

# Chapter 1: Getting Started with Java 11

[jdk.java.net](http://jdk.java.net)

GA Releases  
JDK 10

Early-Access Releases  
JDK 12  
JDK 11  
JDK 8  
OpenJFX  
Valhalla  
JMC

Reference Implementations  
Java SE 10  
Java SE 9  
Java SE 8  
Java SE 7

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## JDK 11 Early-Access Builds

### Schedule, status, & features (OpenJDK)

#### Documentation

- Release notes
- Test results
- API Javadoc

#### Latest build: 25 (2018/8/2)

- Changes in this build
- Issues addressed in this build

#### OpenJDK builds

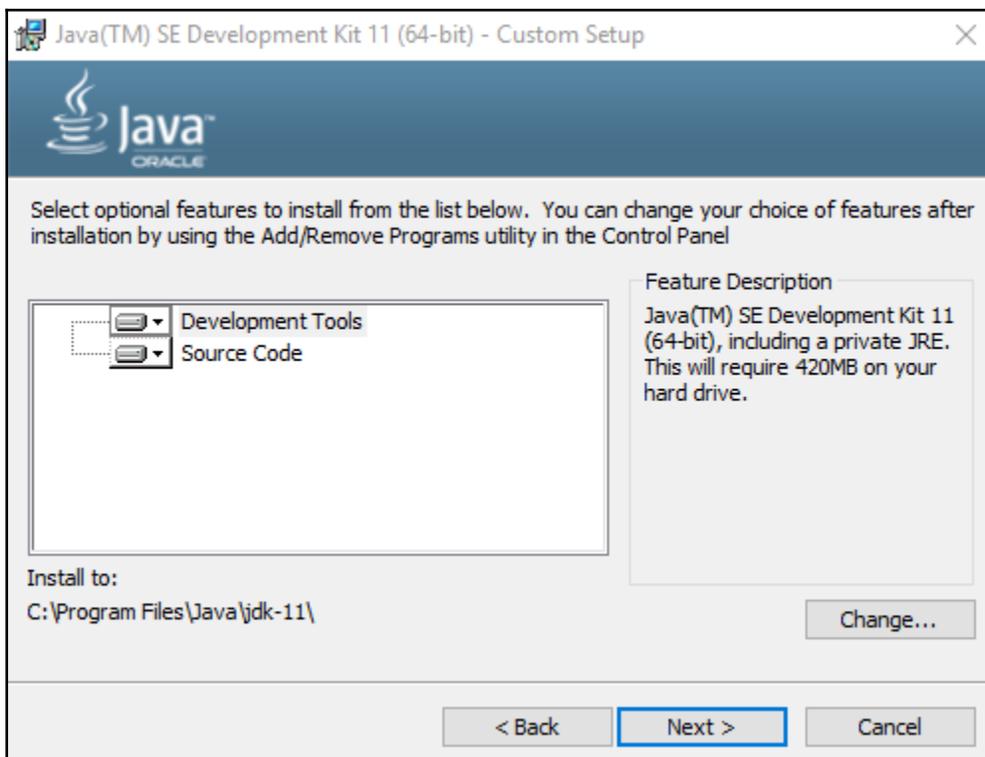
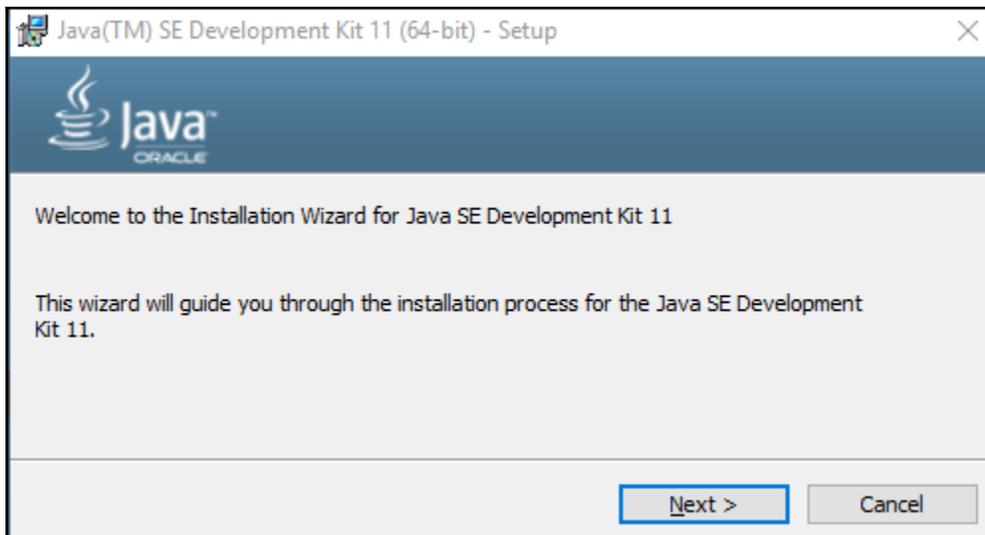
These early-access, open-source builds are provided under the GNU General Public License, version 2, with the Classpath Exception.

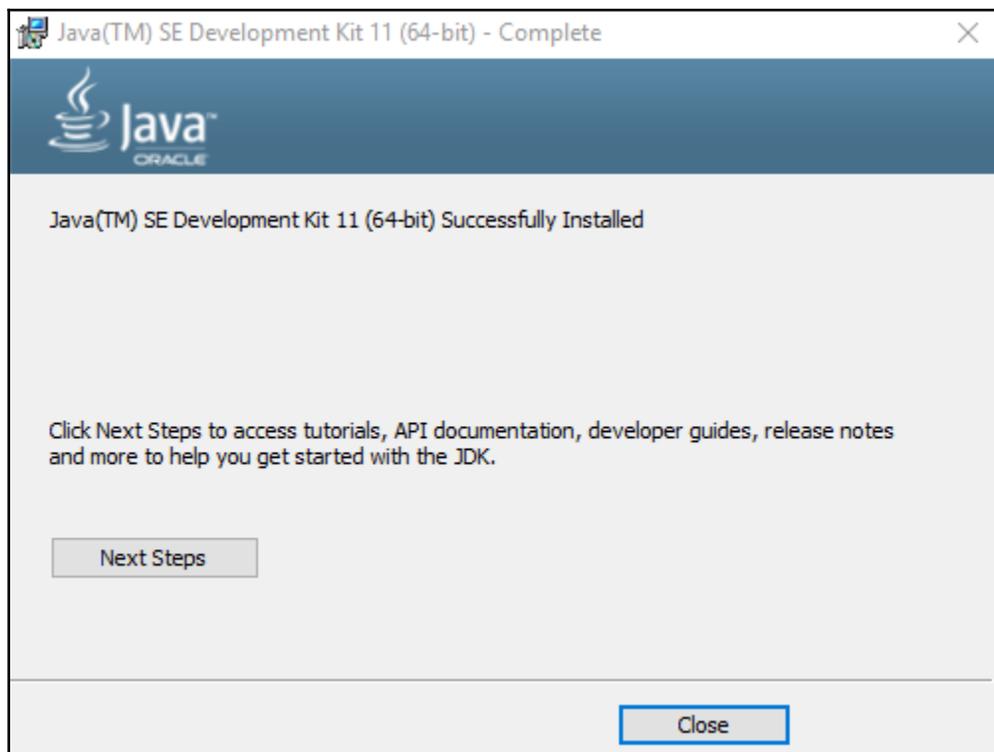
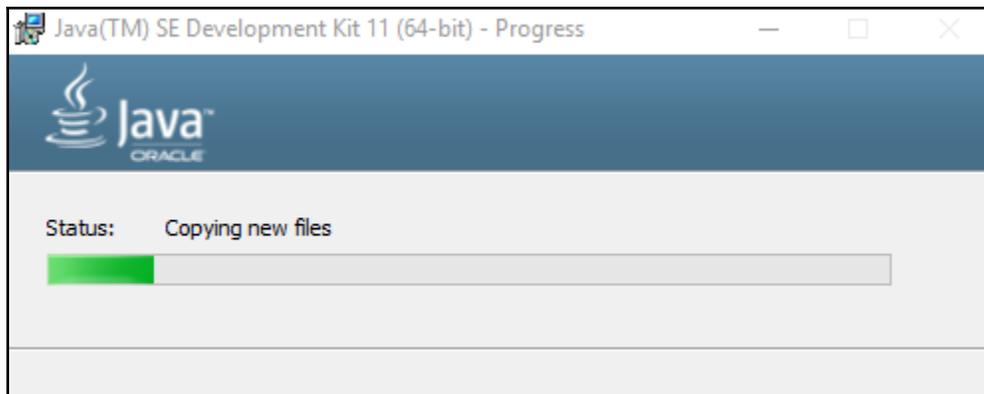
<b>Linux/x64</b>	tar.gz (sha256)	187599632 bytes
<b>macOS/x64</b>	tar.gz (sha256)	182050291
<b>Windows/x64</b>	zip (sha256)	187368712
<b>Alpine Linux/x64</b>	tar.gz (sha256)	186738581

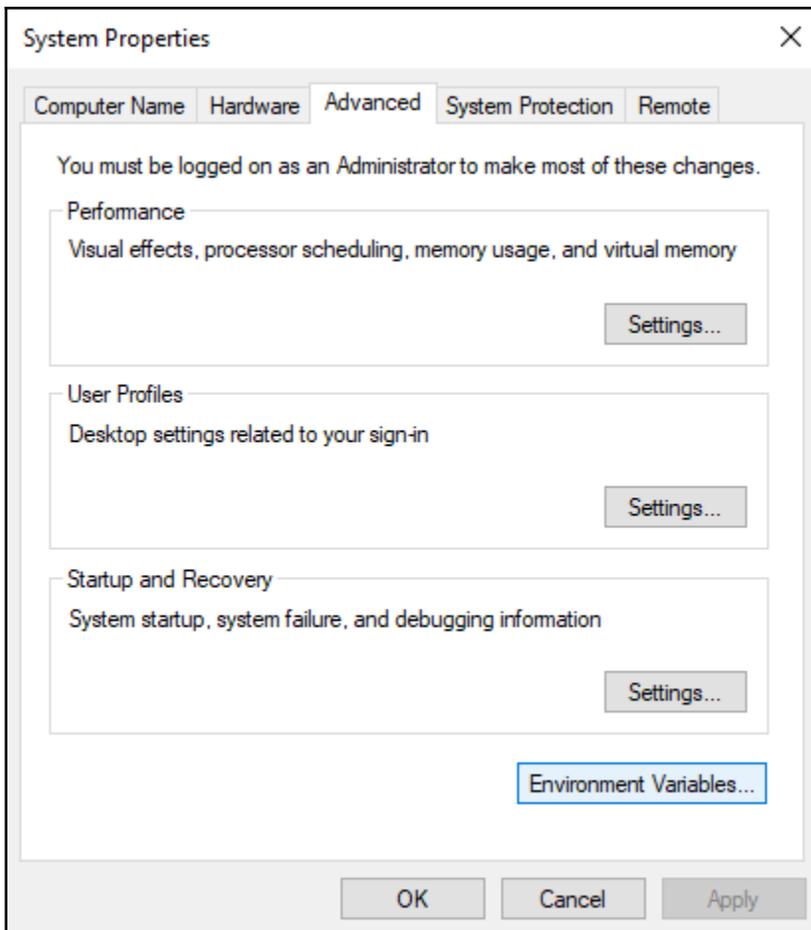
#### Oracle JDK builds

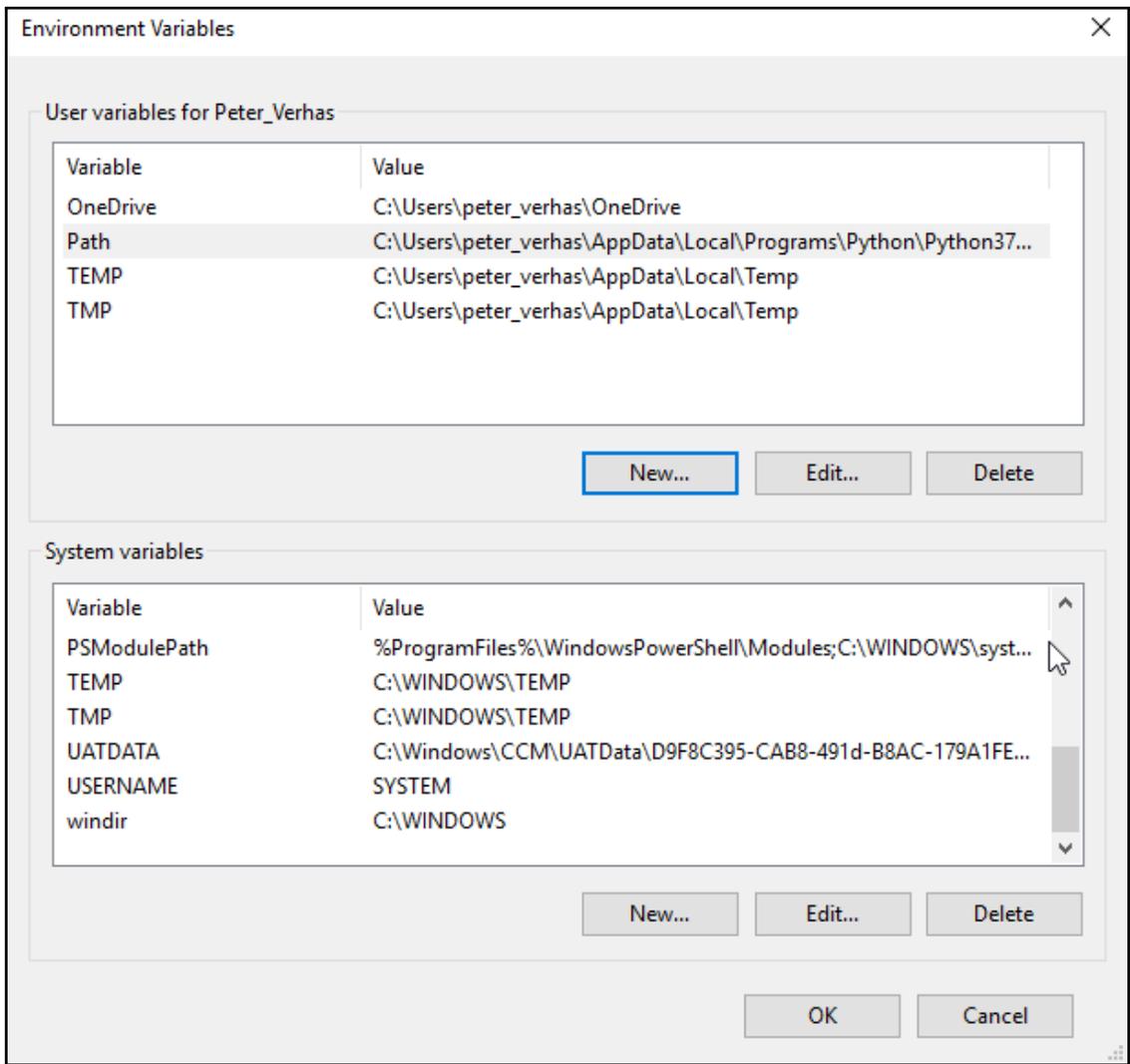
Thank you for accepting the [Early Adopter Development License Agreement](#). You may now download this software.

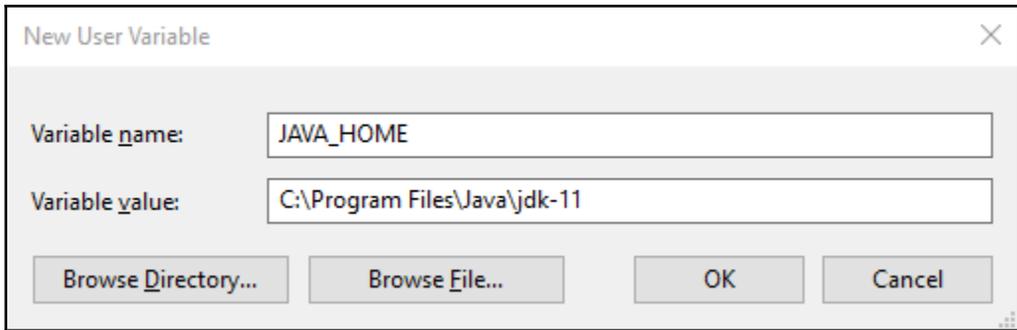
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<b>macOS/x64</b>	dmg (sha256)	174786244
<b>Solaris/SPARC</b>	tar.gz (sha256)	196935830
<b>Windows/x64</b>	exe (sha256)	159419752
<b>API Javadoc</b>	zip (sha256)	53179697



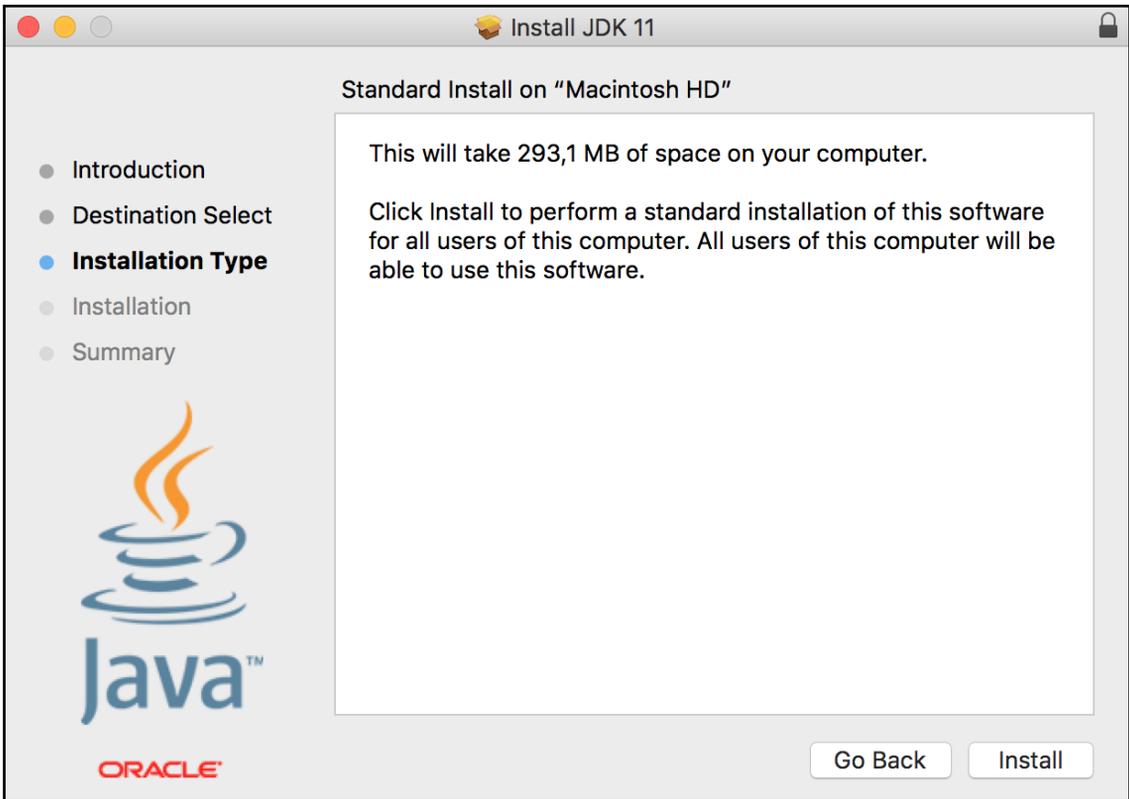


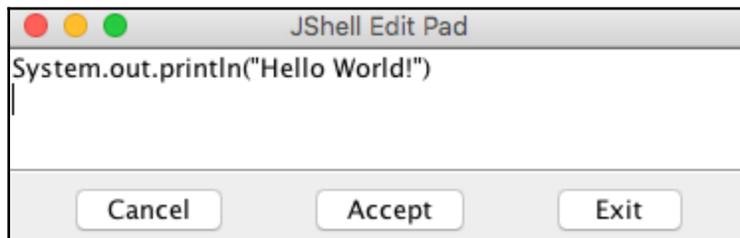
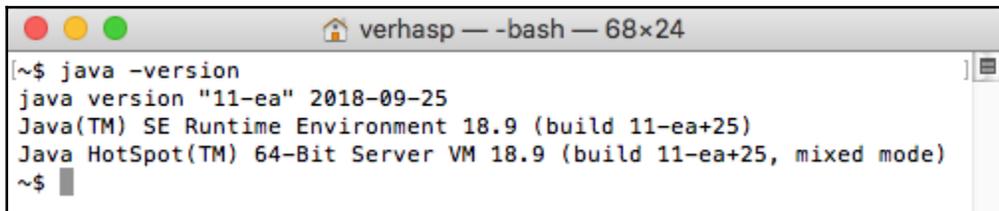
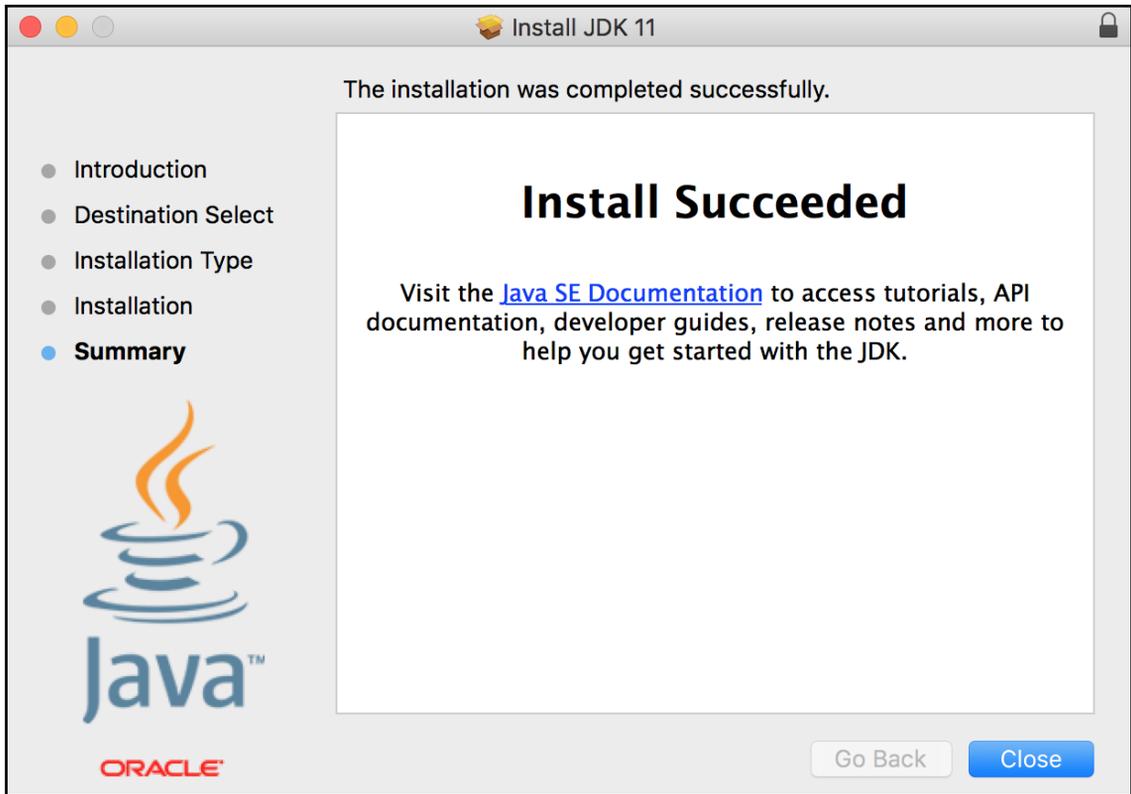


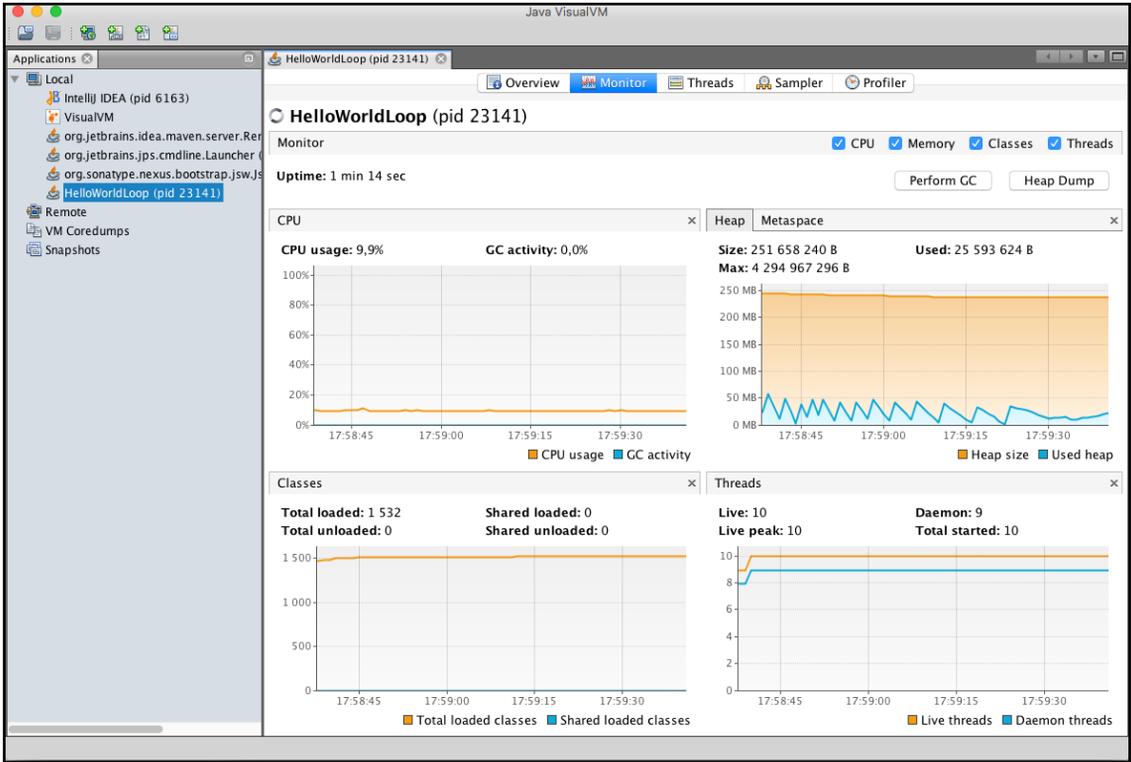


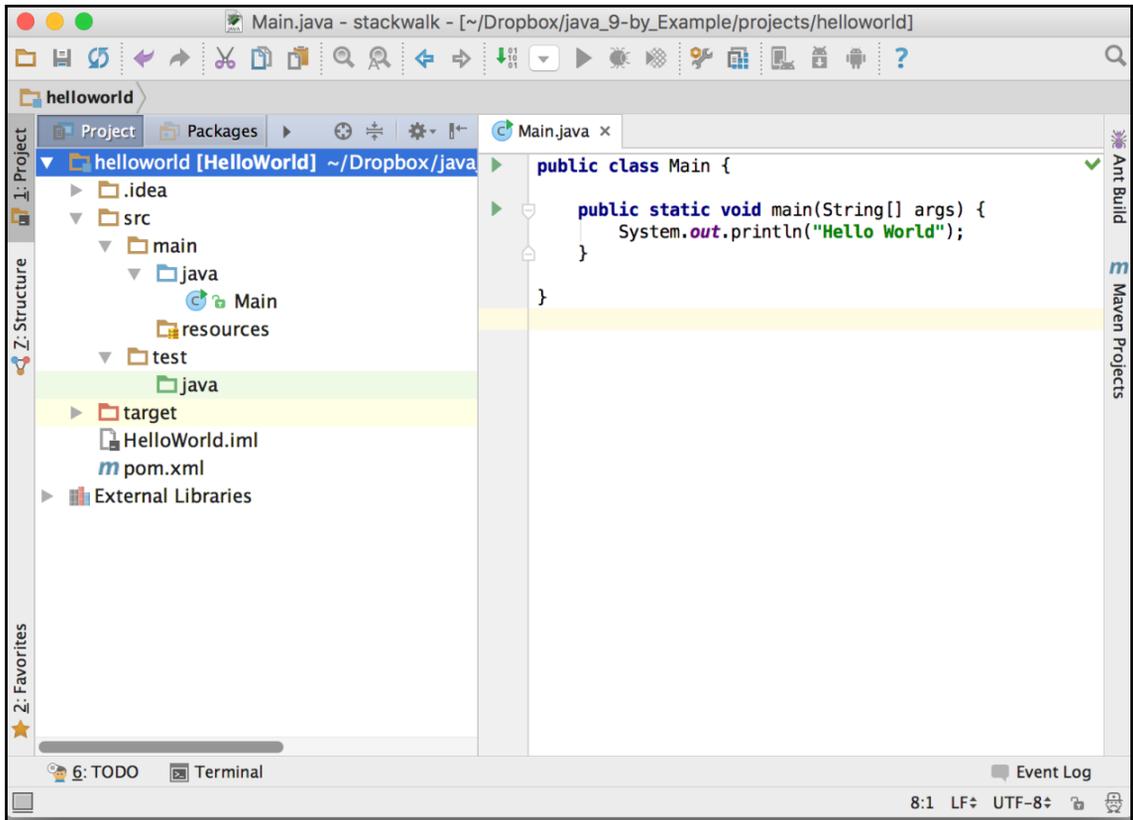










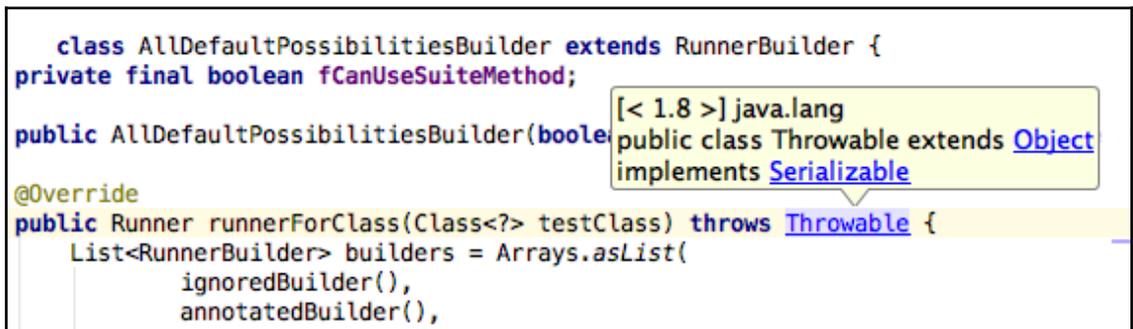
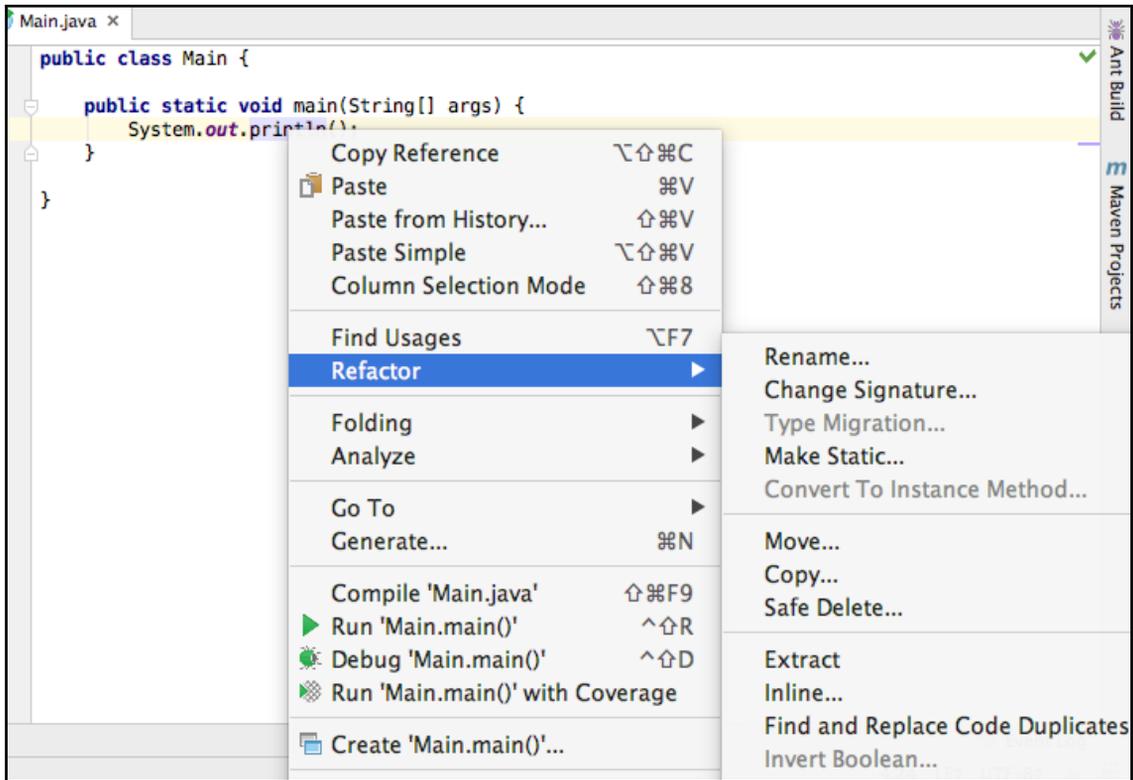


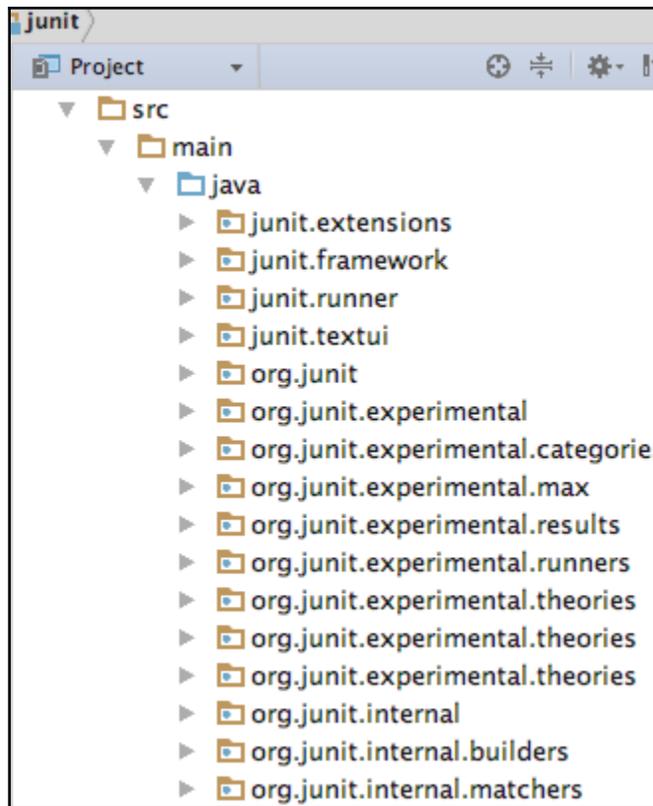
```
Main.java x
public class Main {
    public static void main(String[] args) {
        System.o...
    }
}

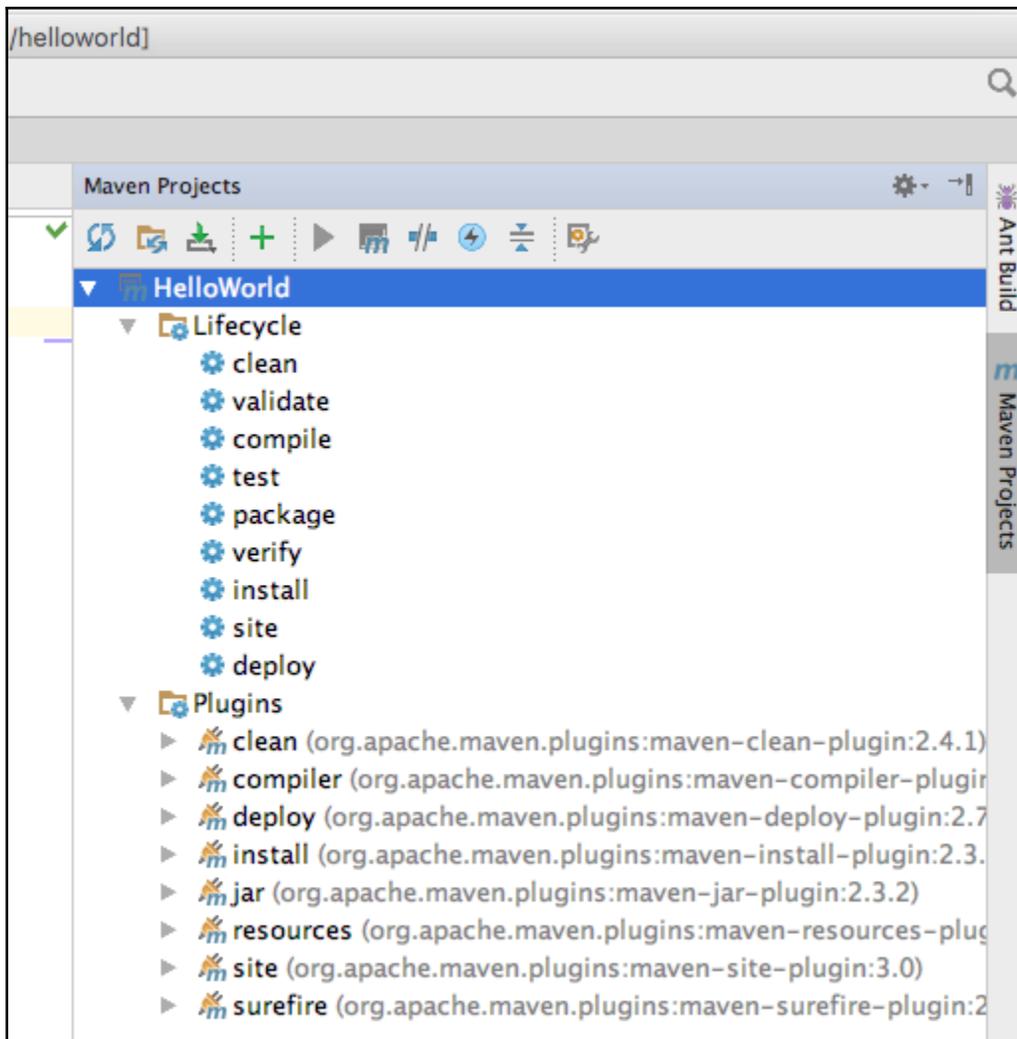
out PrintStream
setOut(PrintStream out) void
runFinalizersOnExit(boolean value) void
arraycopy(Object src, int srcPos, Object dest, int destP... void
clearProperty(String key) String
console() Console
getProperties() Properties
getProperty(String key) String
getProperty(String key, String def) String
identityHashCode(Object x) int
lineSeparator() String
load(String filename) void
loadLibrary(String libname) void
nanoTime() long
Pressing ^Space twice without a class qualifier would show all accessible static methods
```

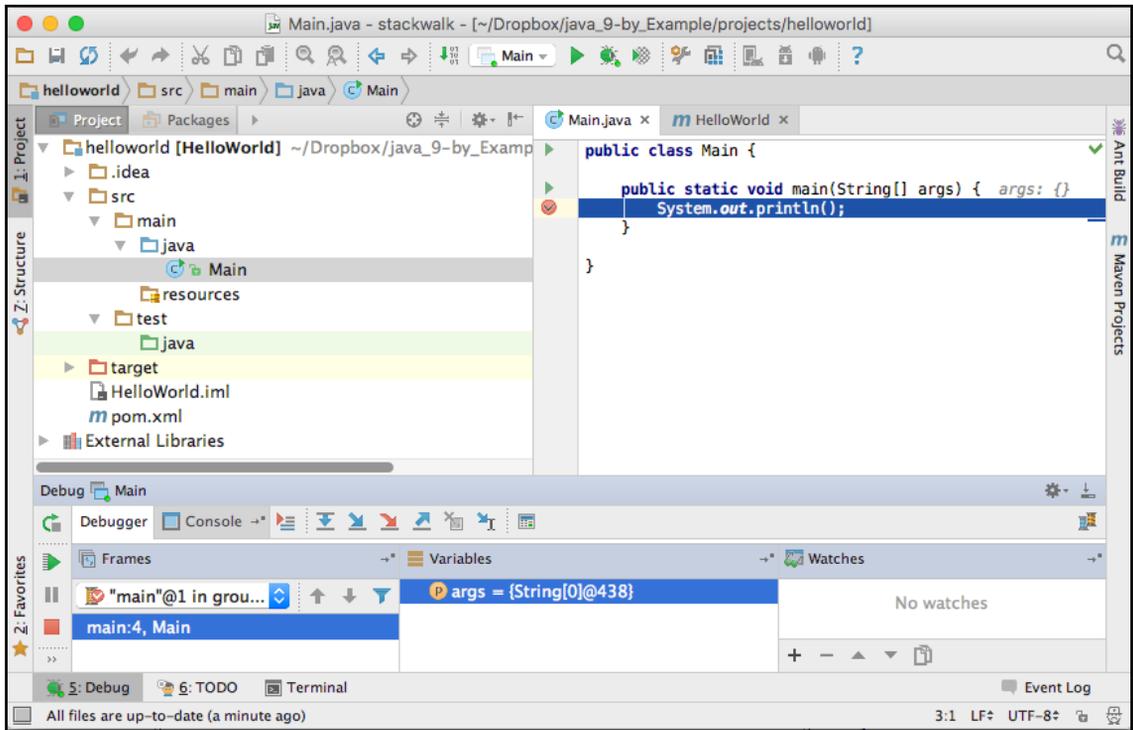
```
public static void main(String[] args) {
    System.out.println();
}

<no parameters>
boolean x
char x
int x
long x
float x
double x
@NotNull char[] x
String x
@Nullable Object x
```









# Chapter 2: The First Real Java Program - Sorting Names

- .zip archive: [apache-ant-1.9.7-bin.zip](#) [PGP] [SHA1] [SHA512] [MD5]
- .tar.gz archive: [apache-ant-1.9.7-bin.tar.gz](#) [PGP] [SHA1] [SHA512] [MD5]
- .tar.bz2 archive: [apache-ant-1.9.7-bin.tar.bz2](#) [PGP] [SHA1] [SHA512] [MD5]

```
C:\Users\peter_verhas\Dropbox\packt\Fundamentals-of-java-18.9\sources\ch02\mavenHelloWorld>tree
Folder PATH listing for volume C:
Volume serial number is EE2E-A381
C:.
├── SortTutorial
│   └── src
│       ├── main
│       │   ├── java
│       │   │   ├── packt
│       │   │   │   ├── java11
│       │   │   │   │   ├── example
│       │   │   │   │   │   └── stringsort
│       │   └── test
│       │       ├── java
│       │       │   ├── packt
│       │       │   │   ├── java11
│       │       │   │   │   ├── by
│       │       │   │   │   │   └── example
│       └── test
└── test
```

C:\Users\peter\_verhas\Dropbox\packt\Fundamentals-of-java-18.9\sources\ch02\mavenHelloWorld>

```
SortTutorial -- -bash -- 159x54
$ mvn package
[INFO] Scanning for projects...
[WARNING]
[WARNING] Some problems were encountered while building the effective model for packt.java9.by.example.SortTutorial:jar:1.0.0-SNAPSHOT
[WARNING] 'build.plugins.plugin.version' for org.apache.maven.plugins:maven-compiler-plugin is missing. @ line 10, column 15
[WARNING]
[WARNING] It is highly recommended to fix these problems because they threaten the stability of your build.
[WARNING]
[WARNING] For this reason, future Maven versions might no longer support building such malformed projects.
[WARNING]
[INFO] -----< packt.java9.by.example.SortTutorial >-----
[INFO] Building SortTutorial 1.0.0-SNAPSHOT
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ SortTutorial ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory /Users/verhasp/Dropbox/packt/Fundamentals-of-java-18.9/sources/ch02/mavenHelloWorld/SortTutorial/src/main/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ SortTutorial ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ SortTutorial ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory /Users/verhasp/Dropbox/packt/Fundamentals-of-java-18.9/sources/ch02/mavenHelloWorld/SortTutorial/src/test/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ SortTutorial ---
[INFO] Changes detected - recompiling the module!
[WARNING] File encoding has not been set, using platform encoding UTF-8, i.e. build is platform dependent!
[INFO] Compiling 1 source file to /Users/verhasp/Dropbox/packt/Fundamentals-of-java-18.9/sources/ch02/mavenHelloWorld/SortTutorial/target/test-classes
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ SortTutorial ---
[INFO] Surefire report directory: /Users/verhasp/Dropbox/packt/Fundamentals-of-java-18.9/sources/ch02/mavenHelloWorld/SortTutorial/target/surefire-reports

-----
T E S T S
-----
Running packt.java11.by.example.AppTest
Tests run: 0, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0 sec

Results :

Tests run: 0, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar) @ SortTutorial ---
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] -----
[INFO] Total time: 2.014 s
[INFO] Finished at: 2018-08-27T20:29:43+02:00
[INFO]
[INFO] -----
$
```

```
SortTutorial -- -bash -- 159x26

-----
T E S T S
-----
Running packt.java11.by.example.AppTest
Tests run: 0, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0 sec

Results :

Tests run: 0, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar) @ SortTutorial ---
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 2.014 s
[INFO] Finished at: 2018-08-27T20:29:43+02:00
[INFO]
-----
$
$ java -cp target/SortTutorial-1.0.0-SNAPSHOT.jar packt.java11.example.stringsort.App
Abraham
Dagobert
Johnson
Wilkinson
Wilson
$
```

```
verhasp -- -bash -- 80x24

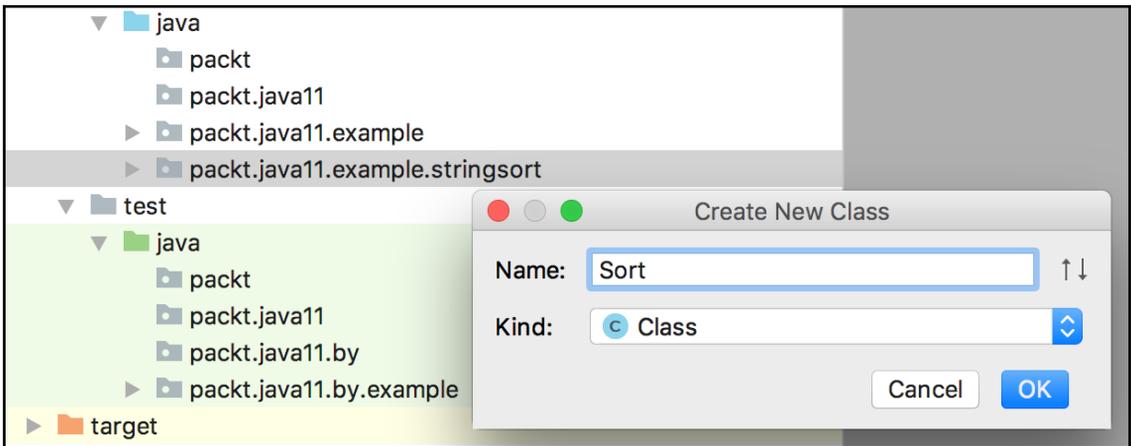
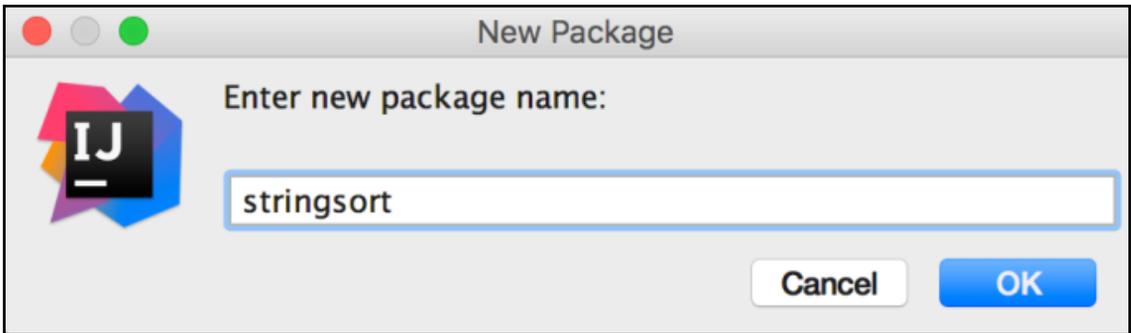
~$ gradle -version
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.codehaus.groovy.reflection.CachedClass
 (file:/Users/verhasp/bin/gradle-4.7/lib/groovy-all-2.4.12.jar) to method java.l
ang.Object.finalize()
WARNING: Please consider reporting this to the maintainers of org.codehaus.groov
y.reflection.CachedClass
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflect
ive access operations
WARNING: All illegal access operations will be denied in a future release

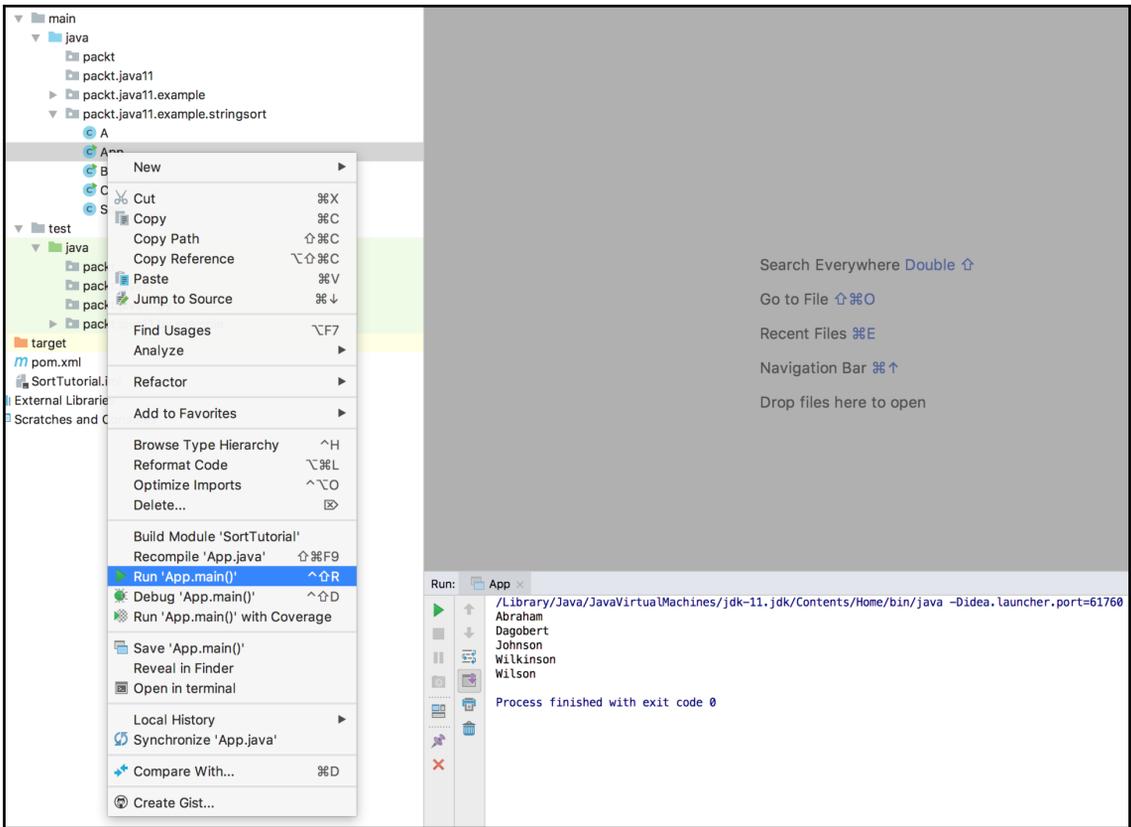
-----
Gradle 4.7
-----

Build time:    2018-04-18 09:09:12 UTC
Revision:     b9a962bf70638332300e7f810689cb2feb4a6c

Groovy:       2.4.12
Ant:          Apache Ant(TM) version 1.9.9 compiled on February 2 2017
JVM:          11-ea (Oracle Corporation 11-ea+25)
OS:           Mac OS X 10.13.6 x86_64

~$
```





```

package packt.java11.example.stringsort;

public class Sort {

    public static void sort(String[] names) {
        var n = names.length;
        while (n > 1) {
            for (var j = 0; j <= n - 1; j++) {
                if (names[j].compareTo(names[j + 1]) > 0) {
                    final var tmp = names[j + 1];
                    names[j + 1] = names[j];
                    names[j] = tmp;
                }
            }
            n--;
        }
    }
}

```

AppTest

Tests failed: 1 of 1 test - 16 ms

Test Results 16 ms /Library/Java/JavaVirtualMachines/jdk-11.jdk/Contents/Home/bin/java ...

AppTest 16 ms

sortRunsFine() 16 ms

```

java.lang.ArrayIndexOutOfBoundsException: Index 3 out of bounds for length 3

    at packt.java11.example.stringsort.Sort.sort(Sort.java:9)
    at packt.java11.by.example.AppTest.sortRunsFine(AppTest.java:15)
    at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
    at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
    at java.base/jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
    at java.base/java.lang.reflect.Method.invoke(Method.java:566) <12 internal calls>
    at java.base/java.util.stream.ForEachOps$ForEachOp$OfRef.accept(ForEachOps.java:183)
    at java.base/java.util.stream.ReferencePipeline$2$1.accept(ReferencePipeline.java:177)
    at java.base/java.util.Iterator.forEachRemaining(Iterator.java:133)
    at java.base/java.util.Spliterators$IteratorSpliterator.forEachRemaining(Spliterators.java:1801)
    at java.base/java.util.stream.AbstractPipeline.copyInto(AbstractPipeline.java:484)
    at java.base/java.util.stream.AbstractPipeline.wrapAndCopyInto(AbstractPipeline.java:474)
    at java.base/java.util.stream.ForEachOps$ForEachOp.evaluateSequential(ForEachOps.java:150)
    at java.base/java.util.stream.ForEachOps$ForEachOp$OfRef.evaluateSequential(ForEachOps.java:173)
    at java.base/java.util.stream.AbstractPipeline.evaluate(AbstractPipeline.java:234)
    at java.base/java.util.stream.ReferencePipeline.forEach(ReferencePipeline.java:497) <5 internal calls>
    at java.base/java.util.stream.ReferencePipeline$2$1.accept(ReferencePipeline.java:183)
    at java.base/java.util.stream.ReferencePipeline$2$1.accept(ReferencePipeline.java:177)
    at java.base/java.util.Iterator.forEachRemaining(Iterator.java:133)
    at java.base/java.util.Spliterators$IteratorSpliterator.forEachRemaining(Spliterators.java:1801)
    at java.base/java.util.stream.AbstractPipeline.copyInto(AbstractPipeline.java:484)
    at java.base/java.util.stream.AbstractPipeline.wrapAndCopyInto(AbstractPipeline.java:474)
    at java.base/java.util.stream.ForEachOps$ForEachOp.evaluateSequential(ForEachOps.java:150)
    at java.base/java.util.stream.ForEachOps$ForEachOp$OfRef.evaluateSequential(ForEachOps.java:173)
    at java.base/java.util.stream.AbstractPipeline.evaluate(AbstractPipeline.java:234)
    at java.base/java.util.stream.ReferencePipeline.forEach(ReferencePipeline.java:497) <13 internal calls>
    at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
    at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
    at java.base/jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
    at java.base/java.lang.reflect.Method.invoke(Method.java:566) <1 internal call>

```

Process finished with exit code 255

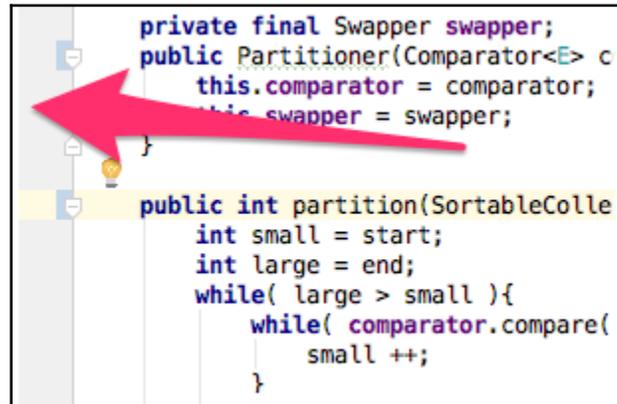
```

SortTutorial — -bash — 86x7
$ java -cp target/SortTutorial-1.0.0-SNAPSHOT.jar packt.java11.example.stringsort.App
Abraham
Dagobert
Johnson
Wilkinson
Wilson
$

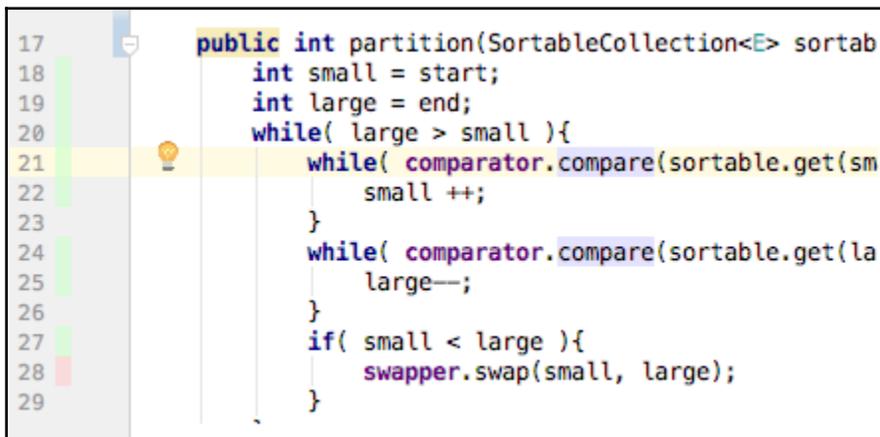
```

## Chapter 3: Optimizing the Sort - Making Code Professional

```
private final Swapper swapper;  
public Partitioner(Comparator<E> c  
    this.comparator = comparator;  
    this.swapper = swapper;  
}  
  
public int partition(SortableColle  
    int small = start;  
    int large = end;  
    while( large > small ){  
        while( comparator.compare(  
            small ++;  
        )
```

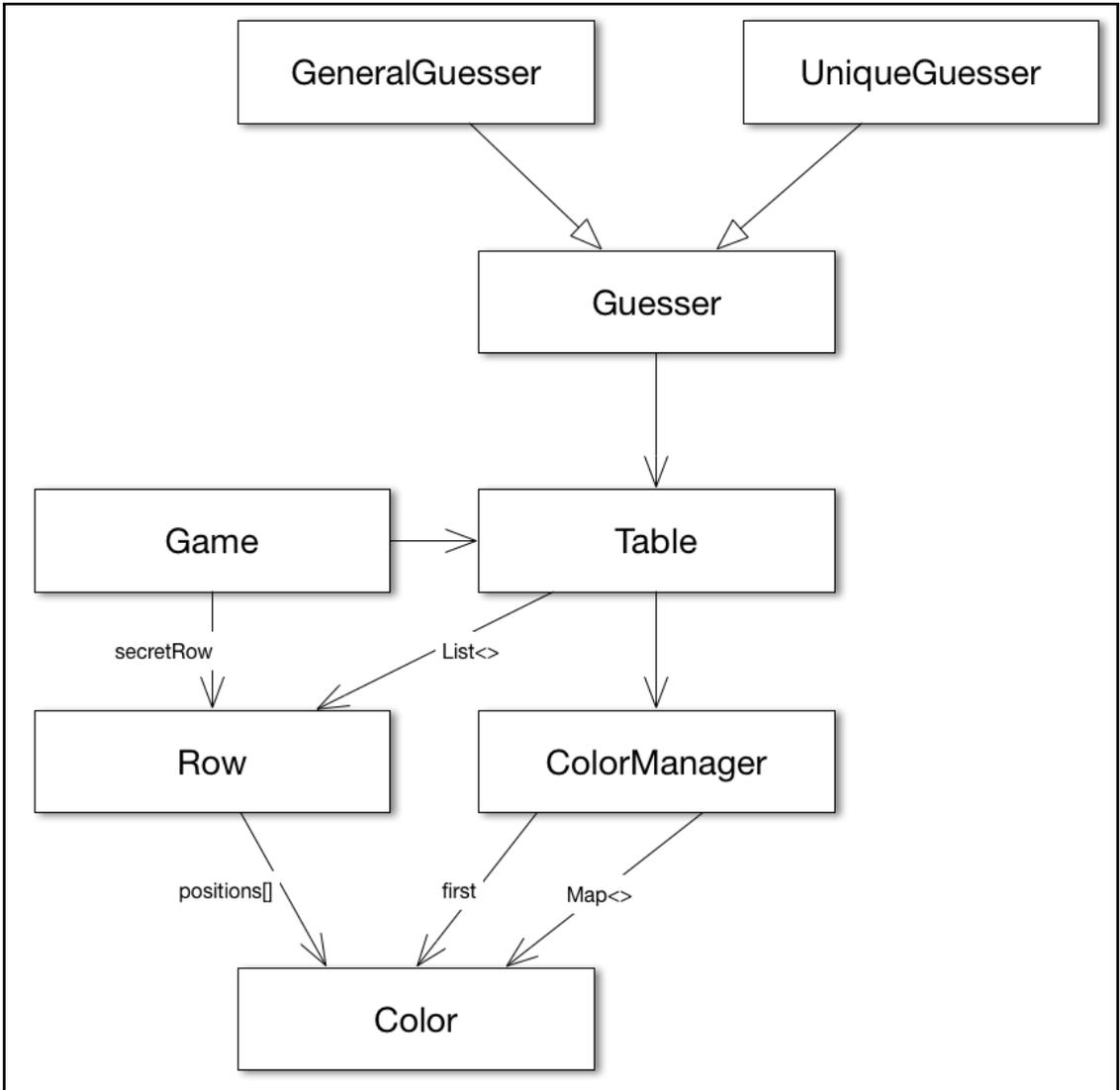


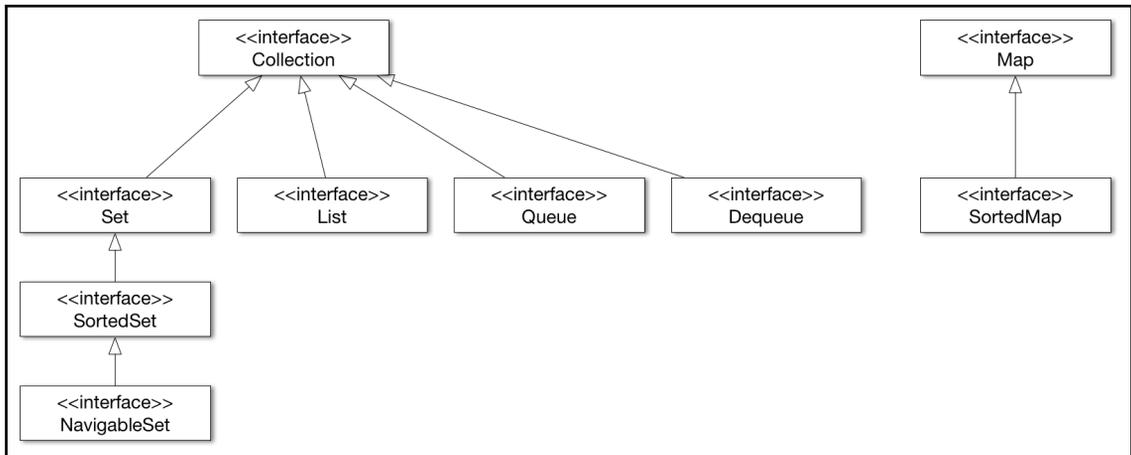
```
17 public int partition(SortableCollection<E> sortab  
18     int small = start;  
19     int large = end;  
20     while( large > small ){  
21         while( comparator.compare(sortable.get(sm  
22             small ++;  
23         )  
24         while( comparator.compare(sortable.get(la  
25             large--;  
26         )  
27         if( small < large ){  
28             swapper.swap(small, large);  
29         }
```



# Chapter 4: Mastermind - Creating a Game

					position	color only
hidden row	BLUE	YELLOW	WHITE	BLACK		
1st guess					<input type="text" value="0"/>	<input type="text" value="2"/>
2nd guess					<input type="text" value="0"/>	<input type="text" value="2"/>
3rd guess					<input type="text" value="0"/>	<input type="text" value="4"/>
4th guess					<input type="text" value="2"/>	<input type="text" value="2"/>
5th guess					<input type="text" value="4"/>	<input type="text" value="0"/>





```
packt.java189fundamentals.example.mastermind.Guesser
private boolean guessMatch(Color[] guess)
```

A guess matches if all rows in the table matches the guess.

Params: guess – to match against the rows

Returns: true if all rows match

- >  .gradle
- >  .idea
- >  build
- >  classes
- >  gradle
- >  out
- ▼  src
  - ▼  main
    - ▼  java
      - ▼  packt
        - ▼  java189fundamentals
          - ▼  example
            -  mastermind
            -  samples
- ▼  test
  - ▼  java
    - ▼  packt
      - ▼  java189fundamentals
        - ▼  example
          - ▼  mastermind
            -  integration
            -  lettered

# **Chapter 5: Extending the Game - Run Parallel, Run Faster**



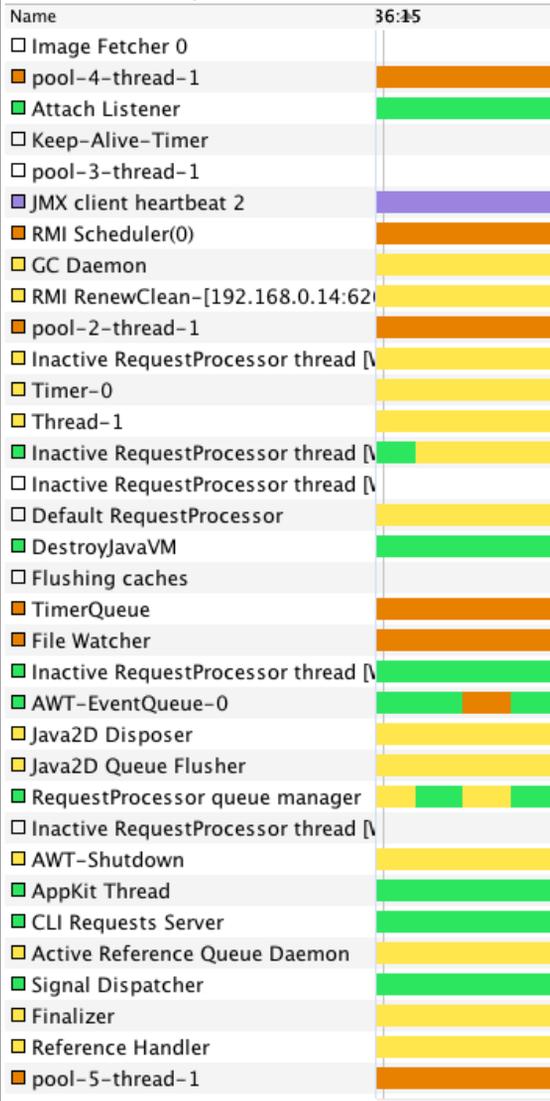
# VisualVM

## Threads

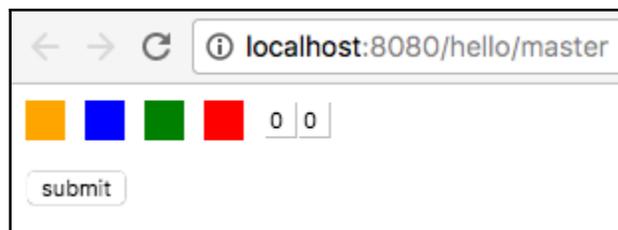
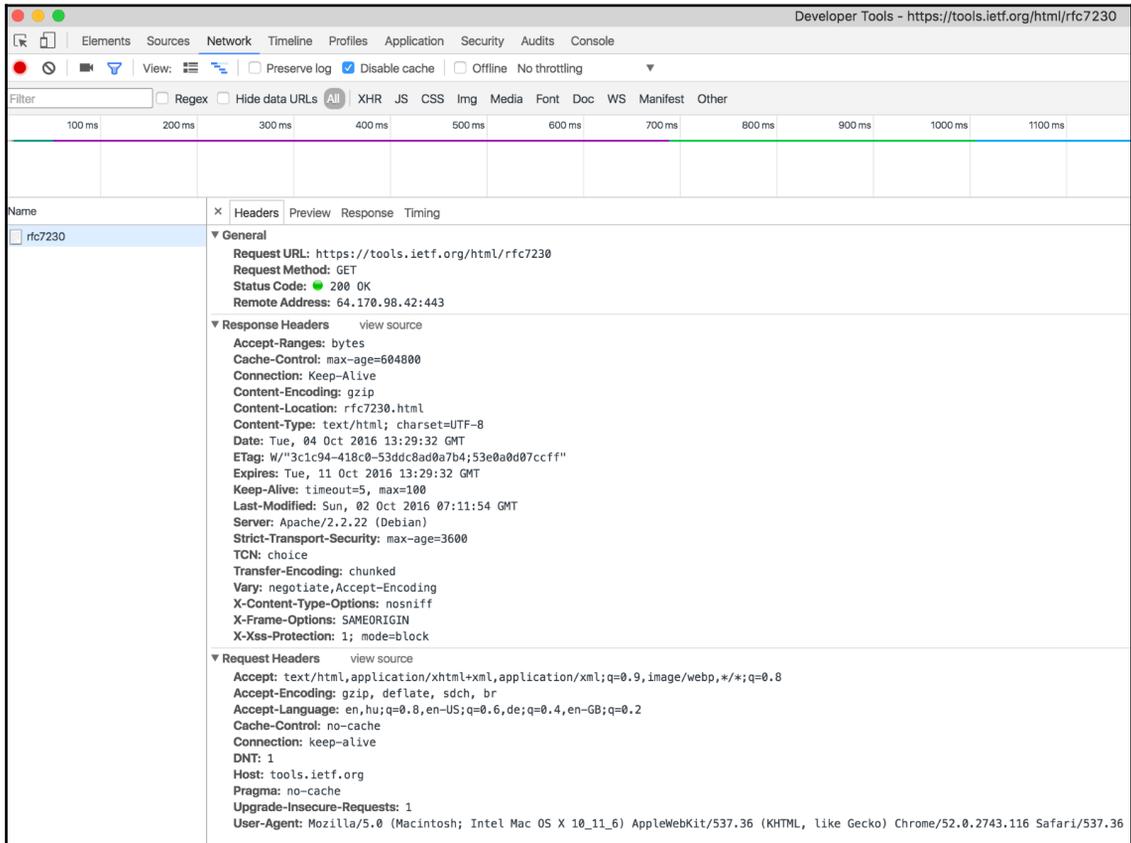
Live threads: 29  
Daemon threads: 23

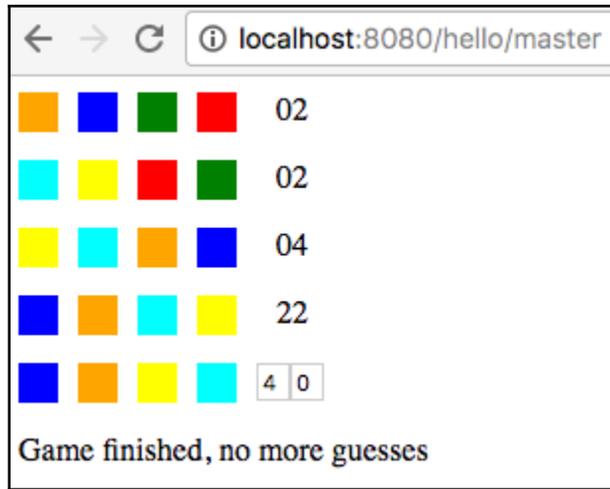
## Timeline

View: All threads



# Chapter 6: Making Our Game Professional - Do it as a Web App





```

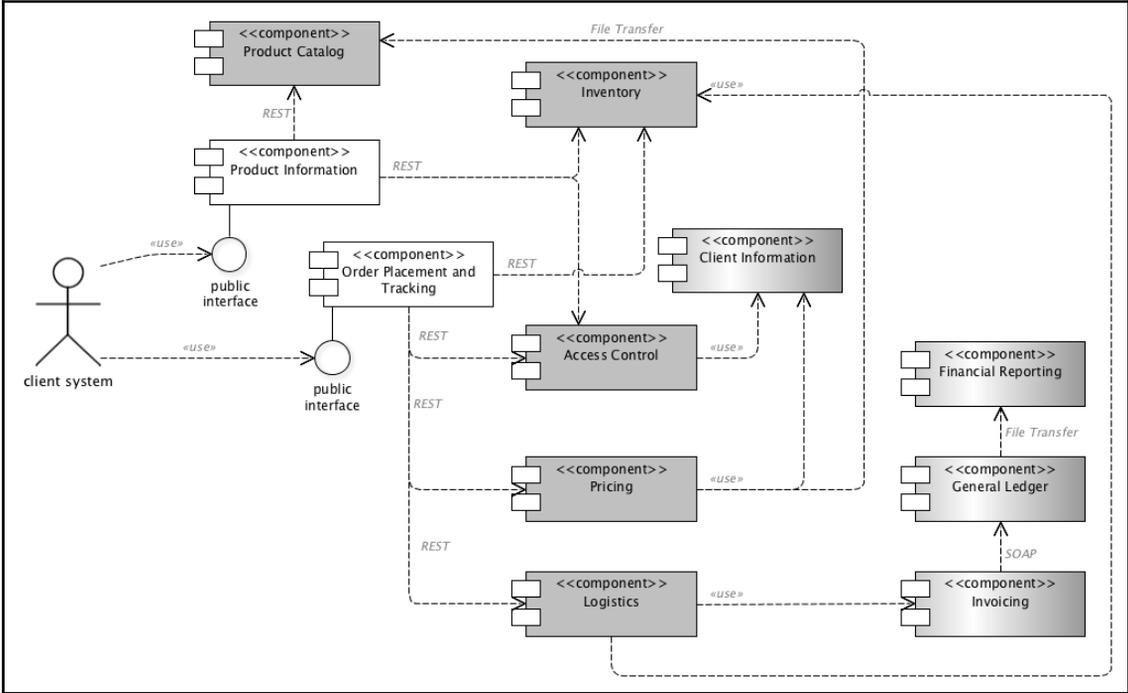
$ gradle appRun
Starting a Gradle Daemon, 1 busy and 1 incompatible Daemons could not be reused, use --status for details
WARNING: Illegal reflective access by org.codehaus.groovy.reflection.CachedClass (file:/C:/Users/peter_verhas/.gradle/caches/modules-2/files-2.1/org.codehaus.groovy/groovy/2.4.15/74b7e0b99526e559e3a59cb4dbcc204d601ee6/groovy-2.4.15.jar) to method java.lang.Object.finalize()
WARNING: Please consider reporting this to the maintainers of org.codehaus.groovy.reflection.CachedClass
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
14:04:41 INFO Jetty 9.2.24.v20180105 started and listening on port 8080
14:04:41 INFO ch06 runs at:
14:04:41 INFO http://localhost:8080/ch06

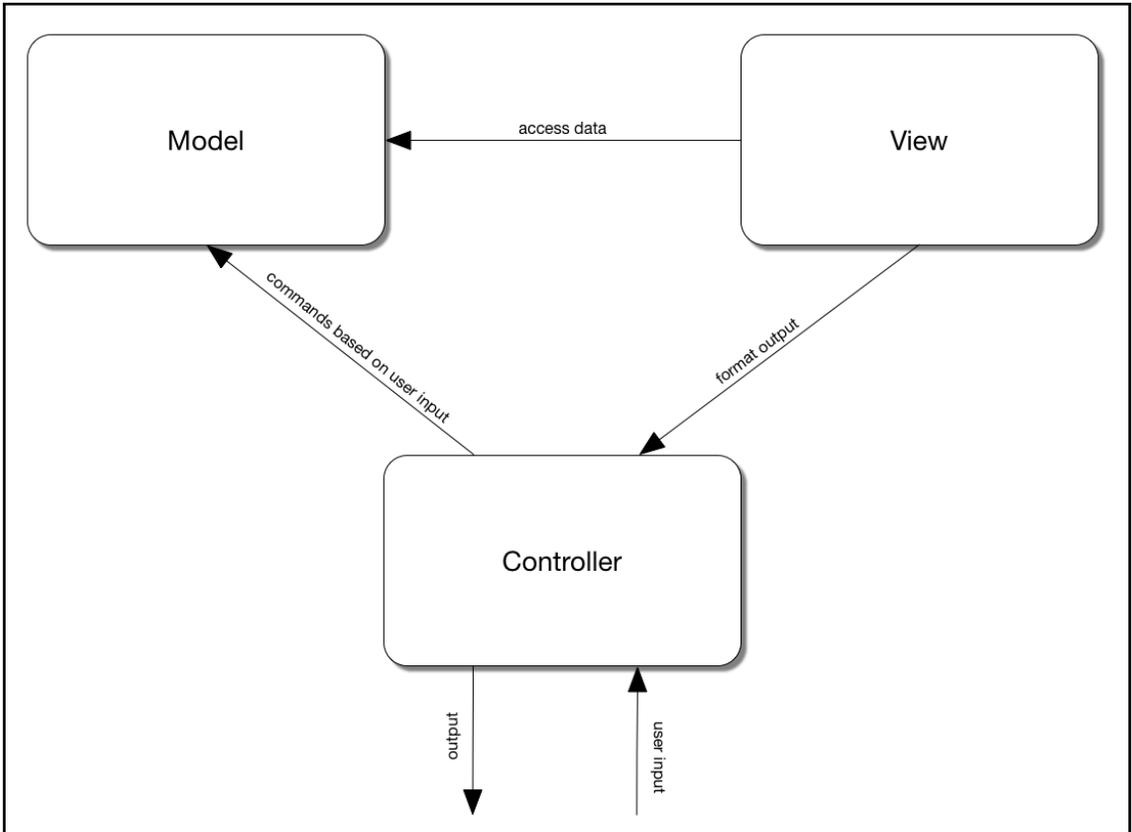
> Task :appRun
Press any key to stop the server.

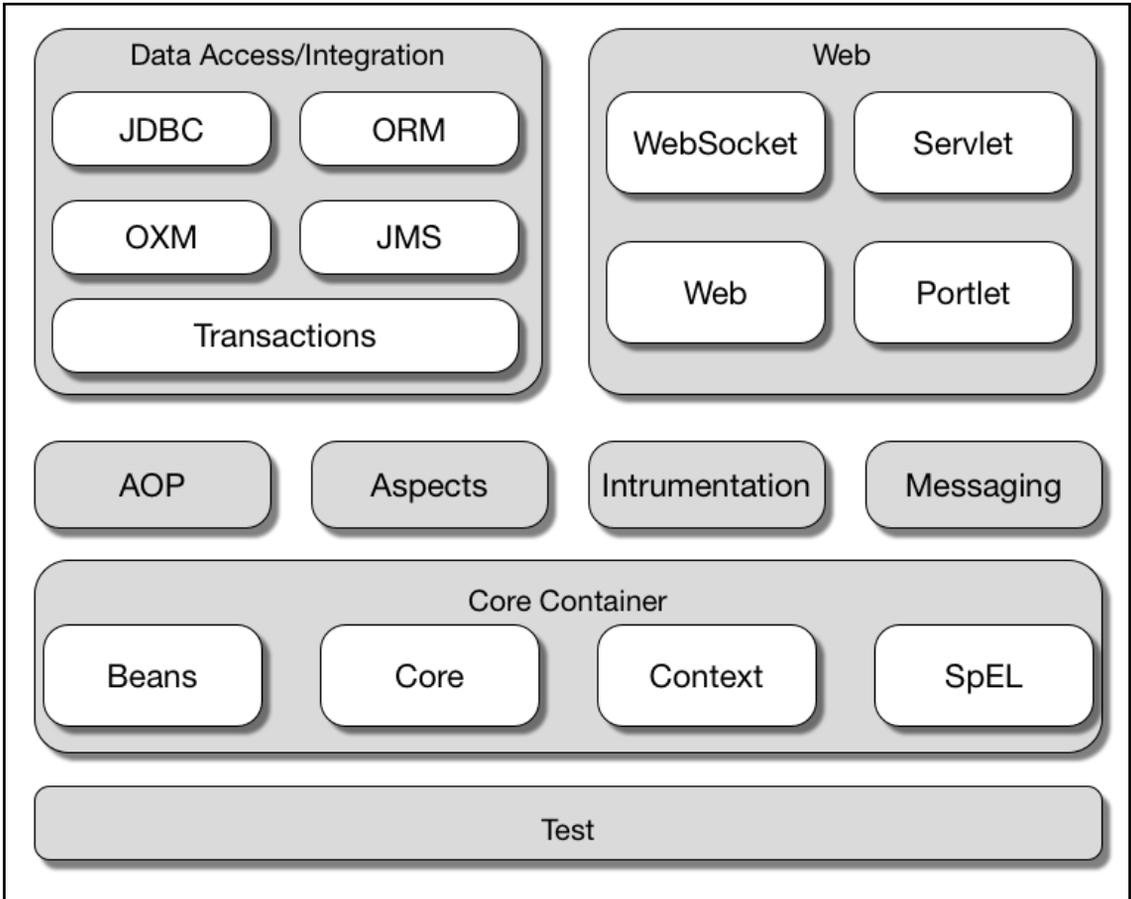
14:04:42.015 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - table is created with 4 columns and packt.javall.mastermind.ColorManager@7b2Fccd7 colorManager
14:04:42.023 [qtp131037934-15] DEBUG p.j.m.servlet.MastermindHandler - converting request to map
14:04:42.031 [qtp131037934-15] DEBUG p.j.m.servlet.MastermindHandler - last row is -1
14:04:42.031 [qtp131037934-15] DEBUG p.j.m.servlet.MastermindHandler - last row is -1
14:04:42.034 [qtp131037934-15] DEBUG p.j.m.servlet.MastermindHandler - Adding new guess 0123 to the game
14:04:42.034 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Size of thetable 1
14:04:42.034 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Fetching color #0 from row 0
14:04:42.035 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Size of thetable 1
14:04:42.036 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Fetching color #1 from row 0
14:04:42.037 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Size of thetable 1
14:04:42.037 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Fetching color #2 from row 0
14:04:42.039 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Size of thetable 1
14:04:42.039 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Fetching color #3 from row 0
14:04:42.045 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Size of thetable 1
14:04:42.046 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Fetching color #0 from row 0
14:04:42.075 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Size of thetable 1
14:04:42.075 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Fetching color #1 from row 0
14:04:42.075 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Size of thetable 1
14:04:42.075 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Fetching color #2 from row 0
14:04:42.076 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Size of thetable 1
14:04:42.076 [qtp131037934-15] DEBUG packt.javall.mastermind.Table - Fetching color #3 from row 0
----- 87% EXECUTING [38s]
> :appRun
> IDLE

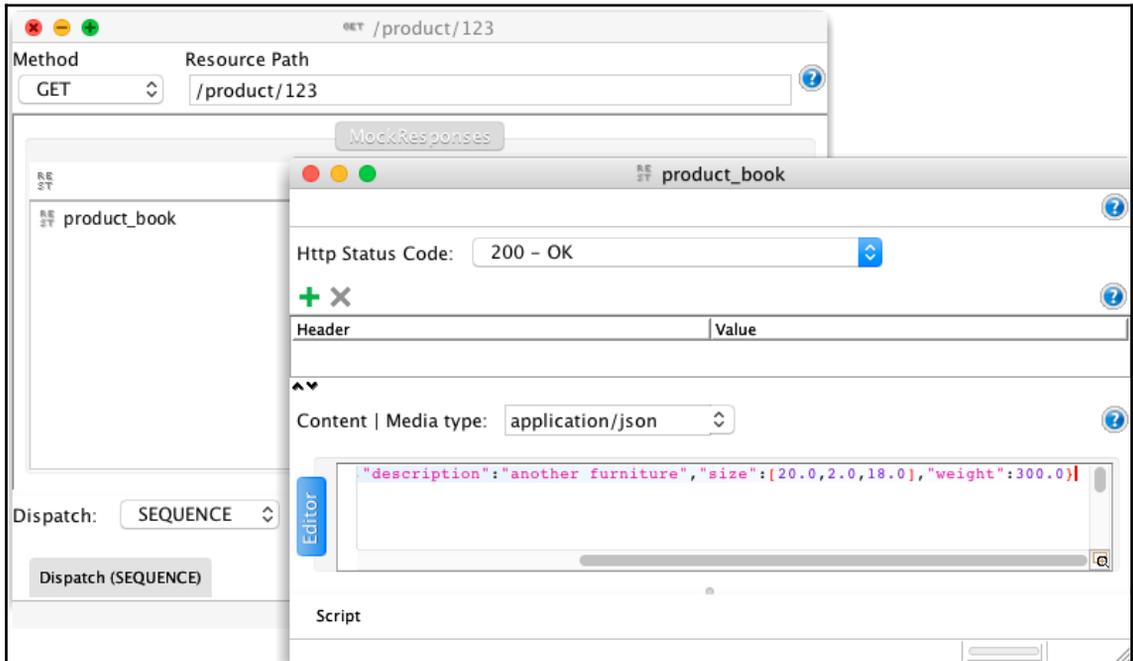
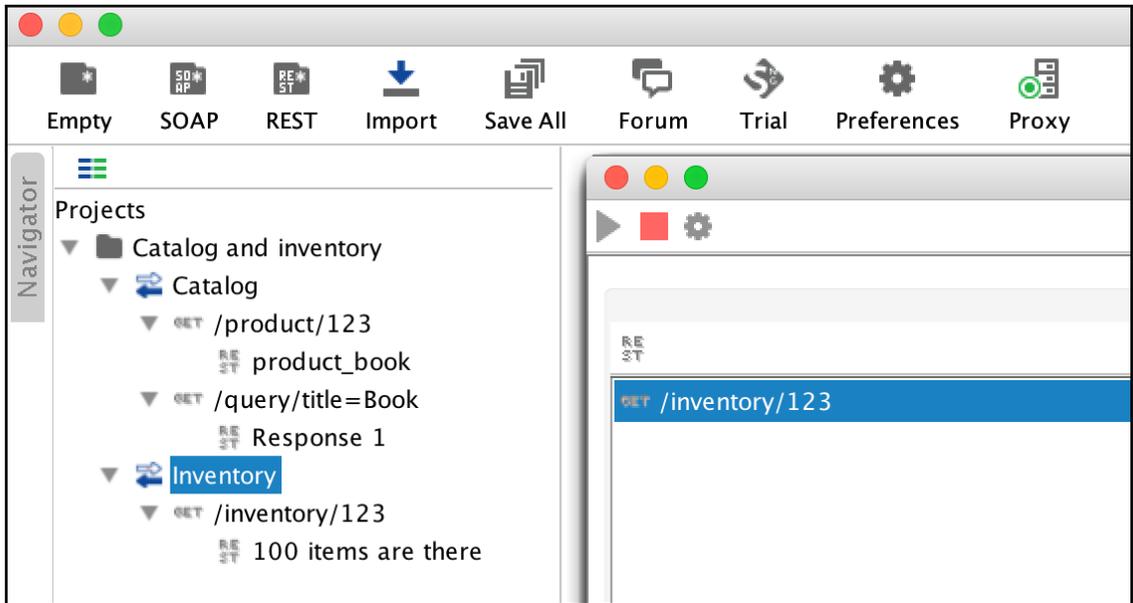
```

# Chapter 7: Building a Commercial Web Application Using REST



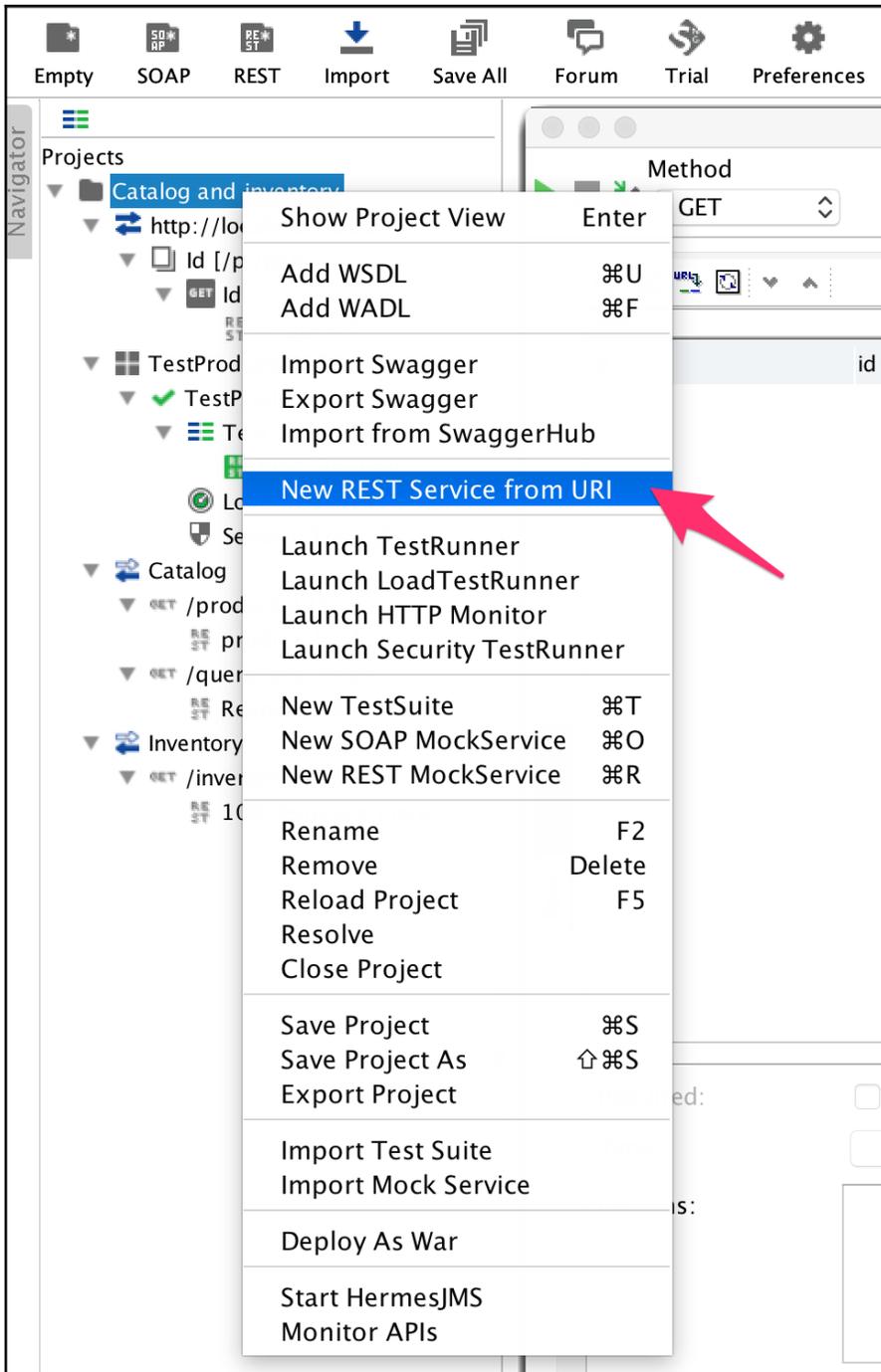






← → ↻ ⓘ localhost:8080/pi/123

```
{"id":"125","title":"Bar Stool","description":"another furniture","size":[20.0,2.0,18.0],"weight":300.0}
```



REST Request

Endpoint: <http://localhost:8080>

Resource/Method: **Id** -> **Id** `[/pi/123]`

Name	Value	Style	Level
id	123	TEMPLA...	RESOUR...

```
1 {
2   "id": "125",
3   "title": "Bar Stool",
4   "description": "another furniture",
5   "size": [
6     20,
7     2,
8     18
9   ],
10  "weight": 300
11 }
```

Headers (4) Attachments (0) SSL Info Representations (1) Schema (conflicts) JMS (0)

Assertions (1) Request Log (2)

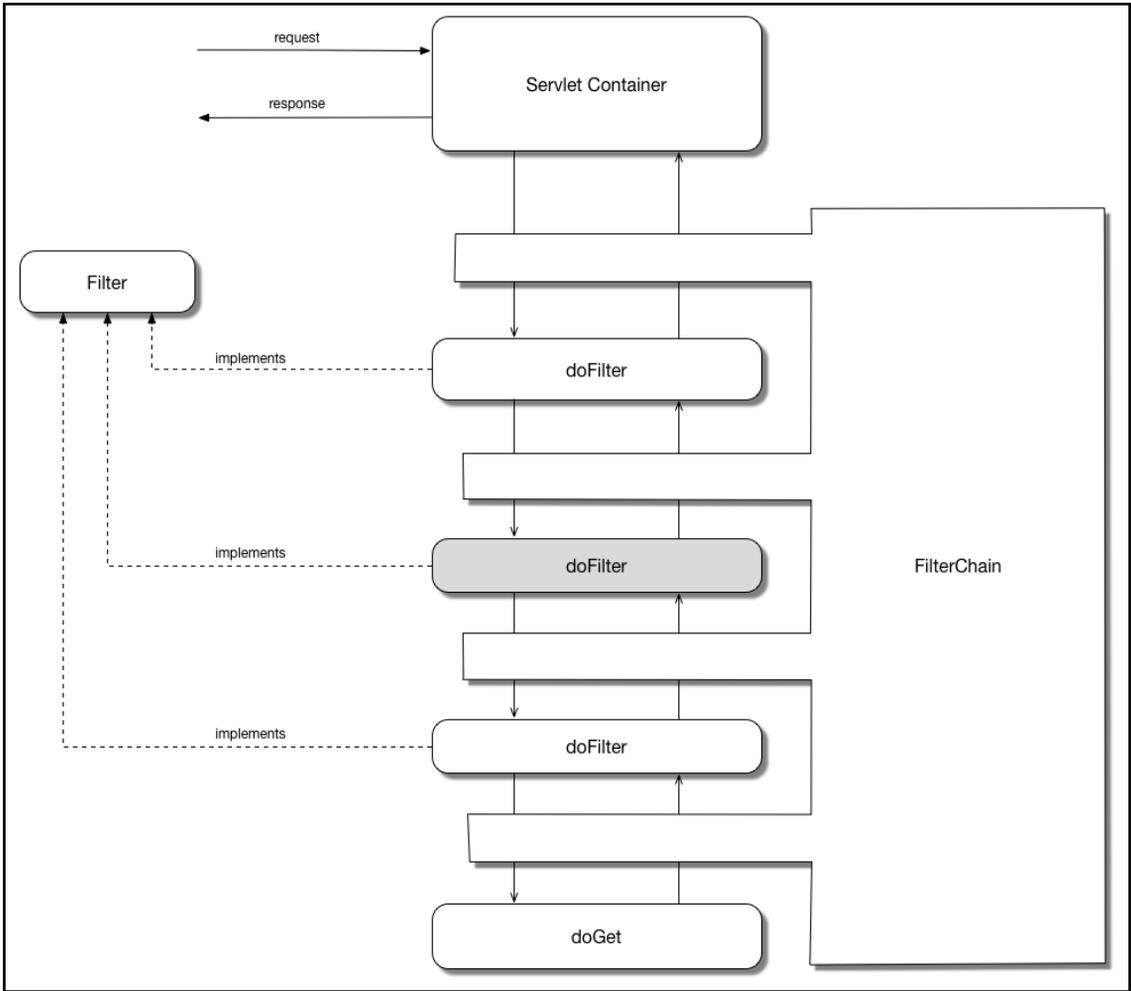
response time: 13ms (104 bytes) 1 : 1

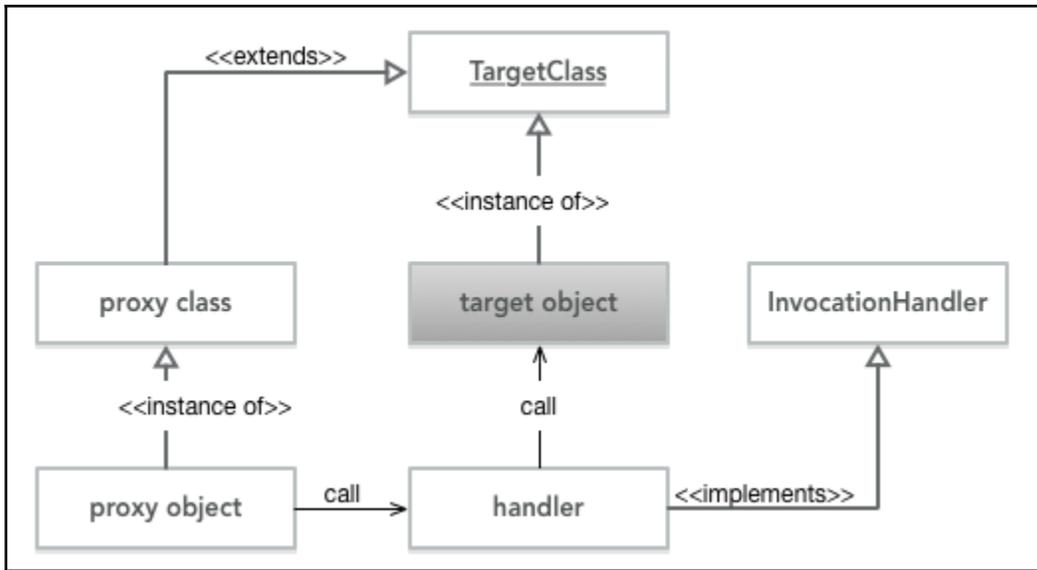
TestProductInterface

FINISHED

TestCases

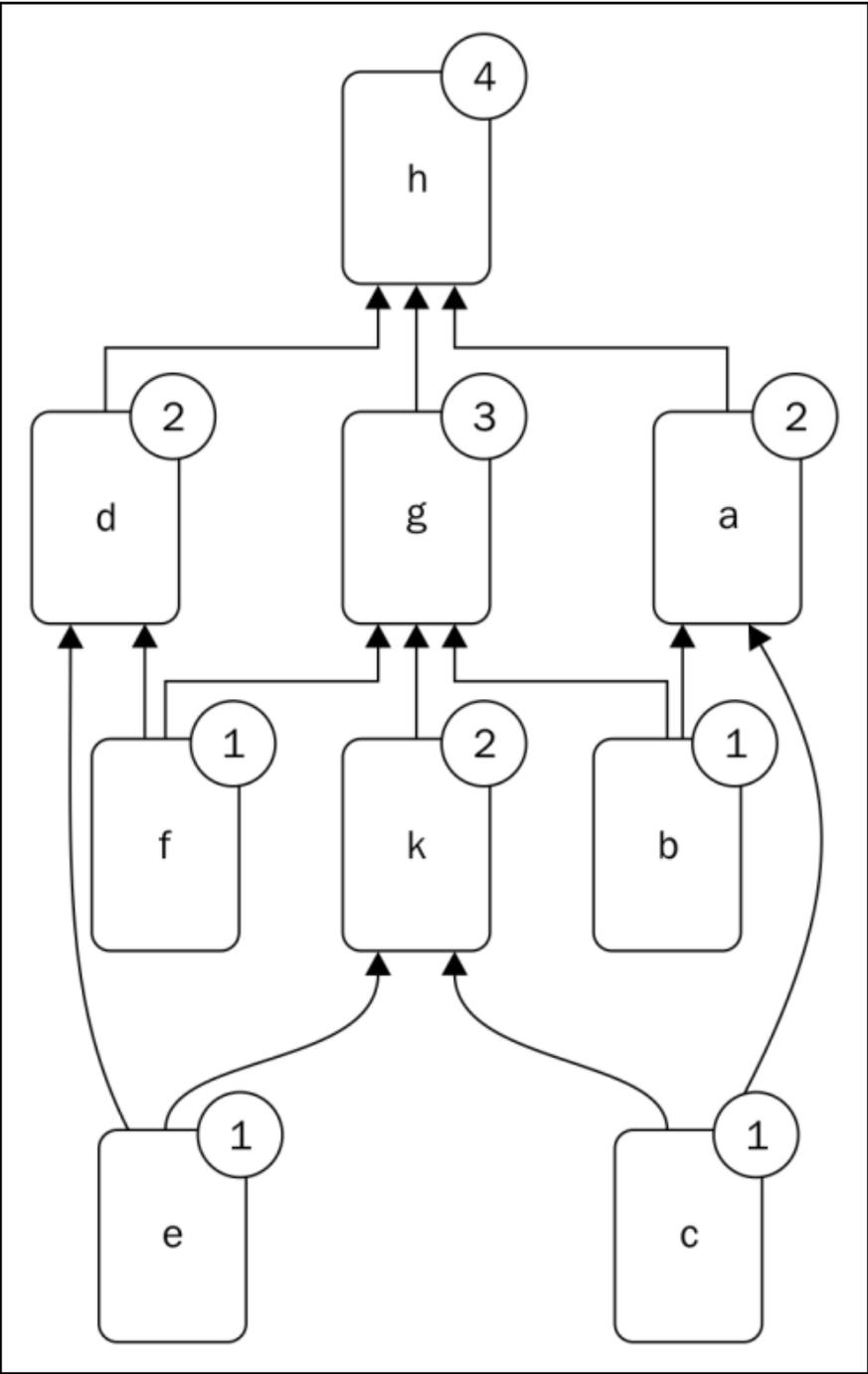
TestProductInformation

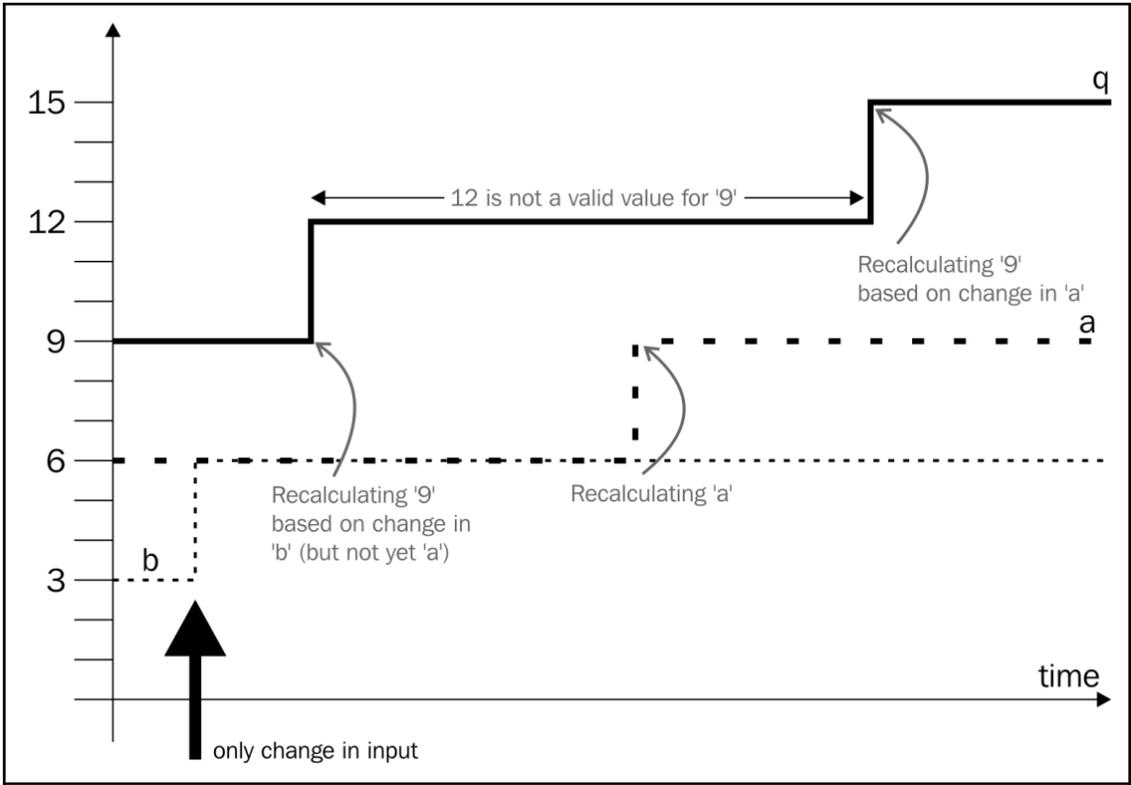


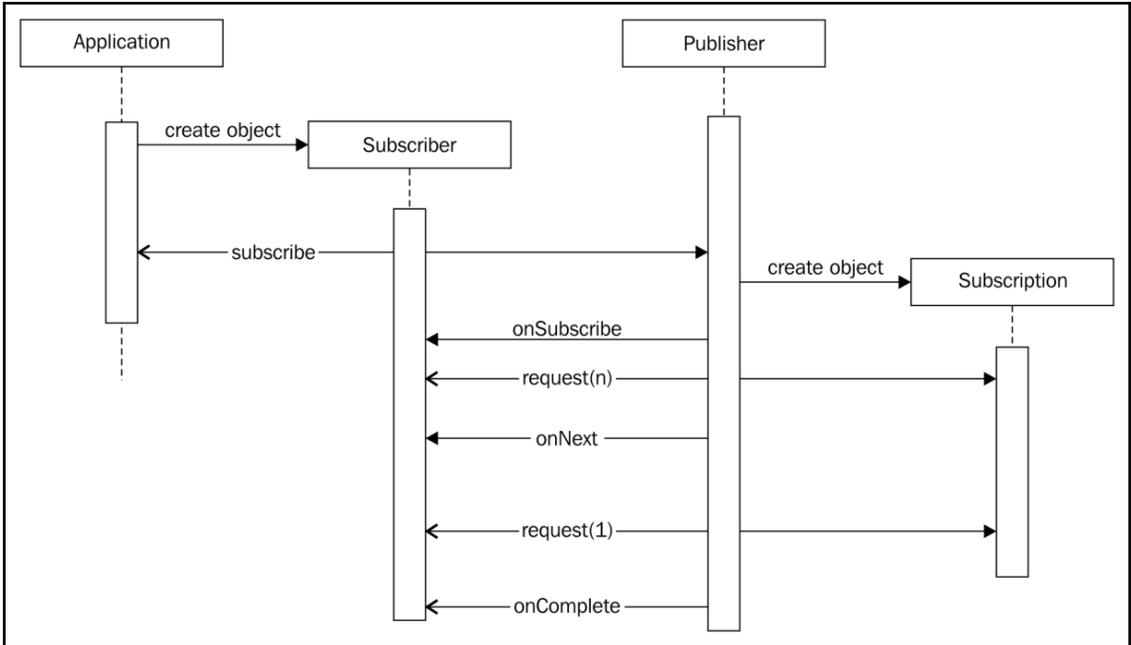
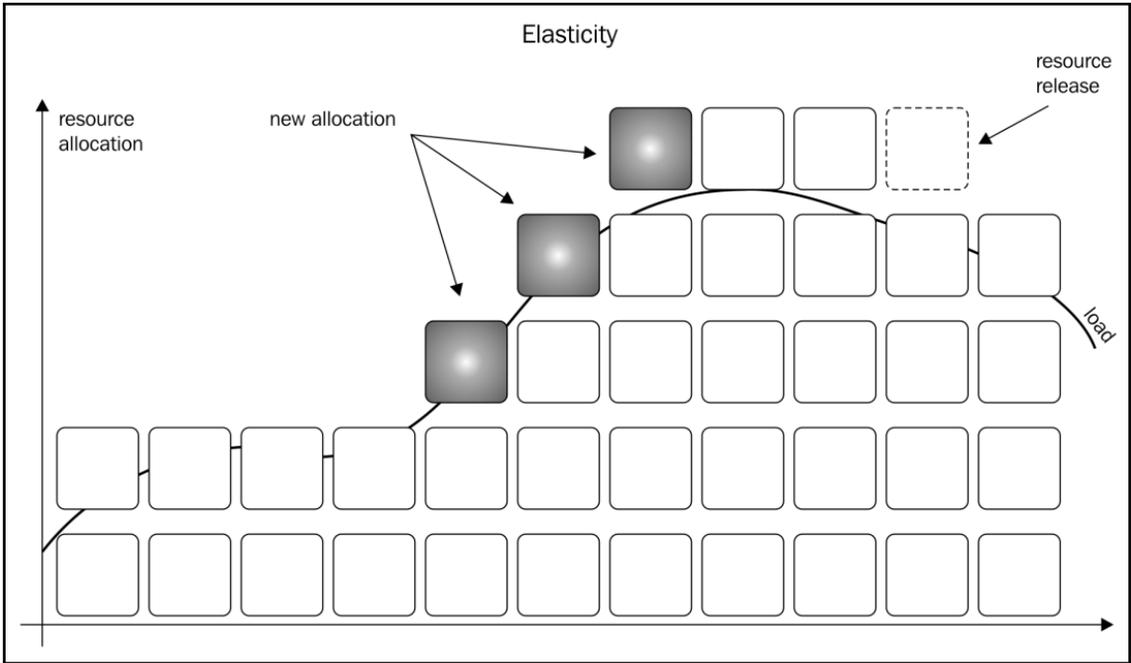


# **Chapter 9: Building an Accounting Application Using Reactive Programming**









# Chapter 10: Finalizing Java Knowledge to a Professional Level

