample4{
    public static void main(String[] args) {

        // Lambda expression with single parameter.
        Sayable s1=(name)->{
            return "Hello, "+name;
        };
        System.out.println(s1.say("Sonoo"));

        // You can omit function parentheses
        Sayable s2= name ->{
            return "Hello, "+name;
        };
        System.out.println(s2.say("Sonoo"));
    }
}
```

MULTIPLE PARAMETERS

```
interface Addable{
    int add(int a,int b);
}

public class LambdaExpressionExample5{
    public static void main(String[] args) {

        // Multiple parameters in lambda expression
        Addable ad1=(a,b)->(a+b);
        System.out.println(ad1.add(10,20));

        // Multiple parameters with data type in lambda expression
        Addable ad2=(int a,int b)->(a+b);
        System.out.println(ad2.add(100,200));
    }
}
```

MULTIPLE STATEMENTS

```
interface Sayable{
    String say(String message);
}

public class LambdaExpressionExample8{
    public static void main(String[] args) {

        // You can pass multiple statements in lambda expression
        Sayable person = (message)-> {
            String str1 = "I would like to say, ";
            String str2 = str1 + message;
            return str2;
        };
            System.out.println(person.say("time is precious."));
    }
}
```

MULTIPLE STATEMENTS

```
interface MyInterface {

    // abstract method
    String reverse(String n);
}
public class LambadaExample9 {
    public static void main( String[] args ) {
        // declare a reference to MyInterface
        // assign a lambda expression to the reference
        MyInterface ref = (str) -> {

            String result = "";
            for (int i = str.length()-1; i >= 0 ; i--)
            result += str.charAt(i);
            return result;
        };

        // call the method of the interface
        System.out.println("Lambda reversed = " + ref.reverse("Lambda"));
    }
}
```

SCOPE

Using lambda expression, you can refer to any final variable or effectively final variable (which is assigned only once). Lambda expression throws a compilation error, if a variable is assigned a value the second time.