Maven Example & Labs

Produced by:

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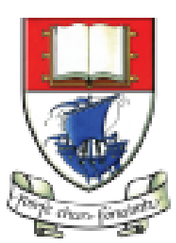


Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Department of Computing and Mathematics
http://www.wit.ie/

Installing the tool

Installing Maven

Maven is a Java tool, so you must have Java installed in order to proceed.

1. ***Download Maven (Binary archive):*** http://maven.apache.org/download.html

Binary tar.gz archive	apache-maven-3.5.0-bin.tar.gz
Binary zip archive	apache-maven-3.5.0-bin.zip

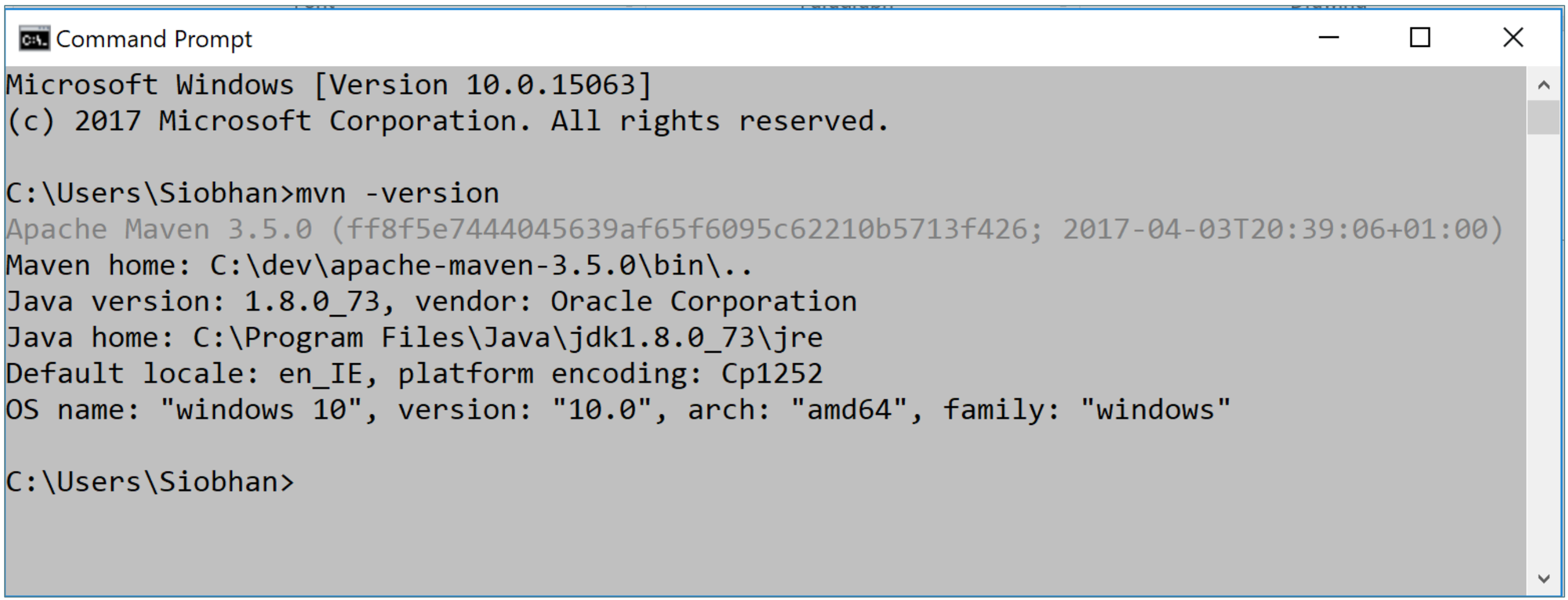
2. ***Install Maven:*** http://maven.apache.org/install.html

> The installation of Apache Maven is a simple process of extracting the archive and adding the `bin` folder with the `mvn` command to the `PATH`.

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Verifying the Install

mvn -version



http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Creating a Java Archetype Project

Creating a Java Project (using Archetypes)

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Command Prompt

```
C:\Users\Siobhan\Desktop\agile workspace>mvn archetype:generate -DgroupId=com.mycompany.app -DartifactId=my-app -D
archetypeArtifactId=maven-archetype-quickstart -DinteractiveMode=false
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building Maven Stub Project (No POM) 1
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] >>> maven-archetype-plugin:2.4:generate (default-cli) > generate-sources @ standalone-pom >>>
[INFO]
[INFO] <<< maven-archetype-plugin:2.4:generate (default-cli) < generate-sources @ standalone-pom <<<
[INFO]
[INFO]
[INFO] --- maven-archetype-plugin:2.4:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Batch mode
[INFO] ----------------------------------------------------------------------------
[INFO] Using following parameters for creating project from Old (1.x) Archetype: maven-archetype-quickstart:1.0
[INFO] ----------------------------------------------------------------------------
[INFO] Parameter: basedir, Value: C:\Users\Siobhan\Desktop\agile workspace
[INFO] Parameter: package, Value: com.mycompany.app
[INFO] Parameter: groupId, Value: com.mycompany.app
[INFO] Parameter: artifactId, Value: my-app
[INFO] Parameter: packageName, Value: com.mycompany.app
[INFO] Parameter: version, Value: 1.0-SNAPSHOT
[INFO] project created from Old (1.x) Archetype in dir: C:\Users\Siobhan\Desktop\agile workspace\my-app
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 11.173 s
[INFO] Finished at: 2017-10-13T21:48:41+01:00
[INFO] Final Memory: 13M/106M
[INFO] ------------------------------------------------------------------------

C:\Users\Siobhan\Desktop\agile workspace>
```

Creating a Java Project (using Archetypes)

Folder structure for ‘quickstart’ archetype, which is the Java sample project.

```
my-app
|-- pom.xml
`-- src
    |-- main
    |   `-- java
    |       `-- com
    |           `-- mycompany
    |               `-- app
    |                   `-- App.java
    `-- test
        `-- java
            `-- com
                `-- mycompany
                    `-- app
                        `-- AppTest.java
```

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Creating a Java Project (using Archetypes)

```
my-app
|-- pom.xml
`-- src
    |-- main
    |   `-- java
    |       `-- com
    |           `-- mycompany
    |               `-- app
    |                   `-- App.java
    `-- test
        `-- java
            `-- com
                `-- mycompany
                    `-- app
                        `-- AppTest.java
```

The base directory name is taken from artifactid.

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Creating a Java Project (using Archetypes)

```
my-app
|-- pom.xml
`-- src
    |-- main
    |   `-- java
    |       `-- com
    |           `-- mycompany
    |               `-- app
    |                   `-- App.java
    `-- test
        `-- java
            `-- com
                `-- mycompany
                    `-- app
                        `-- AppTest.java
```

```
package com.mycompany.app;

public class App
{
    public static void main( String[] args )
    {
        System.out.println( "Hello World!" );
    }
}
```

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Creating a Java Project (using Archetypes)

DinteractiveMode:
If set to true, maven will ask confirmation on each step of the project generation.

```
my-app
|-- pom.xml
`-- src
    |-- main
    |   `-- java
    |       `-- com
    |           `-- mycompany
    |               `-- app
    |                   `-- App.java
    `-- test
        `-- java
            `-- com
                `-- mycompany
                    `-- app
                        `-- AppTest.java
```

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Creating a Java Project (using Archetypes)

```
my-app
|-- pom.xml
`-- src
    |-- main
    |   `-- java
    |       `-- com
    |           `-- mycompany
    |               `-- app
    |                   `-- App.java
    `-- test
        `-- java
            `-- com
                `-- mycompany
                    `-- app
                        `-- AppTest.java
```

A minimal POM is included in base directory.

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

pom.xml

pom.xml

```xml
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/maven-v4_0_0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <groupId>com.mycompany.app</groupId>
  <artifactId>my-app</artifactId>
  <packaging>jar</packaging>
  <version>1.0-SNAPSHOT</version>
  <name>my-app</name>
  <url>http://maven.apache.org</url>
  <dependencies>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>3.8.1</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

pom.xml

```
<project xmlns="http://maven.apache.org/
  xsi:schemaLocation="http://maven.apach
  <modelVersion>4.0.0</modelVersion>
  <groupId>com.mycompany.app</groupId>
  <artifactId>my-app</artifactId>
  <packaging>jar</packaging>
  <version>1.0-SNAPSHOT</version>
  <name>my-app</name>
  <url>http://maven.apache.org</url>
  <dependencies>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>3.8.1</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>
```

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
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```

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pom.xml

```
<project xmlns="http://maven.apache.org/
  xsi:schemaLocation="http://maven.apach
  <modelVersion>4.0.0</modelVersion>
  <groupId>com.mycompany.app</groupId>
  <artifactId>my-app</artifactId>
  <packaging>jar</packaging>
  <version>1.0-SNAPSHOT</version>
  <name>my-app</name>
  <url>http://maven.apache.org</url>
  <dependencies>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>3.8.1</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>
```

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

pom.xml

SNAPSHOT indicates that the version is still in development (i.e. not released).

Unlike regular versions, **Maven** checks for a new **SNAPSHOT** version in the repository for every build.

```
<project xmlns="http://maven.apache.org/
  xsi:schemaLocation="http://maven.apach
  <modelVersion>4.0.0</modelVersion>
  <groupId>com.mycompany.app</groupId>
  <artifactId>my-app</artifactId>
  <packaging>jar</packaging>
  <version>1.0-SNAPSHOT</version>
  <name>my-app</name>
  <url>http://maven.apache.org</url>
  <dependencies>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>3.8.1</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>
```

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

pom.xml

One dependency, **JUnit 3.8.1** has been included with the sample project.

```
<project xmlns="http://maven.apache.org/
  xsi:schemaLocation="http://maven.apach
  <modelVersion>4.0.0</modelVersion>
  <groupId>com.mycompany.app</groupId>
  <artifactId>my-app</artifactId>
  <packaging>jar</packaging>
  <version>1.0-SNAPSHOT</version>
  <name>my-app</name>
  <url>http://maven.apache.org</url>
  <dependencies>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>3.8.1</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>
```

```
mvn archetype:generate
    -DgroupId=com.mycompany.app
    -DartifactId=my-app
    -DarchetypeArtifactId=maven-archetype-quickstart
    -DinteractiveMode=false
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Building the Project

RECAP – Build LifeCycle

- When user invokes a lifecycle phase, all its predecessors are also executed, if necessary, e.g.

mvn package

(invokes validate, compile & test also).

validate
compile
test
package
verify
install
deploy

Build the Project (1 of 2) mvn package

Command Prompt

```
C:\Users\Siobhan\Desktop\agile workspace\my-app>mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building my-app 1.0-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ my-app ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory C:\Users\Siobhan\Desktop\agile workspace\my-app\src\main\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ my-app ---
[INFO] Changes detected - recompiling the module!
[WARNING] File encoding has not been set, using platform encoding Cp1252, i.e. build is platform dependent!
[INFO] Compiling 1 source file to C:\Users\Siobhan\Desktop\agile workspace\my-app\target\classes
[INFO]
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ my-app ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory C:\Users\Siobhan\Desktop\agile workspace\my-app\src\test\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ my-app ---
[INFO] Changes detected - recompiling the module!
[WARNING] File encoding has not been set, using platform encoding Cp1252, i.e. build is platform dependent!
[INFO] Compiling 1 source file to C:\Users\Siobhan\Desktop\agile workspace\my-app\target\test-classes
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ my-app ---
[INFO] Surefire report directory: C:\Users\Siobhan\Desktop\agile workspace\my-app\target\surefire-reports
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

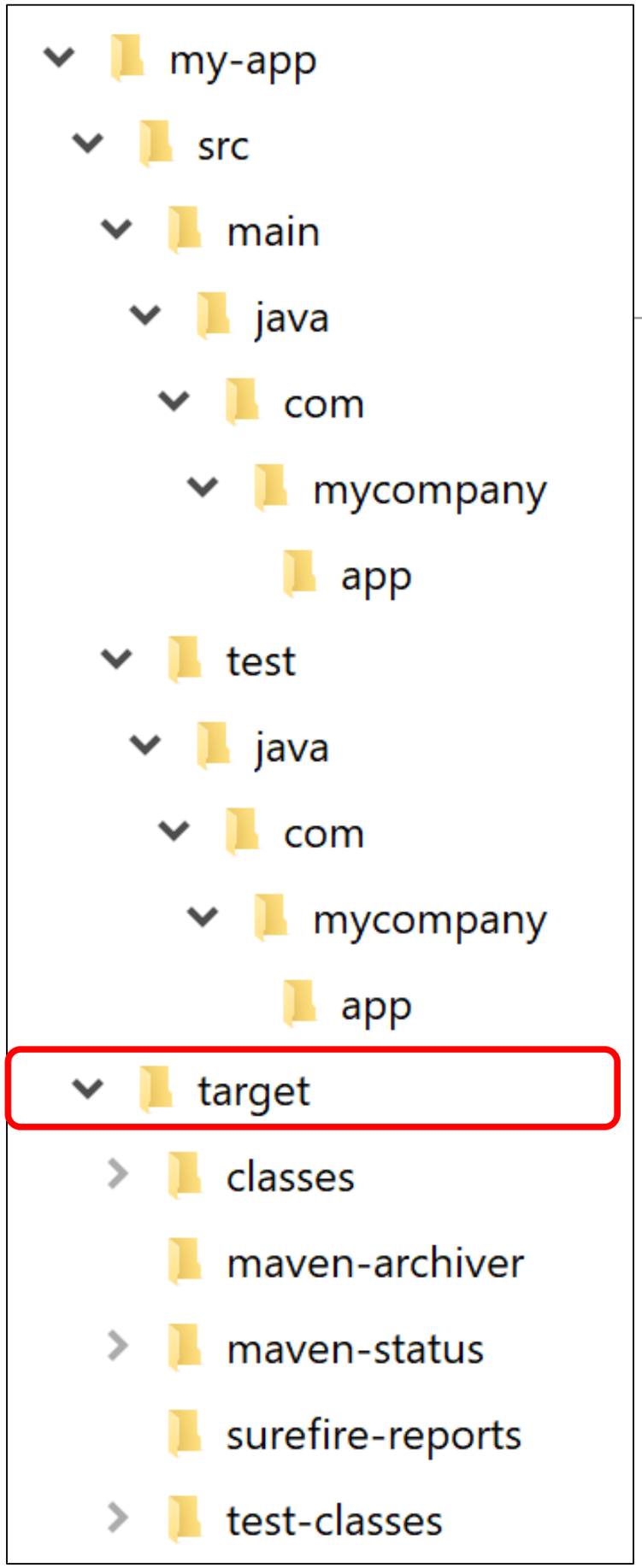
Build the Project (2 of 2) mvn package

Command Prompt

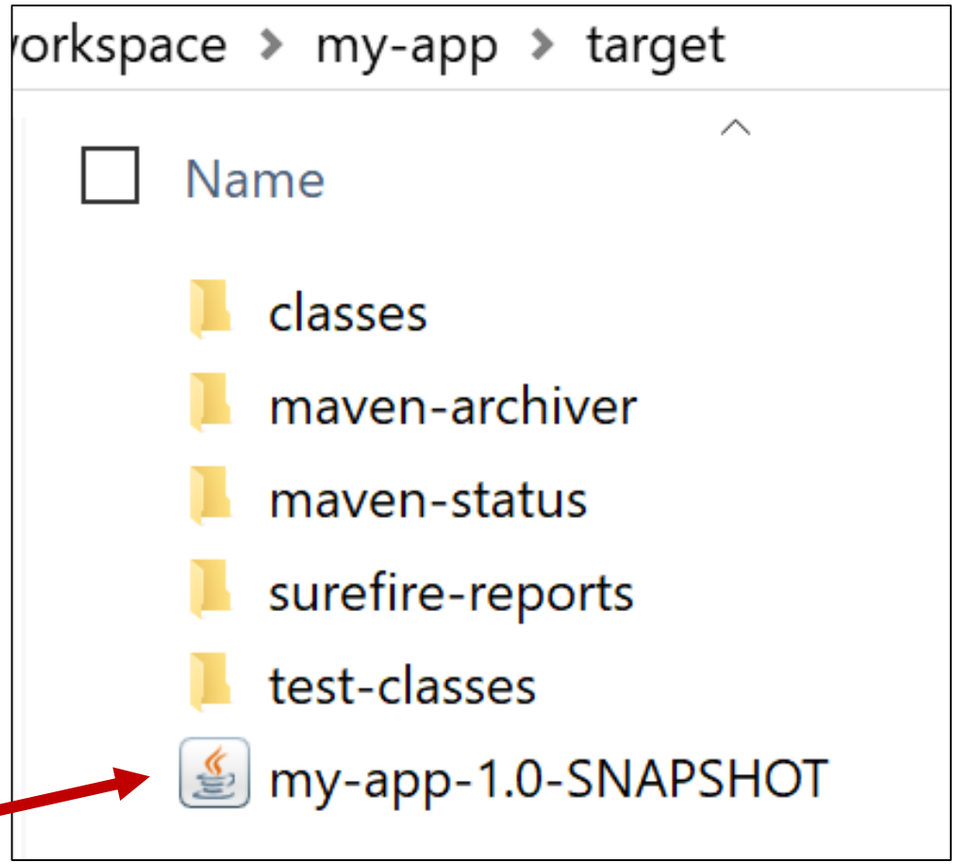
```
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ my-app ---
[INFO] Surefire report directory: C:\Users\Siobhan\Desktop\agile workspace\my-app\target\surefire-reports

-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running com.mycompany.app.AppTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.008 sec

Results :

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar) @ my-app ---
[INFO] Building jar: C:\Users\Siobhan\Desktop\agile workspace\my-app\target\my-app-1.0-SNAPSHOT.jar
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 6.278 s
[INFO] Finished at: 2017-10-13T22:35:01+01:00
[INFO] Final Memory: 14M/115M
[INFO] ------------------------------------------------------------------------

C:\Users\Siobhan\Desktop\agile workspace\my-app>
```

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Build the Project – target directory

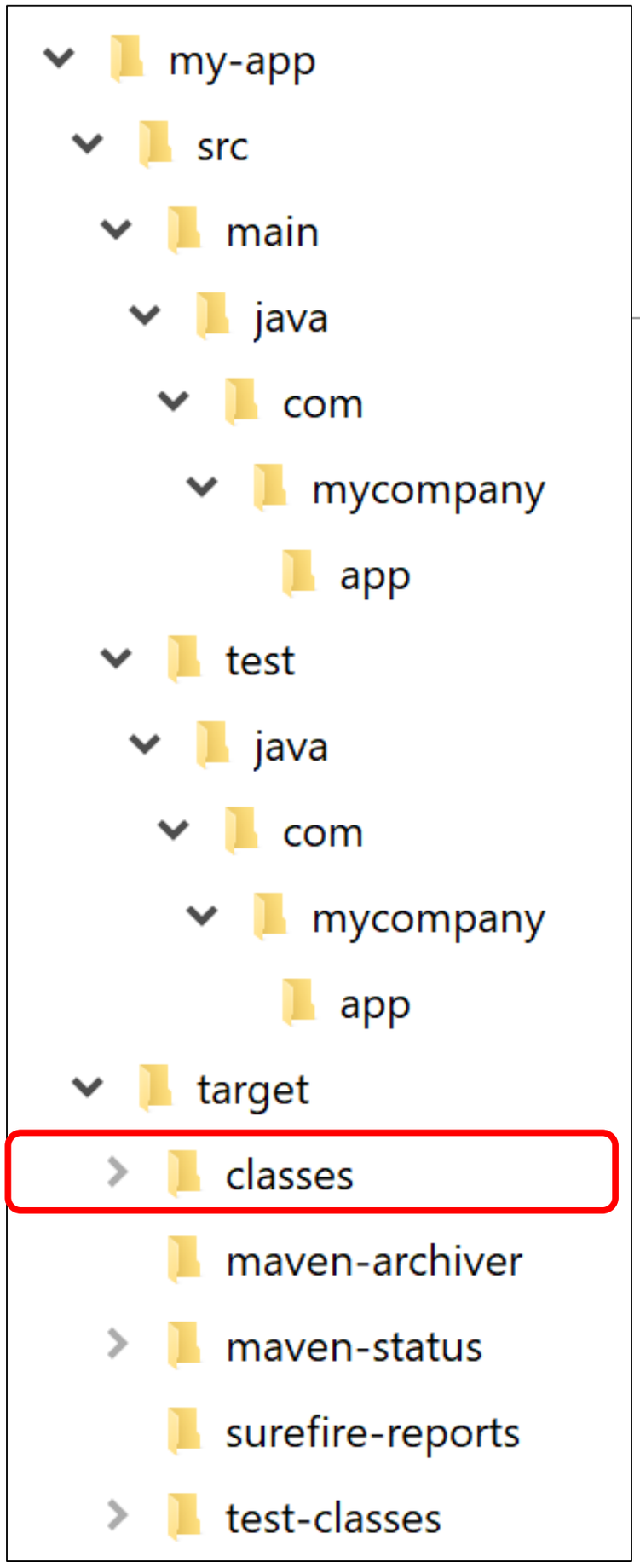


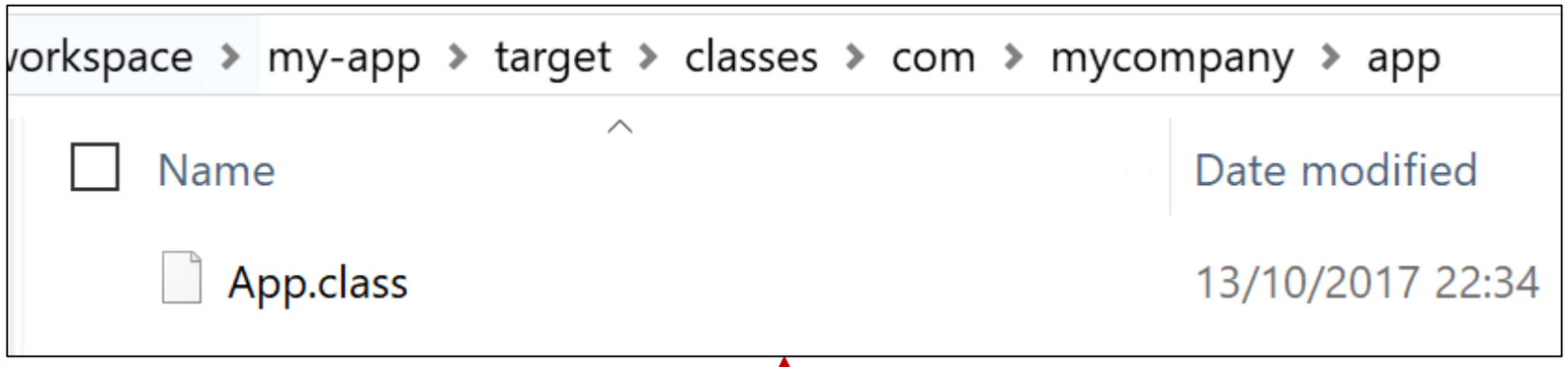
Jar package



http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Build the Project – target directory

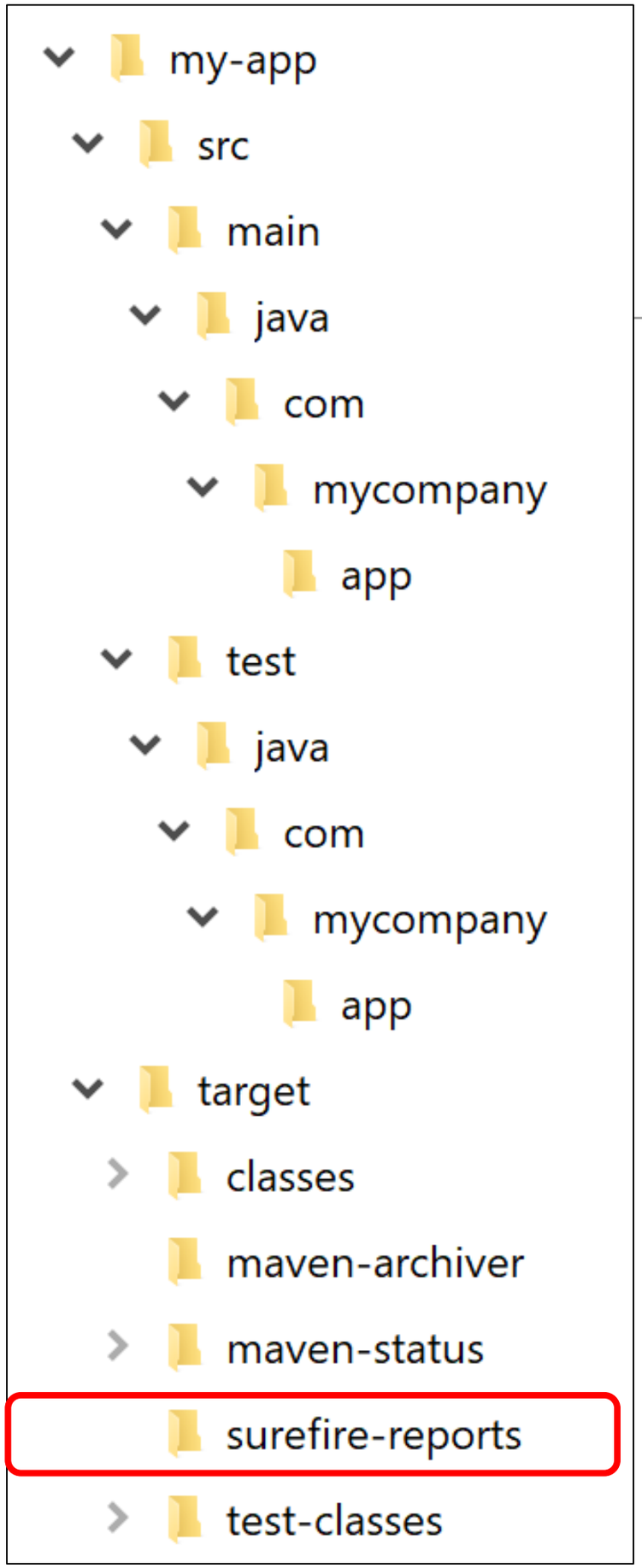


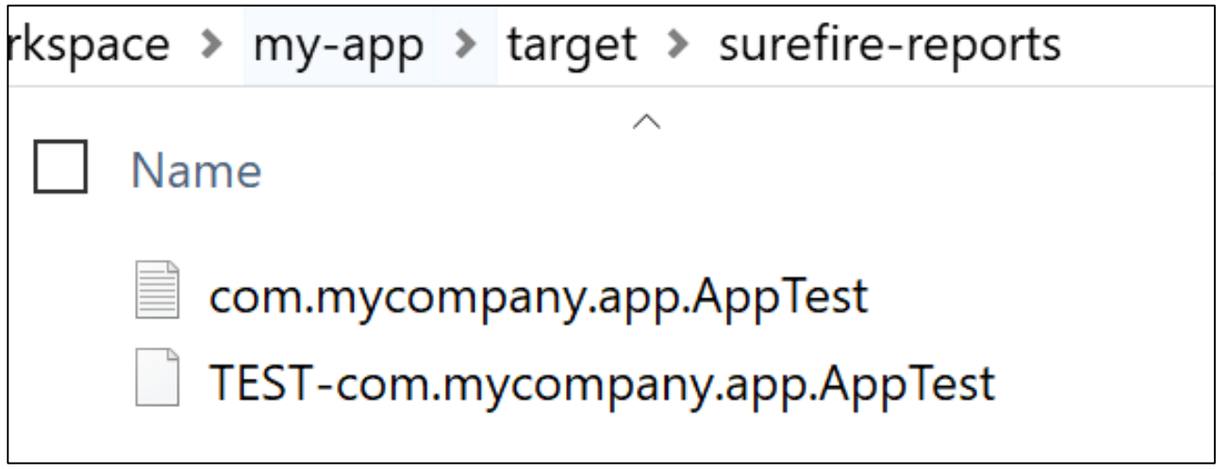


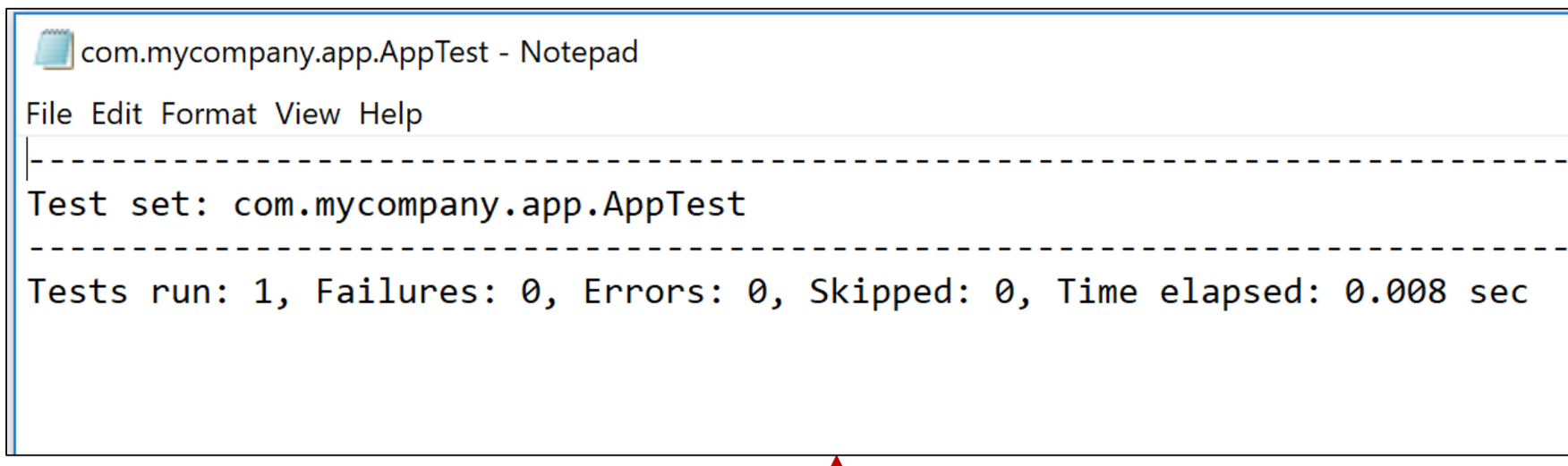
Compiled Java Classes

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Build the Project – target directory



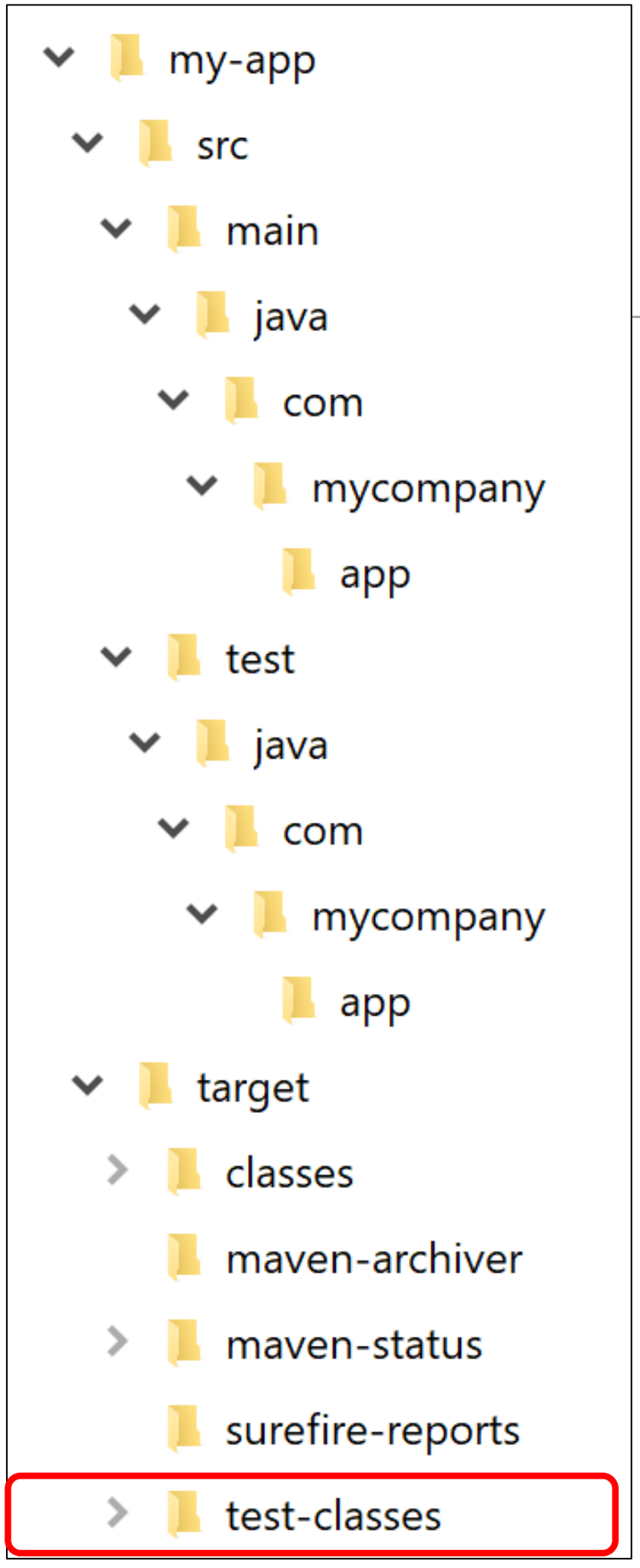


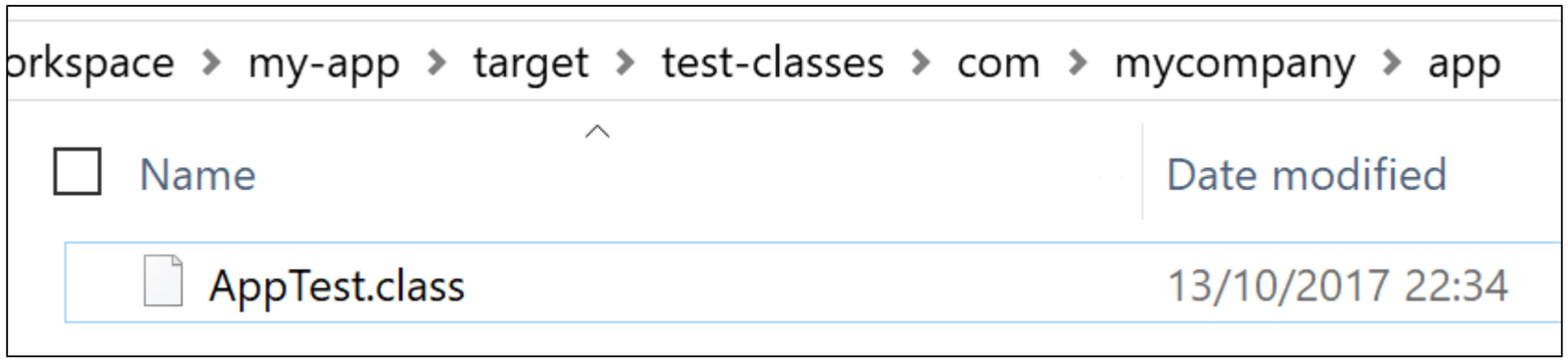


Results of JUnit Tests (they were also printed to the console)

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Build the Project – target directory





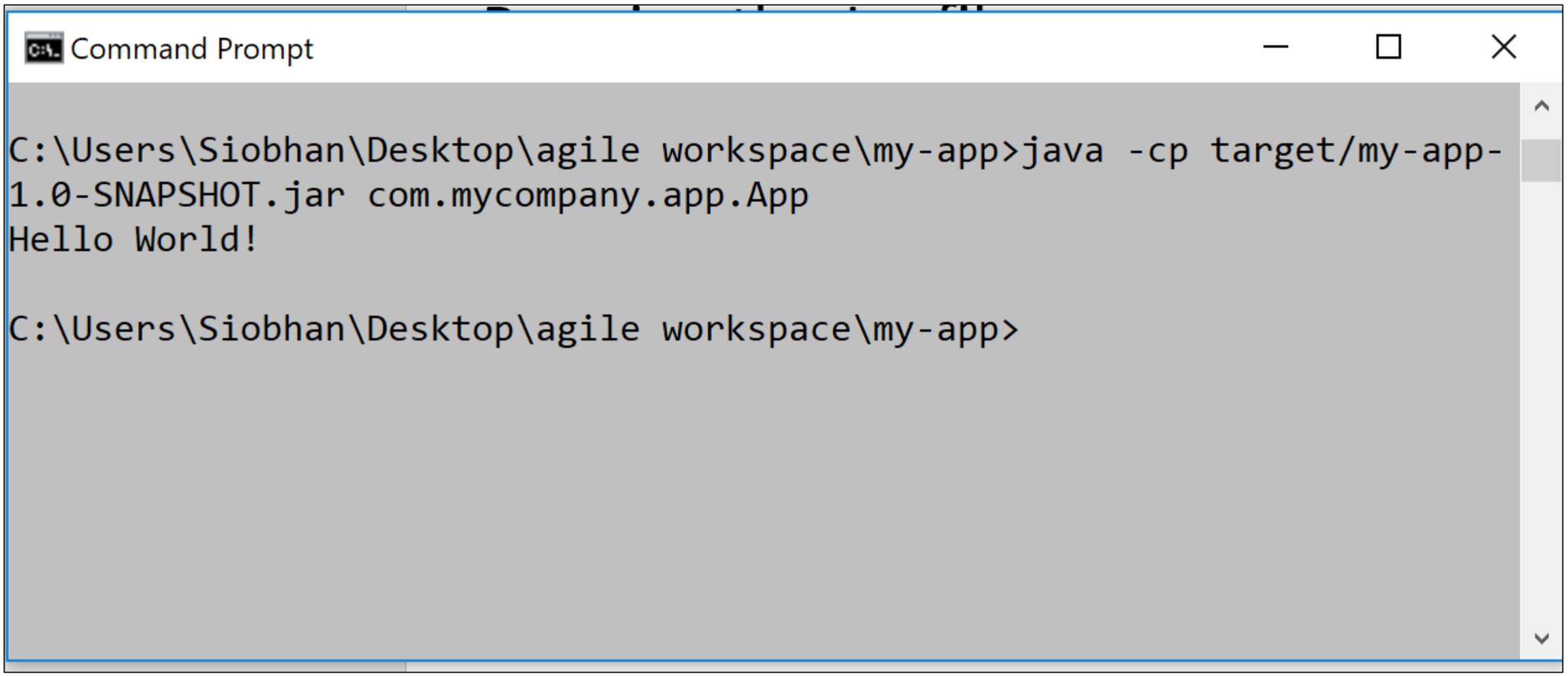
Compiled JUnit Classes

http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Running the Project

Running the Jar file

```
java -cp target/my-app-1.0-SNAPSHOT.jar com.mycompany.app.App
```



http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Generating the Site

Generating a Site for the App

mvn site

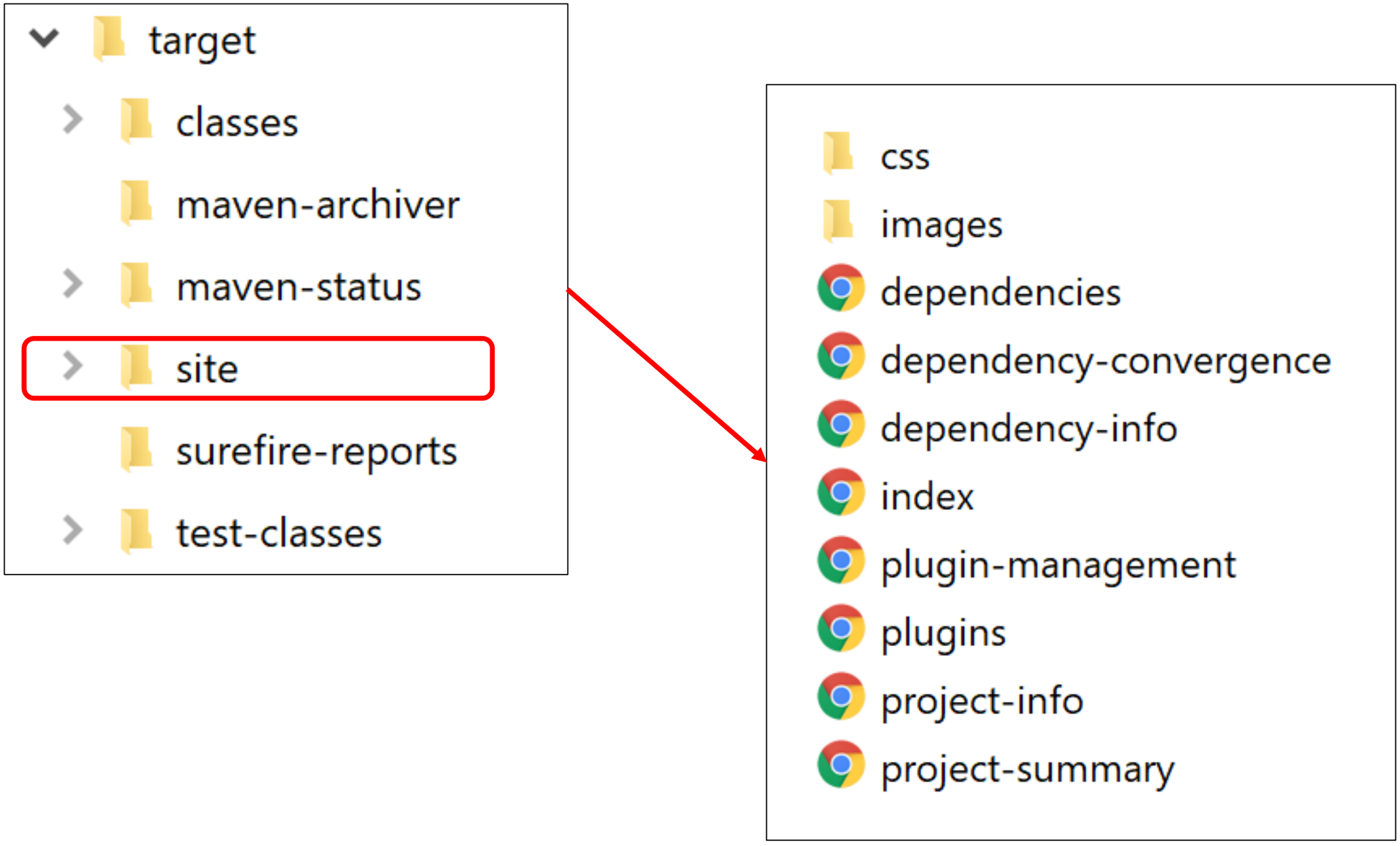
generates a site based upon information on the project's pom.

Command Prompt

```
C:\Users\Siobhan\Desktop\agile workspace\my-app>mvn site
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building my-app 1.0-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] --- maven-site-plugin:3.3:site (default-site) @ my-app ---
[WARNING] Report plugin org.apache.maven.plugins:maven-project-info-reports-plugin has an empty version.
[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.
[INFO] configuring report plugin org.apache.maven.plugins:maven-project-info-reports-plugin:2.9
[INFO] Relativizing decoration links with respect to project URL: http://maven.apache.org
[INFO] Rendering site with org.apache.maven.skins:maven-default-skin:jar:1.0 skin.
[INFO] Generating "Dependencies" report    --- maven-project-info-reports-plugin:2.9
[INFO] Generating "Dependency Convergence" report    --- maven-project-info-reports-plugin:2.9
[INFO] Generating "Dependency Information" report    --- maven-project-info-reports-plugin:2.9
[INFO] Generating "About" report    --- maven-project-info-reports-plugin:2.9
[INFO] Generating "Plugin Management" report    --- maven-project-info-reports-plugin:2.9
[INFO] Generating "Plugins" report    --- maven-project-info-reports-plugin:2.9
[INFO] Generating "Summary" report    --- maven-project-info-reports-plugin:2.9
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 11.695 s
```

Generating a Site for the App

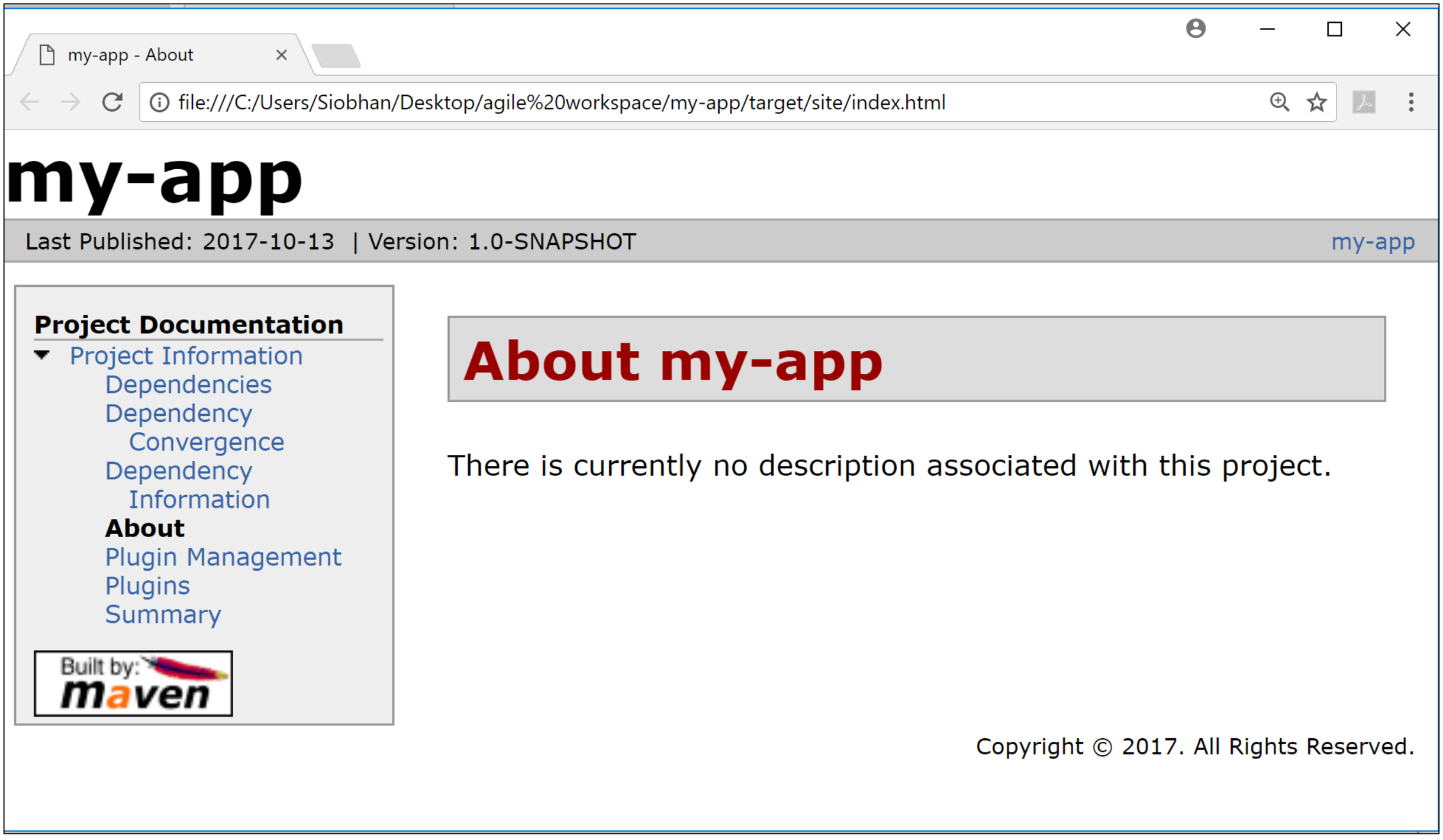
mvn site



http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

Generating a Site for the App

mvn site



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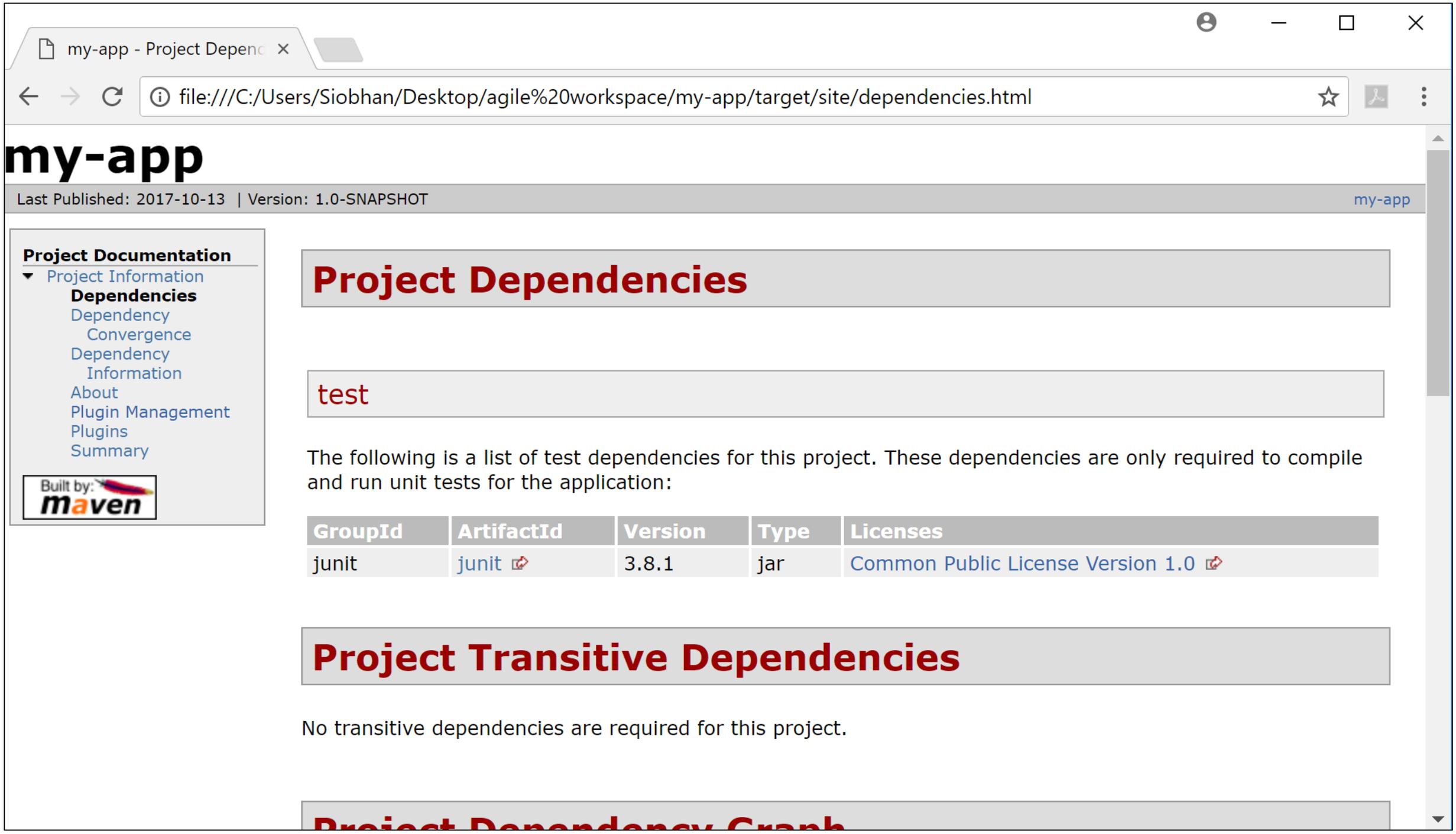
Generating a Site for the App

mvn site



http://maven.apache.org/guides/getting-started/maven-in-five-minutes.html

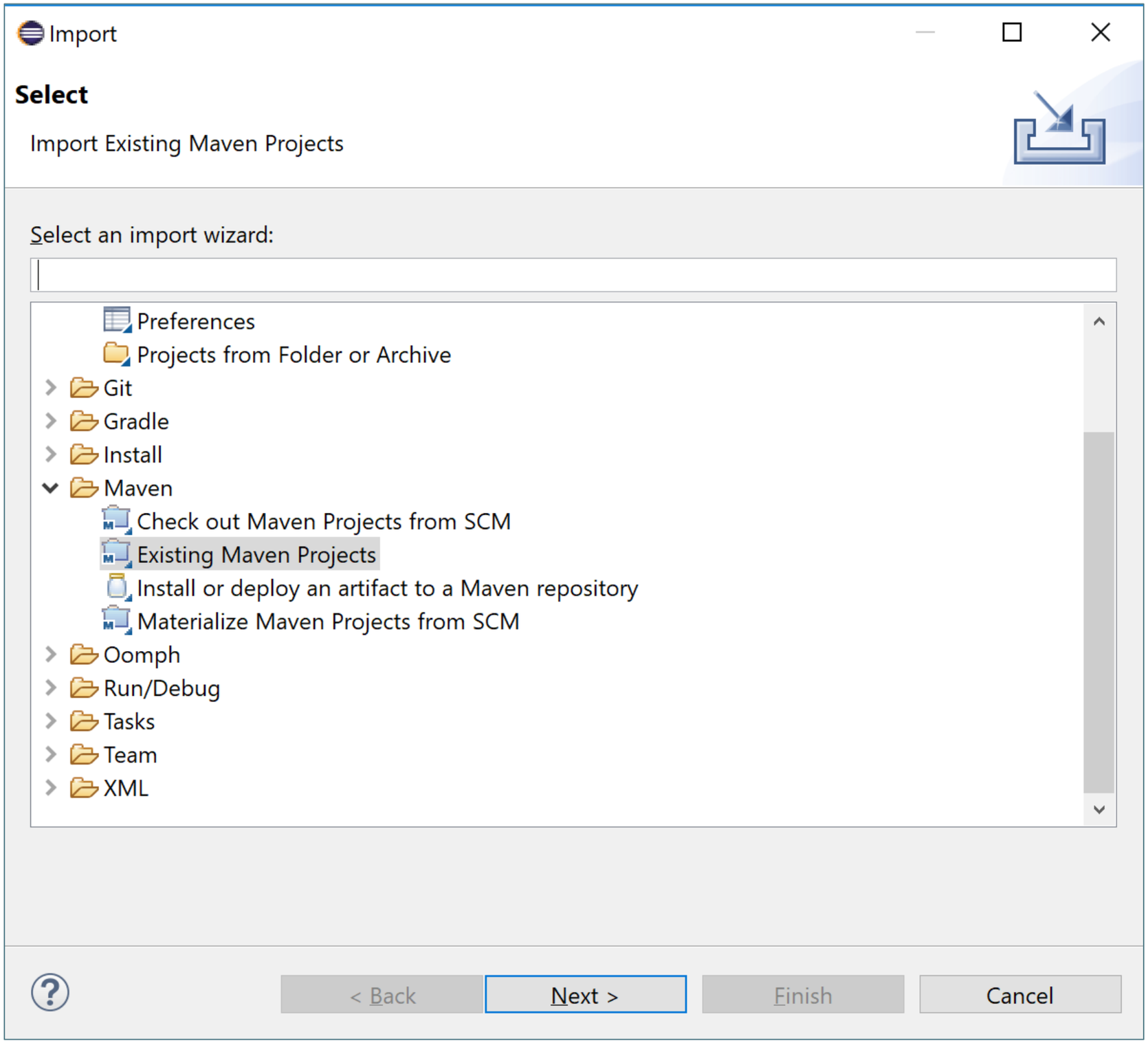
Importing into Eclipse

Import into Eclipse

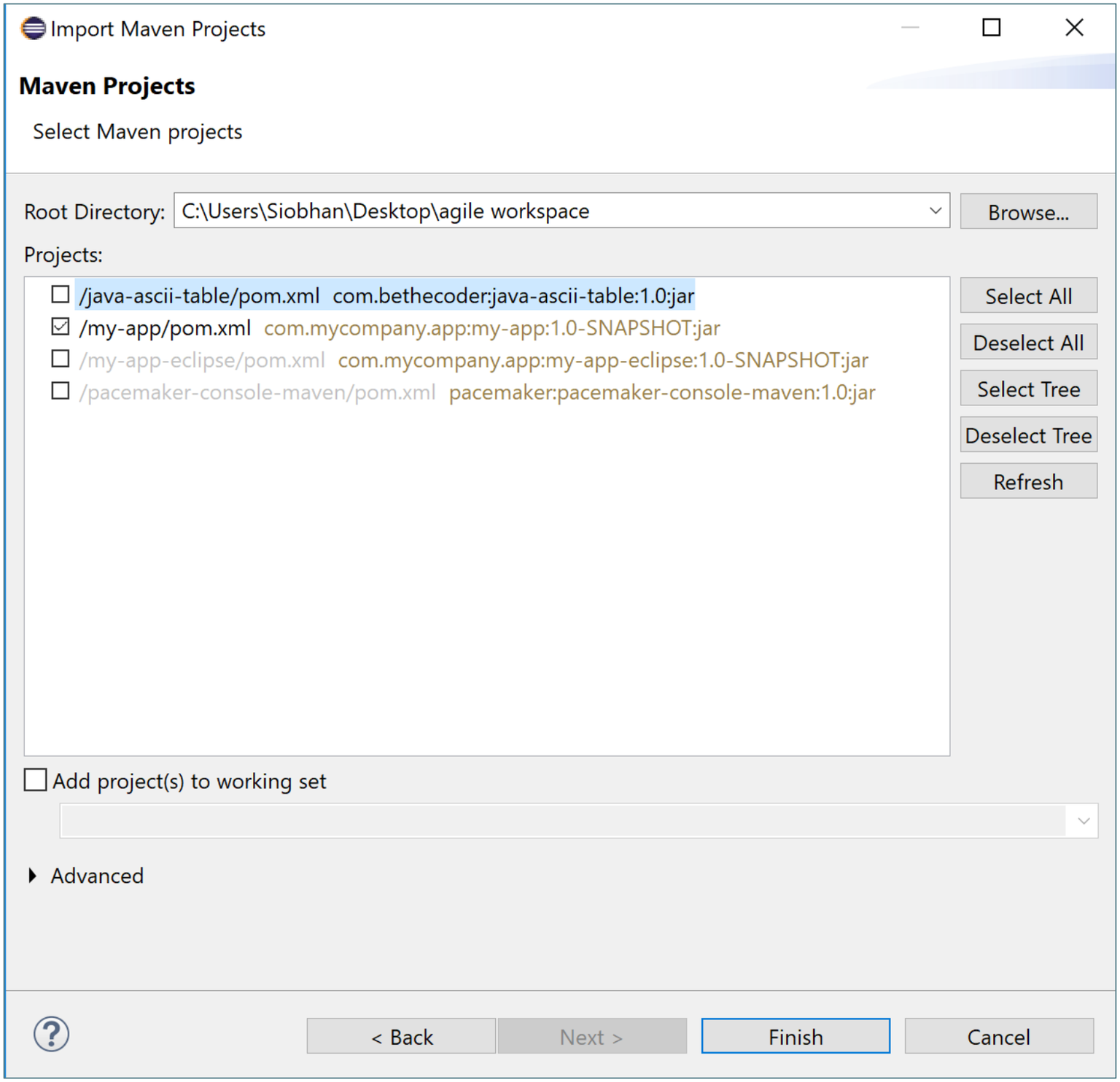
Menu Items:

→ File

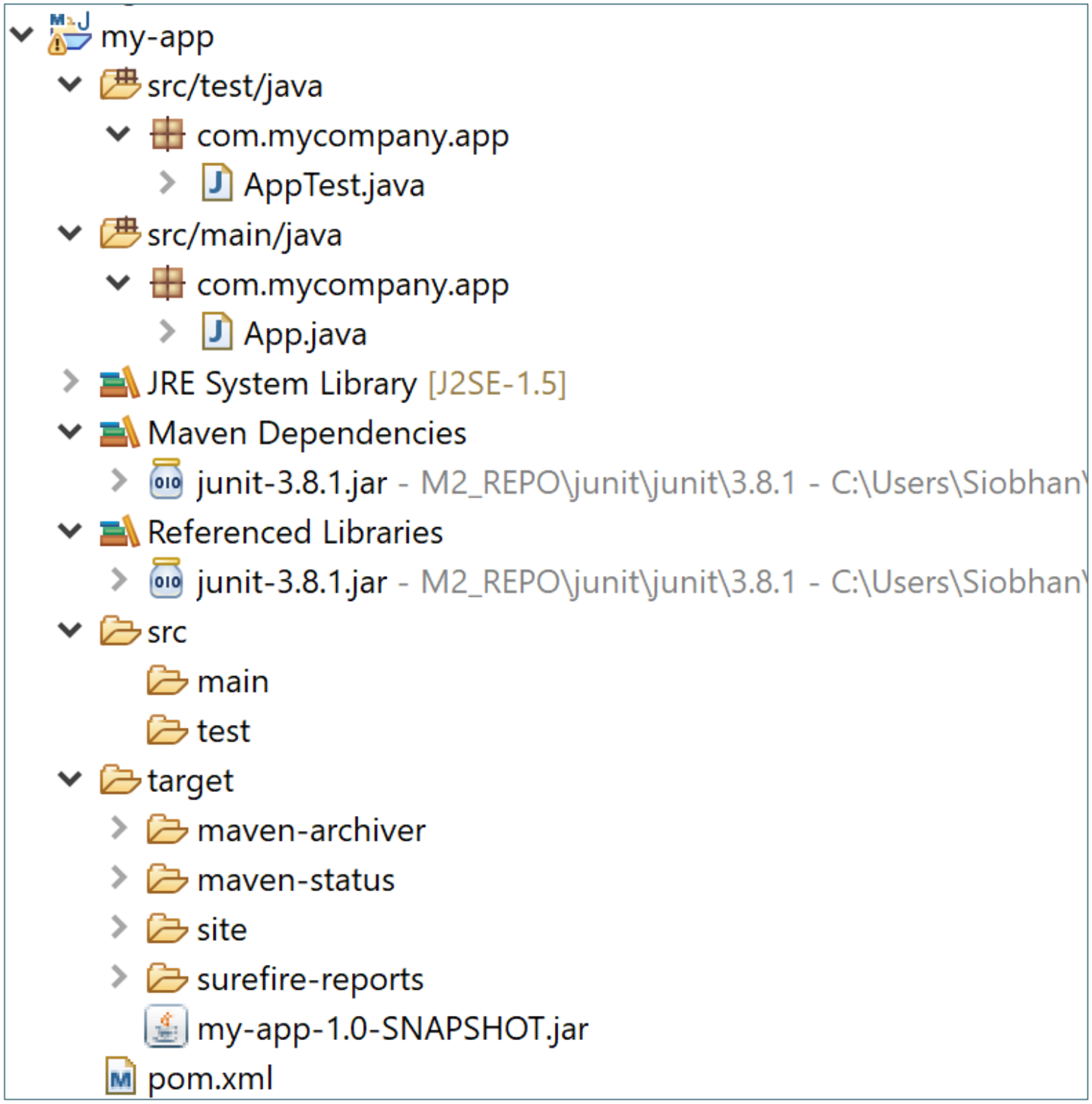
→ Import…



Import into Eclipse



Eclipse Project Structure



Deprecated command…you might need this approach if you are working with an older version of Eclipse!

```
mvn eclipse:eclipse
```

Generates the ‘.project’ and ‘.classpath’ Eclipse uses to specify project name, structure and dependencies.

The project can then be ‘imported’ into eclipse.

Note: you also use this command to refresh the project in Eclipse.

Format / Refresh as Eclipse Project

mvn eclipse:eclipse

Command Prompt

```
C:\Users\Siobhan\Desktop\agile workspace\my-app>mvn eclipse:eclipse
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building my-app 1.0-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] >>> maven-eclipse-plugin:2.10:eclipse (default-cli) > generate-resources @ my-app >>>
[INFO]
[INFO] <<< maven-eclipse-plugin:2.10:eclipse (default-cli) < generate-resources @ my-app <<<
[INFO]
[INFO]
[INFO] --- maven-eclipse-plugin:2.10:eclipse (default-cli) @ my-app ---
[INFO] Using Eclipse Workspace: C:\Users\Siobhan\Desktop\agile workspace
[WARNING] Workspace defines a VM that does not contain a valid jre/lib/rt.jar: C:\Program Files\Java\jre1.8.
0_77
[INFO] Adding default classpath container: org.eclipse.jdt.launching.JRE_CONTAINER
[INFO] Not writing settings - defaults suffice
[INFO] Wrote Eclipse project for "my-app" to C:\Users\Siobhan\Desktop\agile workspace\my-app.
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 1.980 s
[INFO] Finished at: 2017-10-13T23:13:19+01:00
[INFO] Final Memory: 12M/155M
[INFO] ------------------------------------------------------------------------

C:\Users\Siobhan\Desktop\agile workspace\my-app>
```

Labs this week

Maven Labs

- Verify your Maven Installation is ok (installed in a previous lab)

- Build the **my-app** Java Project we just looked at.

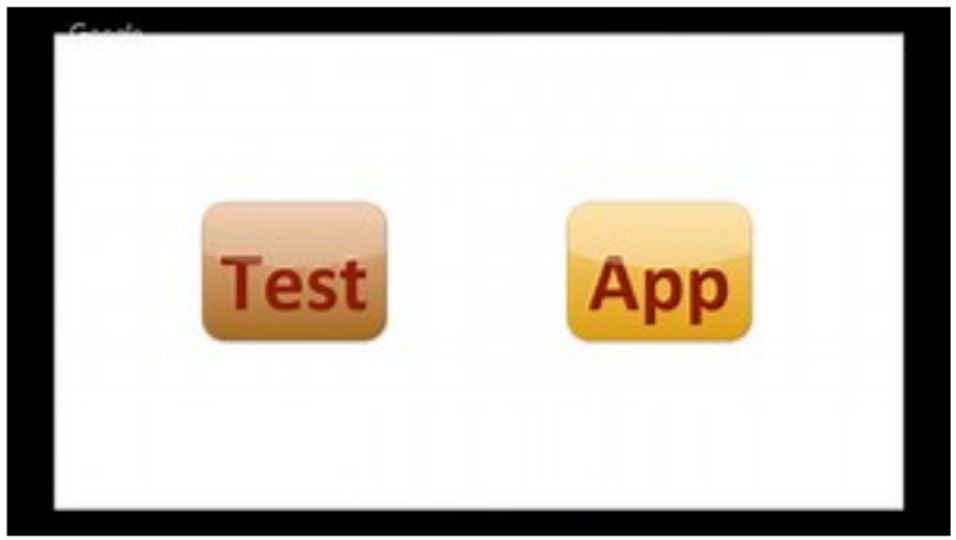
- Pacemaker-console:
  - Create an empty Maven Java Project called **pacemaker-console-maven.**
  - Copy the existing pacemaker files into the pacemaker-console-maven project.
  - Edit pom.xml to incorporate required dependencies (both remote and local).
  - Build, package and run pacemaker-console-maven.
  - Write a script to simply running pacemaker-console-maven.
  - Include JUnit5 capabilities.

Maven™

eclipse
oxygen

CODE COVERAGE

A good video on Eclipse Oxygen and Code Coverage



Eclipse Oxygen Series: EclEmma - Code Coverage in Practice

www.youtube.com

Presenter: Marc R. Hoffmann Host: Kat Hirsch
Topic: EclEmma - Code Coverage in Practice
Time: 11am EDT EclEmma and JaCoCo user's group: jacoco@googlegroups.c...

https://www.youtube.com/watch?v=p_mVa9iNmzk

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