Top 6 Java 8 features you can start using now

Posted on November 8, 2014 by Arulkumaran Kumaraswamipillai — No Comments ↓

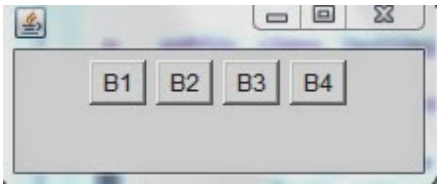
Unlike Java 7, Java 8 has some significant changes. You can get familiarised with the the following simple working code. All you need is Java 8 installed on your machine.

#1: Interface can have static and default methods. This tries to solve the diamond (aka multiple inheriance) issue. In the past it was essentially impossible for Java libraries to add methods to interfaces. Adding a method to an interface would mean breaking all existing code that implements the interface. Now, as long as a sensible default implementation of a method can be provided, library maintainers can add methods to these interfaces. The static

methods serve as utility methods, hence you don't need a separate helper class.

#2: Lambda expression for supporting closures, which simplifies your code. In the past, you need to write anonymous classes. Lambda expressions are **anonymous methods** which are intended to replace the bulkiness of **anonymous inner classes** with a much more compact mechanism.

Here is a basic example that covers **#1** and **#2**. A simple button click example.



Let's define an interface with a static method (e.g. a utility function) and two default methods as shown below.

```
1  package com.java8.examples;
2
3  import java.awt.event.ActionEvent;
4
5  public interface Test {
6
7   //Java 8: static method in an interface
8   static void doSomething(ActionEvent event) {
9          System.out.println("B1 clicked .....");
10     }
11
12  default void doAnotherSomething(ActionEvent eve
13         System.out.println("B2 clicked .....");
14     }
15
16
17  //Java 8: default method in interface
18  default void doWork(){
19   System.out.println("executing default method")
20  }
21 }
22
```

Define the *TestImpl* class, which implements the interface *Test*. The *TestImpl* uses closures via lambda expressions and makes use of the methods implemented in the interface Test.

```
package com.java8.examples;

import java.awt.FlowLayout;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

import java.awt.Button;
import javax.swing.JFrame;

public class TestImpl implements Test {

 public static void main(String[] args) {

  JFrame frame = new JFrame();
  frame.setLayout(new FlowLayout());

  Button button1 = new Button("B1");
  Button button2 = new Button("B2");
  Button button3 = new Button("B3");
  Button button4 = new Button("B4");

  frame.getContentPane().add(button1);
  frame.getContentPane().add(button2);
  frame.getContentPane().add(button3);
  frame.getContentPane().add(button4);

  //Java 8: Lambda expressions &amp;amp; invocation

  //invokes static method on the interface
  button1.addActionListener(Test::doSomething);
  Test testObj = new TestImpl();
  button2.addActionListener(testObj::doAnotherSo
  //input is e and result is println(..) and doW
  button3.addActionListener((e) -> {System.out.p
                                    testObj.doW

  //old way: pre Java 8: Anonymous inner class
  button4.addActionListener(new ActionListener()

   @Override
   public void actionPerformed(ActionEvent e) {
    System.out.println("B4 clicked");

   }
  });


  frame.setDefaultCloseOperation(JFrame.EXIT_ON_
  frame.pack();
  frame.setVisible(true);
 }
}
```

If you click on all 4 buttons from B1 to B4, you will get an output of

```
B1 clicked .....
B2 clicked .....
```

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```
3 B3 clicked ...
4 executing default method
5 B4 clicked
6
```

Q. How does " button3.addActionListener((e) -> {System.out.println("B3 clicked …"); testObj.doWork(); }); " know what method to execute? Did you notice that there is no new *ActionListener( )* and no *public void actionPerformed(ActionEvent event)*?

A. Here the compiler understands that there is only one method in the *ActionListener* interface and that takes only one parameter. So obviously, it decides (finalizes) that the e as a reference to *ActionEvent*.

The functional interfaces that are annotated with *@FunctionalInterface* in Java 8 ensures that you can only define one abstract method. You can define as many default and static method implementations as you want.

#3 Java 8 adopts Joda as its native date & time framework. Due to what was perceived as a design flaw in Joda, Java 8 implemented its own new date / time API from scratch. The new APIs were designed with simplicity in mind.

All the core classes in the new API are constructed by fluent factory methods. When constructing a value by its constituent fields, the factory is called of; when converting from another type, the factory is called from.

```
1  package com.java8.examples;
2
3  import java.time.LocalDate;
4  import java.time.LocalDateTime;
5  import java.time.LocalTime;
6  import java.time.Month;
7
8  public class TimeTest {
9
10  public static void main(String[] args) {
11   // The current date and Time
12   LocalDateTime timePoint = LocalDateTime.now();
13   System.out.println("now=" + timePoint);
14
15   //10th of Jan  2012
16   LocalDate pastDate = LocalDate.of(2012, Month.
17   System.out.println("pastDate=" + pastDate);
```

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```
18
19
20    LocalTime mathsClassTonight = LocalTime.of(19,
21    System.out.println("mathsClassTonight=" +  mat
22
23    mathsClassTonight = LocalTime.parse("19:30:50"
24    System.out.println("mathsClassTonight=" +  mat
25
26
27    //add 12 days to pastDate
28    LocalDate plusDays = pastDate.plusDays(12);
29    System.out.println("pastPlus12days=" +  plusDa
30
31
32    LocalDate epochDay = LocalDate.ofEpochDay(150)
33    System.out.println("epochDay=" +  epochDay);
34
35   }
36
37 }
38
```

The **output** will be:

```
1 now=2014-04-02T16:27:41.467
2 pastDate=2012-01-10
3 mathsClassTonight=19:30
4 mathsClassTonight=19:30:50
5 pastPlus12days=2012-01-22
6 epochDay=1970-05-31
7
```

Example 1: The ***java.lang.Runnable*** interface has been made a functional interface.

```
1  package com.java8.examples;
2
3  public class Example1 {
4
5   public static void main(String[] args) {
6     System.out.println("main thread: " + Thread.c
7
8     //run method takes no arguments so: () -> (bo
9     //closure worker thread1
10    Runnable r = () -> (System.out.println("worke
11    new Thread(r).start(); //pass the Runnable cl
12
13    //closure worker thread2
14    new Thread( () -> (System.out.println("worker
15   }
16 }
17
18
```

Output:

main thread: main
worker thread: Thread-0
worker thread: Thread-1

Example 2: The **java.util.function package** has a number of functional interfaces.

```
1  package com.java8.examples;
2
3  import java.util.function.Consumer;
4
5  public class Example2 {
6
7    public static void main(String[] args) {
8     //closure of Consumer 1. the accept(T t) meth
9     Consumer<Integer>  c1 = (x) -> {System.out.pr
10    //closure of Consumer 2. x is an Integer
11    Consumer<Integer>  c2 = (x) -> {System.out.pr
12
13
14    c1.accept(5);
15    c2.accept(5);
16
17    //andThen is a default method implementation
18    Consumer<Integer> c3 = c1.andThen(c2);
19    c3.accept(6);
20   }
21 }
22
23
```

Output:

consumed: 5
consumed: 25
consumed: 6
consumed: 36

Example 3: The ***Function*** is similar to ***Consumer***, but the *Function* interface has a return value in its *apply(T t)* method, whereas the *Consumer* has a void method *accept(T t)*.

```
1  package com.java8.examples;
2
3  import java.util.function.Function;
4
```

```
5  public class Example3 {
6
7    public static void main(String[] args) {
8     //closure of Function.  apply(T t) method tak
9     Function<Double, Double>  c1 = (arg) -> (arg
10    Function<Double, Double>  c2 = (arg) -> (arg
11
12    Double result1 = c1.apply(5.0);
13    Double result2 = c2.apply(5.0);
14
15    System.out.println("result1= " + result1);
16    System.out.println("result2= " + result2);
17
18    //andThen is a default method implementation
19    Function<Double, Double> c3 = c1.andThen(c2);
20    Double result3 = c3.apply(6.0);
21
22    System.out.println("result3= " + result3);//
23
24   }
25 }
26
```

Output:

result1= 10.0
result2= 25.0
result3= 144.0

Example 4: The ***Predicate*** interface from *java.util.function* package has *test(T t)* method that returns a boolean value indicating test condition has passed or failed. The predicates are often used to filter a collection of objects.

```
1  package com.java8.examples;
2
3  import java.util.Arrays;
4  import java.util.List;
5  import java.util.function.Predicate;
6
7  public class Example4 {
8
9   private static final int SHORT_NAME_LENGTH = 3;
10
11  public static void main(String[] args) {
12
13   List<String> languages = Arrays.asList("Java",
14
15   //The Predicate interface has test(T t) that r
16   Predicate<String> shortNamePredicate = (s) ->
17
18
19   Predicate<String> startsWithCPredicate = (s) -
20
21   languages.stream()
22            .filter(shortNamePredicate)
23            .forEach(e -> System.out.println("sho
```

```
24
25    languages.stream()
26              .filter(startsWithCPredicate)
27              .forEach(e -> System.out.println("sta
28
29   }
30 }
31
```

Output:

short names: C++
short names: PHP
short names: C#
starts with J: Java
starts with J: JRuby
starts with J: Jython

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