# Java 7: Top 8 new features with examples

Posted on November 9, 2014 by Arulkumaran Kumaraswamipillai — No Comments ↓



There are several small new features and enhancements in Java 7. The major features and enhancements are in Java 8. Let's look at the Java 7 new features.

### #1: string in switch statement:

```
1  public class Java7Feature1 {
2
3   private static String color = "BLUE";
4
5   private enum Color {
6    RED, GREEN
7   };
8
9   public static void main(String[] args) {
```

```
10
11    // Pre Java 5
12    if (color.equals("RED")) {
13     System.out.println("Color is Red");
14    } else if (color.equals("GREEN")) {
15     System.out.println("Color is Green");
16    } else {
17     System.out.println("Color not found");
18    }
19
20    // Java 5 enum. try/catch is required for colo
21    try {
22     switch (Color.valueOf(color)) {
23     case RED:
24      System.out.println("Color is Red");
25      break;
26     case GREEN:
27      System.out.println("Color is Green");
28     }
29    } catch (IllegalArgumentException e) {
30     System.out.println("Color not found");
31    }
32
33    // Java 7 String in switch statement for simpl
34    //JDK 7 switch performs better than if-else
35    //using types with enums is only useful when i
36    //the value for color could come from database
37    switch (color) {
38    case "RED":
39     System.out.println("Color is Red");
40     break;
41    case "GREEN":
42     System.out.println("Color is Green");
43     break;
44    default:
45     System.out.println("Color not found");
46    }
47   }
48
49 }
50
51
52
```

**Output is:**

```
1 Color not found
2 Color not found
3 Color not found
4
```

## #2 Binary integral literals

```
1  public class Java7Feature2 {
2
3   public static void main(String[] args) {
4    // Pre Java 7
```



## 16 Technical Key Areas

```
5    int n = Integer.parseInt("10000000", 2);
6    System.out.println(n);
7
8    n = 1 << 7;
9    System.out.println(n);
10
11   // Java 7
12   n = 0b10000000; // 128 = 2^7
13   System.out.println(n);
14  }
15 }
16
```

**Output:**

```
1 128
2 128
3 128
4
```

### #3: Underscores for better readability in numeric literals

```
1  public class Java7Feature3 {
2
3   public static void main(String[] args) {
4           //pre Java 7
5     int million = 1000000;
6     System.out.println(million);
7
8     //Java 7. More readable
9     million = 1_000_000;
10    System.out.println(million);
11
12    //consecutive underscores are allowed
13    int ten_million = 10__000_000;
14    System.out.println(ten_million);
15
16    //underscores can be used in other numeric ty
17    double million_dollars_5_cents = 1_000_000.0_
18    System.out.println(million_dollars_5_cents);
19
20    //illegal to have underscores
21    //1. start or end a literal with an underscor
22    //2. have underscores before or after a decim
23  }
24 }
25
```

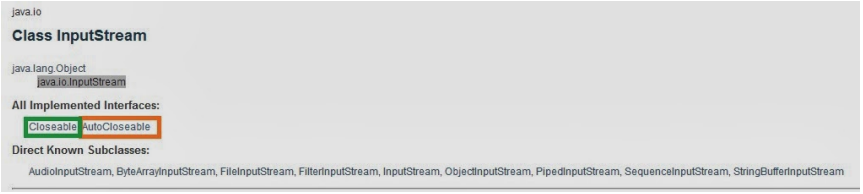
**Output**:

```
1 1000000
2 1000000
```

```
3 10000000
4 1000000.05
5
```

### **#4**: **AutoCloseable** interface.

Java 5 introduced the *Closeable* interface and Java 7 has introduced the *AutoCloseable* interface to avoid the unsightly try/catch/finally(within finally try/catch) blocks to close a resource. It also prevents potential resource leaks due to not properly closing a resource. The *java.io.InputStream* and java.io.OutputStream now implements the *AutoCloseable* interface.




try-with-resources is one of the most useful additions in Java 7.

```
1  import java.io.BufferedReader;
2  import java.io.File;
3  import java.io.FileInputStream;
4  import java.io.IOException;
5  import java.io.InputStream;
6  import java.io.InputStreamReader;
7
8  public class Java7Feature4 {
9
10  public static void main(String[] args) {
11   // pre Java 7
12   BufferedReader br = null;
13
14   try {
15    File f = new File("c://temp/simple.txt");
16    InputStream is = new FileInputStream(f);
17    InputStreamReader isr = new InputStreamReader
18    br = new BufferedReader(isr);
19
20    String read;
21
22    while ((read = br.readLine()) != null) {
23     System.out.println(read);
24    }
25   } catch (IOException ioe) {
26    ioe.printStackTrace();
27   } finally {
28    try {
29     if (br != null)
30      br.close();
31    } catch (IOException ex) {
```

```
32      ex.printStackTrace();
33     }
34    }
35
36
37    // Java 7 -- more concise 11 lines as opposed
38    try (InputStream is = new FileInputStream(new
39      InputStreamReader isr = new InputStreamReade
40      BufferedReader br2 = new BufferedReader(isr)
41
42     String read;
43
44     while ((read = br2.readLine()) != null) {
45      System.out.println(read);
46     }
47
48    }
49    catch (IOException ioe) {
50     ioe.printStackTrace();
51    }
52
53   }
54
55 }
56
```

The output is:

```
1 Big
2 brown fox
3 jumped over the fence
4 Big
5 brown fox
6 jumped over the fence
7
```

try can now have multiple statements in the parenthesis and each statement should create an object which implements the new java.lang.***AutoCloseable*** interface. The ***AutoCloseable*** interface consists of just one method.
void close () throws Exception {}. Each *AutoClosable* resource created in the try statement will be automatically closed! If an exception is thrown in the try block and another *Exception* is thrown while closing the resource, the first *Exception* is the one eventually thrown to the caller.

Think of the close( ) method as implicitly being called as the last line in the try block.

## #5 Multi-catch to avoid code duplication

```
1  public class Java7Feature4 {
2
3   public static void main(String[] args) {
4
5    //pre Java 7
6    try {
7     someMethod();
8    } catch (CustomException1 ex1) {
9     ex1.printStackTrace();
10   } catch (CustomException2 ex2) {
11    ex2.printStackTrace();
12   }
13
14
15   //Java 7 -- 5 lines as opposed to 7 lines.
16   //no code duplication
17   try {
18    someMethod();
19   } catch (CustomException1|CustomException2 ex)
20    ex.printStackTrace();
21   }
22  }
23
24  public static void someMethod() throws CustomEx
25
26  }
27
28  public static class CustomException1 extends Ex
29   private static final long serialVersionUID = 1
30  }
31
32  public static class CustomException2 extends Ex
33   private static final long serialVersionUID = 1
34  }
35
36 }
37
```

Note that the pipe '|' character is used as the delimiter.

### #6 Improved type inference for generic instance creation

This is only a small change that makes generics declaration a little less verbose. As shown below, you can just use empty diamond "<>" in Java 7 on the RHS.

```
1  import java.util.Collections;
2  import java.util.HashMap;
3  import java.util.List;
4  import java.util.Map;
5
6  public class Java7Feature4 {
7
8   public static void main(String[] args) {
```

```
9          //Pre Java 7
10    getEmployeesWithManagersOld("a102");
11    //Java 7
12    getEmployeesWithManagersNew("a102");
13   }
14
15
16   public static Map<String, List<Employee>>  getE
17     if(empCode == null){
18        return Collections.emptyMap();
19     }
20
21     //gives type safety warning. You need to add
22     Map<String, List<Employee>> mapEmployees = ne
23
24
25     return mapEmployees;
26   }
27
28
29   //Java 7
30   public static Map<String, List<Employee>>  getE
31     if(empCode == null){
32        return Collections.emptyMap();
33     }
34
35     //no duplication of generic inference
36     Map<String, List<Employee>> mapEmployees = ne
37     //do something with mapEmployees
38
39     return mapEmployees;
40   }
41
42
43   static class Employee {}
44  }
45
46
```

### #7: More new I/O APIs for the Java platform (NIO – 2.0)

Those who worked with Java IO may still remember the headaches that framework caused. It was never easy to work seamlessly across operating systems or multi-file systems. The NIO 2.0 has come forward with many enhancements. It's also introduced new classes to ease the life of a developer when working with multiple file systems with classes and interfaces such as ***Path***, ***Paths***, ***FileSystem***, ***FileSystems*** and others.

Another very handy feature is the *WatchService* for file change notifications. It can monitor a directory for changes as demonstrated below.

```
1  import java.io.IOException;
2  import java.nio.file.FileSystems;
3  import java.nio.file.Files;
4  import java.nio.file.Path;
5  import java.nio.file.Paths;
6  import java.nio.file.StandardWatchEventKinds;
7  import java.nio.file.WatchEvent;
8  import java.nio.file.WatchEvent.Kind;
9  import java.nio.file.WatchKey;
10 import java.nio.file.WatchService;
11
12 public class Java7Feature7 {
13
14  public static void main(String[] args) throws I
15
16   // Java 7
17   Path path = Paths.get("c:\\Temp\\simple.txt");
18   System.out.println(path.getFileName());
19   System.out.println(path.getRoot());
20   System.out.println(path.getParent());
21
22   // Java 7 file change watch service
23   WatchService watchService = FileSystems.getDef
24
25   //register Temp folder with the watch service
26   path.getParent().register(watchService, Standa
27     StandardWatchEventKinds.ENTRY_MODIFY, Standa
28
29   //wait for incoming events
30   while (true) {
31    final WatchKey key = watchService.take();
32    for (WatchEvent<?> watchEvent : key.pollEvent
33     final Kind<?> kind = watchEvent.kind();
34     // Overflow event
35     if (StandardWatchEventKinds.OVERFLOW == kind
36      continue; // loop
37     } else if (StandardWatchEventKinds.ENTRY_CRE
38       || StandardWatchEventKinds.ENTRY_DELETE ==
39      @SuppressWarnings("unchecked")
40      final WatchEvent<Path> watchEventPath = (Wa
41      final Path entry = watchEventPath.context()
42
43      System.out.println(kind + "-->" + entry);
44
45     }
46
47    }
48
49    if (!key.reset()) {
50     break;
51    }
52   }
53
54   // deleting a file is as easy as.
55   Files.deleteIfExists(path); // Java 7 feature
56  }
57
58 }
59
60
```

The output will be something like:

```
simple.txt
c:\
c:\Temp
ENTRY_CREATE-->New Text Document.txt
ENTRY_DELETE-->New Text Document.txt
ENTRY_CREATE-->File1.txt
ENTRY_MODIFY-->File1.txt


```

### #8: Fork and Join

Java 7 has incorporated the feature that would distribute the work across multiple cores and then join them to return the result set as a Fork and Join framework. he effective use of parallel cores in a Java program has always been a challenge. It's a divide-and-conquer algorithm where Fork-Join breaks the task at hand into mini-tasks until the mini-task is simple enough that it can be solved without further breakups. One important concept to note in this framework is that ideally no worker thread is idle. They implement a work-stealing algorithm in that idle workers "steal" the work from those workers who are busy.

The example below demonstrates this with a simple task of summing up 10 numbers. If the count of numbers to be added are greater than 5, it is forked into chunks of 5 to be processed by separate thread, and the forked sum are then joined to give the overall total of 10 numbers from 1 to 10, which is 55.  The total of numbers 1 to 5 is 15, and 6 to 10 is 40.

```
import java.io.IOException;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.List;
import java.util.concurrent.ForkJoinPool;
import java.util.concurrent.RecursiveTask;

public class Java7Feature8 {

 static int[] numbers = { 1, 2, 3, 4, 5, 6, 7, 8

 public static void main(String[] args) throws I
     int numberOfCpuCores = Runtime.getRuntime()
     ForkJoinPool forkJoinPool = new ForkJoinPoo
     int sum = forkJoinPool.invoke(new ChunkingT
```

```
16      System.out.println(sum);
17  }
18
19  //inner class
20  static class SumCalculatorTask extends Recursiv
21   int[] numbers;
22
23   SumCalculatorTask(int[] numbers) {
24    this.numbers = numbers;
25   }
26
27   @Override
28   protected Integer compute() {
29    int sum = 0;
30    for (int i : numbers) {
31     sum += i;
32    }
33
34    System.out.println(Thread.currentThread().get
35
36    return sum;
37   }
38  }
39
40
41  //inner class
42
43  /**
44   *
45   *chunking size is 5
46   */
47  static class ChunkingTask extends RecursiveTask
48
49   private static final int CHUNK_SIZE = 5;
50   int[] numbers;
51
52   ChunkingTask(int[] numbers) {
53    this.numbers = numbers;
54   }
55
56   @Override
57   protected Integer compute() {
58    int sum = 0;
59    List<RecursiveTask<Integer>> forks = new Arra
60
61    //if the numbers size is > CHUNK_SIZE fork th
62    if (numbers.length > CHUNK_SIZE) {
63     ChunkingTask chunk1 = new ChunkingTask(Array
64     ChunkingTask chunk2 = new ChunkingTask(Array
65     forks.add(chunk1);
66     forks.add(chunk2);
67     chunk1.fork();
68     chunk2.fork();
69    //size is less than or equal to CHUNK_SIZE st
70    } else {
71     SumCalculatorTask sumCalculatorTask = new Su
72     forks.add(sumCalculatorTask);
73     sumCalculatorTask.fork();
74    }
75
76    // Combine the result from all the tasks
77    //join
78    for (RecursiveTask<Integer> task : forks) {
79     sum += task.join();
80    }
81
```

```
82     return sum;
83    }
84
85   }
86
87 }
88
```

**Output is:**

```
1 ForkJoinPool-1-worker-2 sum = 15
2 ForkJoinPool-1-worker-2 sum = 40
3 55
4
```

Java 8's *Arrays.parallelSort( … )* make use of this fork and join feature to sort an array in parallel.

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