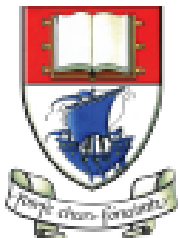


Maven Example & Labs

Produced
by:

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<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>

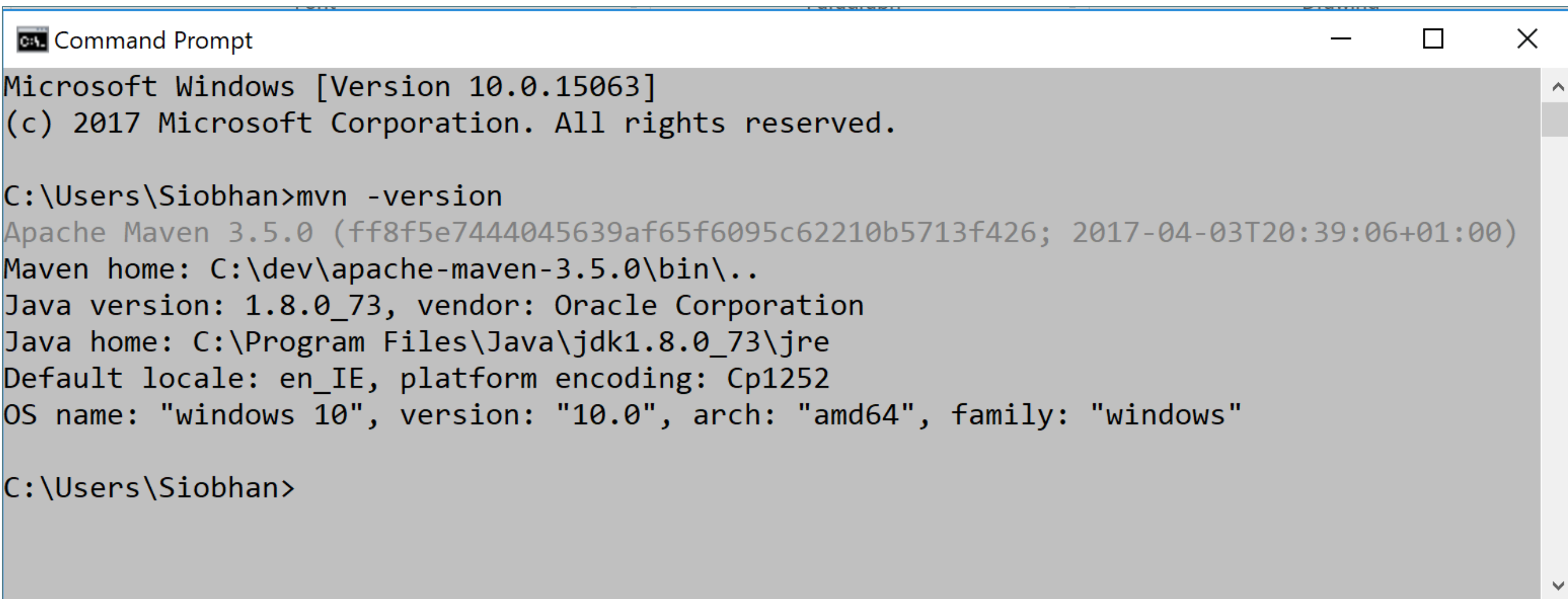
Binary tar.gz archive	apache-maven-3.5.0-bin.tar.gz
Binary zip archive	apache-maven-3.5.0-bin.zip

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`.

Verifying the Install

mvn -version



```
C:\> Command Prompt
Microsoft Windows [Version 10.0.15063]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\Siobhan>mvn -version
Apache Maven 3.5.0 (ff8f5e7444045639af65f6095c62210b5713f426; 2017-04-03T20:39:06+01:00)
Maven home: C:\dev\apache-maven-3.5.0\bin\..
Java version: 1.8.0_73, vendor: Oracle Corporation
Java home: C:\Program Files\Java\jdk1.8.0_73\jre
Default locale: en_IE, platform encoding: Cp1252
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"

C:\Users\Siobhan>
```

Maven™

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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
```

```
C:\Users\Siobhan\Desktop\agile workspace>mvn archetype:generate -DgroupId=com.mycompany.app -DartifactId=my-app -DarchetypeArtifactId=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]
```

```
[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

Creating a Java Project (using Archetypes)

The base directory name is taken from artifactid.

```
mvn archetype:generate
```

```
-DgroupId=com.mycompany.app
```

```
-DartifactId=my-app
```

```
-DarchetypeArtifactId=maven-archetype-quickstart
```

```
-DinteractiveMode=false
```

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

Creating a Java Project (using Archetypes)

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

```
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

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**

Creating a Java Project (using Archetypes)

A minimal POM is included
in base directory.

```
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

Maven™

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pom.xml

pom.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>
```

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

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

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.

```
mvn archetype:generate
```

- DgroupId=com.mycompany.app
- DartifactId=my-app
- DarchetypeArtifactId=maven-archetype-quickstart
- DinteractiveMode=false

```
<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>
```

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

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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
<i>package</i>
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] --- 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
```

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>
```

Build the Project – target directory

- my-app
 - src
 - main
 - java
 - com
 - mycompany
 - app
 - test
 - java
 - com
 - mycompany
 - app
 - target

- workspace > my-app > target
- classes
 - maven-archiver
 - maven-status
 - surefire-reports
 - test-classes
 - my-app-1.0-SNAPSHOT

Jar
package

Build the Project – target directory

- my-app
 - src
 - main
 - java
 - com
 - mycompany
 - app
 - test
 - java
 - com
 - mycompany
 - app
 - target
 - classes
 - maven-archiver
 - maven-status
 - surefire-reports
 - test-classes

workspace > my-app > target > classes > com > mycompany > app

<input type="checkbox"/>	Name	Date modified
<input type="checkbox"/>	App.class	13/10/2017 22:34

Compiled
Java
Classes

- ▼ my-app
 - ▼ src
 - ▼ main
 - ▼ java
 - ▼ com
 - ▼ mycompany
 - app
 - ▼ test
 - ▼ java
 - ▼ com
 - ▼ mycompany
 - app
 - ▼ target
 - > classes
 - maven-archiver
 - > maven-status
 - surefire-reports
 - > test-classes

Build the Project – target directory

workspace > my-app > target > surefire-reports

Name

com.mycompany.app.AppTest

TEST-com.mycompany.app.AppTest

com.mycompany.app.AppTest - Notepad

File Edit Format View Help

Test set: com.mycompany.app.AppTest

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.008 sec

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

Build the Project – target directory

- my-app
 - src
 - main
 - java
 - com
 - mycompany
 - app
 - test
 - java
 - com
 - mycompany
 - app
 - target
 - classes
 - maven-archiver
 - maven-status
 - surefire-reports
 - test-classes

workspace > my-app > target > test-classes > com > mycompany > app

<input type="checkbox"/>	Name	Date modified
<input type="checkbox"/>	AppTest.class	13/10/2017 22:34

Compiled
JUnit
Classes

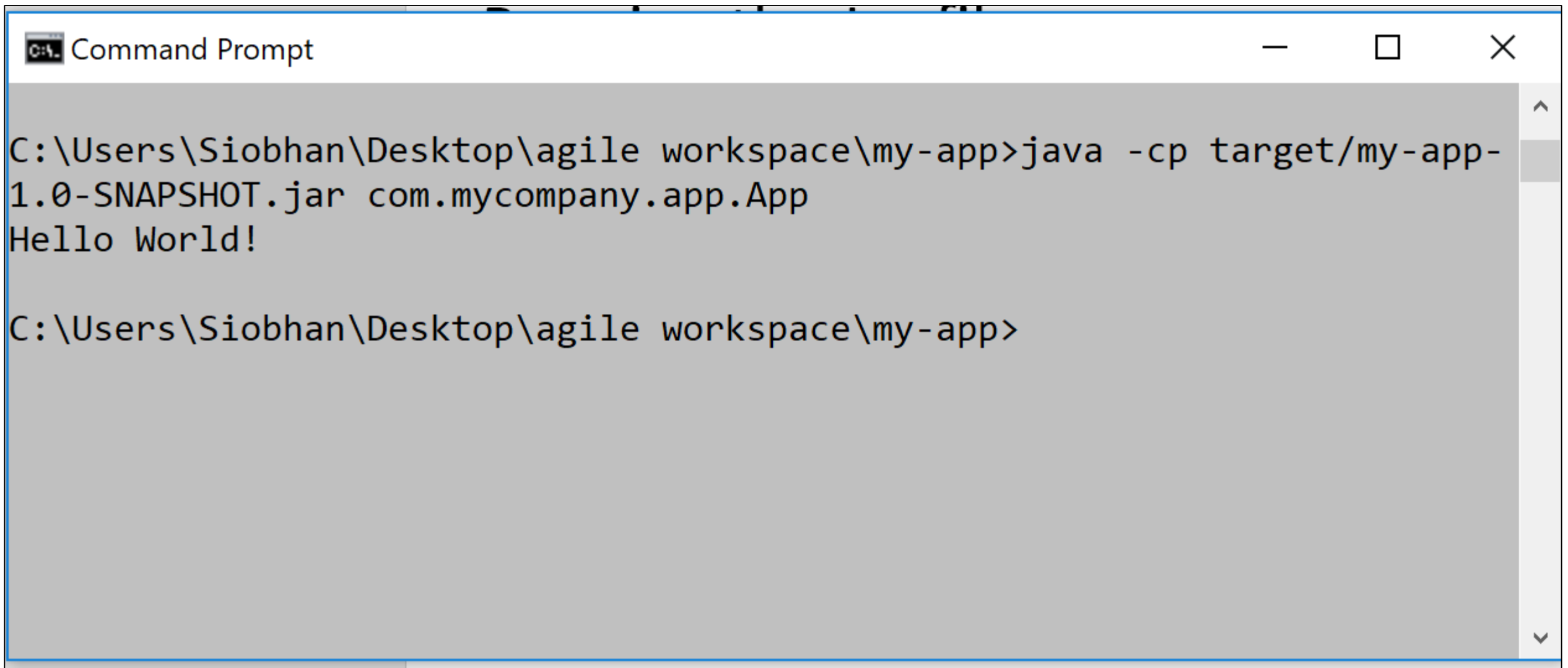
Maven™

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Running the Project

Running the Jar file

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



```
C:\Users\Siobhan\Desktop\agile workspace\my-app>java -cp target/my-app-1.0-SNAPSHOT.jar com.mycompany.app.App
Hello World!

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

Maven™

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Generating the Site

Generating a Site for the App

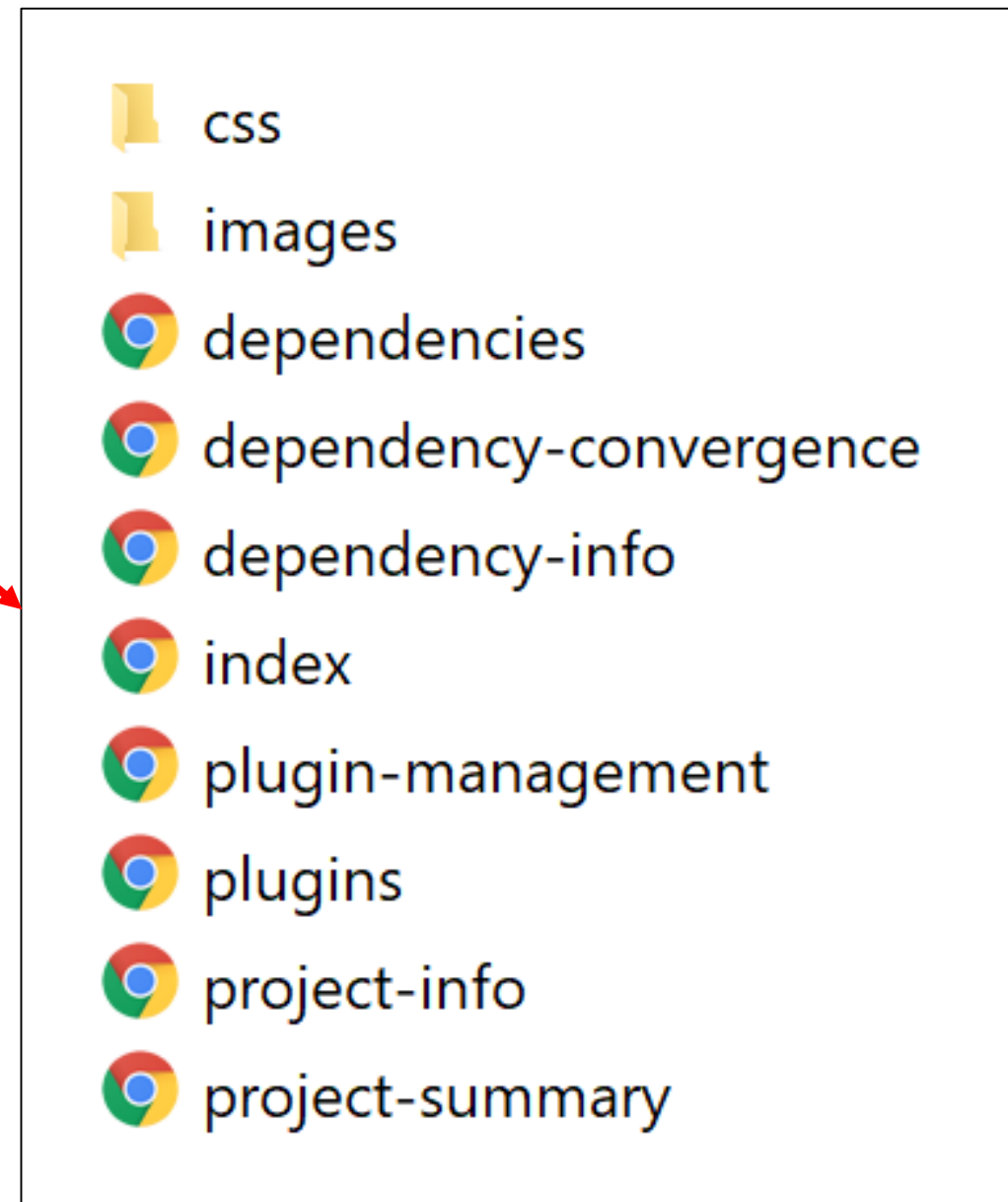
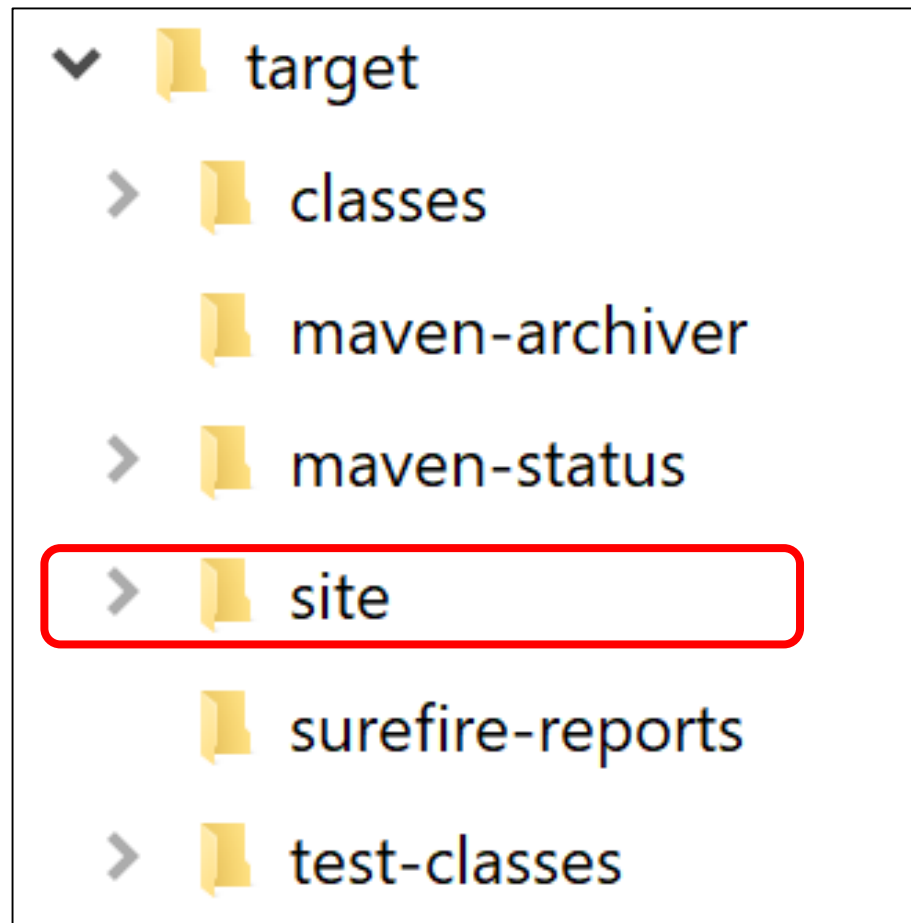
mvn site

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
```

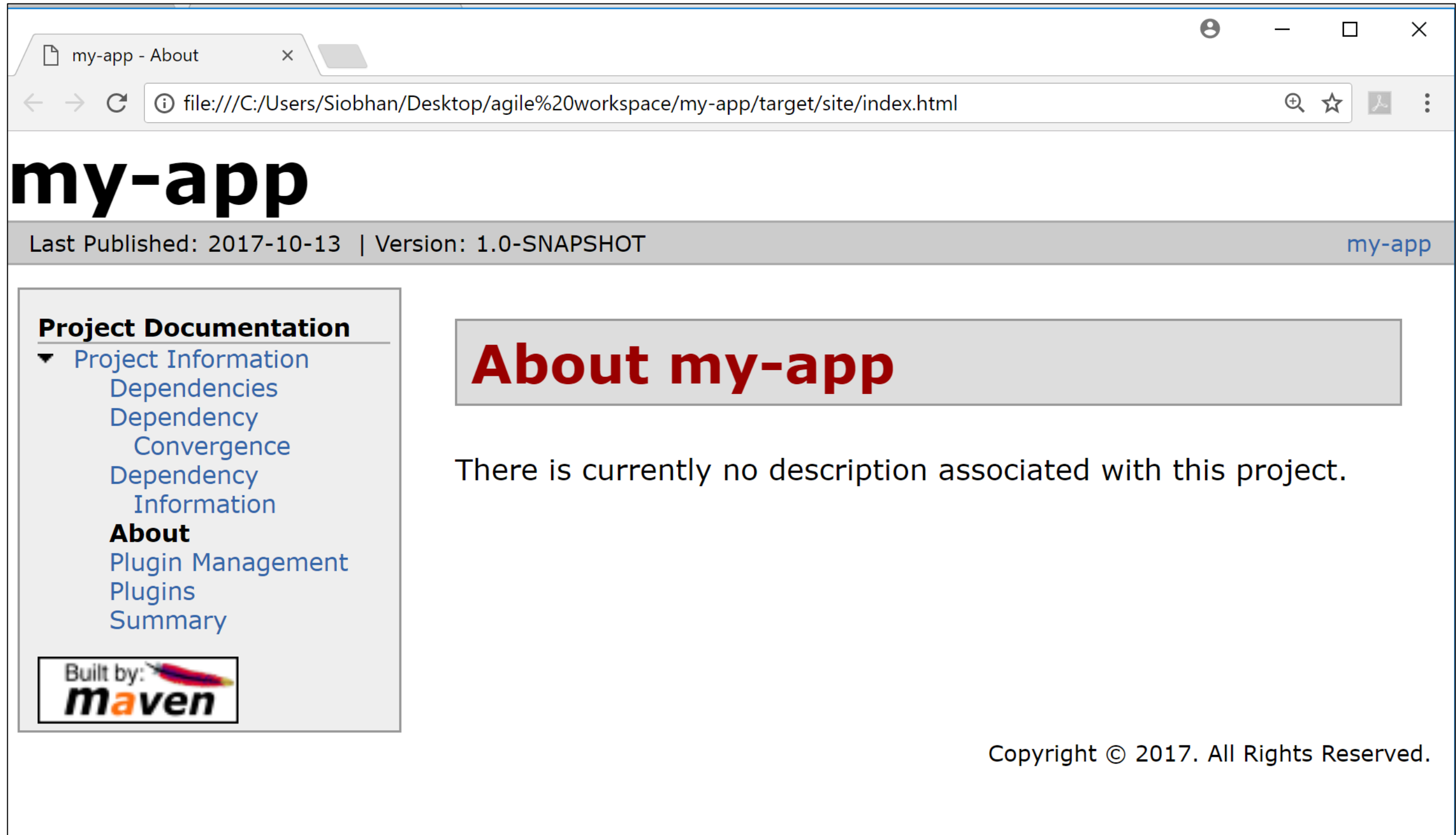
Generating a Site for the App

mvn site



Generating a Site for the App

mvn site



my-app - About


file:///C:/Users/Siobhan/Desktop/agile%20workspace/my-app/target/site/index.html

my-app

Last Published: 2017-10-13 | Version: 1.0-SNAPSHOT my-app

Project Documentation

- Project Information
 - Dependencies
 - Dependency
 - Convergence
 - Dependency
 - Information
- About**
- Plugin Management
- Plugins
- Summary

Built by:  **maven**

About my-app

There is currently no description associated with this project.

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Generating a Site for the App

mvn site

my-app - Project Dependenc x

file:///C:/Users/Siobhan/Desktop/agile%20workspace/my-app/target/site/dependencies.html

my-app

Last Published: 2017-10-13 | Version: 1.0-SNAPSHOT my-app

Project Documentation

- Project Information
- Dependencies**
- Dependency Convergence
- Dependency Information
- About
- Plugin Management
- Plugins
- Summary

Built by: maven

Project Dependencies

test

The following is a list of test dependencies for this project. These dependencies are only required to compile and run unit tests for the application:

GroupId	ArtifactId	Version	Type	Licenses
junit	junit	3.8.1	jar	Common Public License Version 1.0

Project Transitive Dependencies

No transitive dependencies are required for this project.

Project Dependency Graph

Maven™

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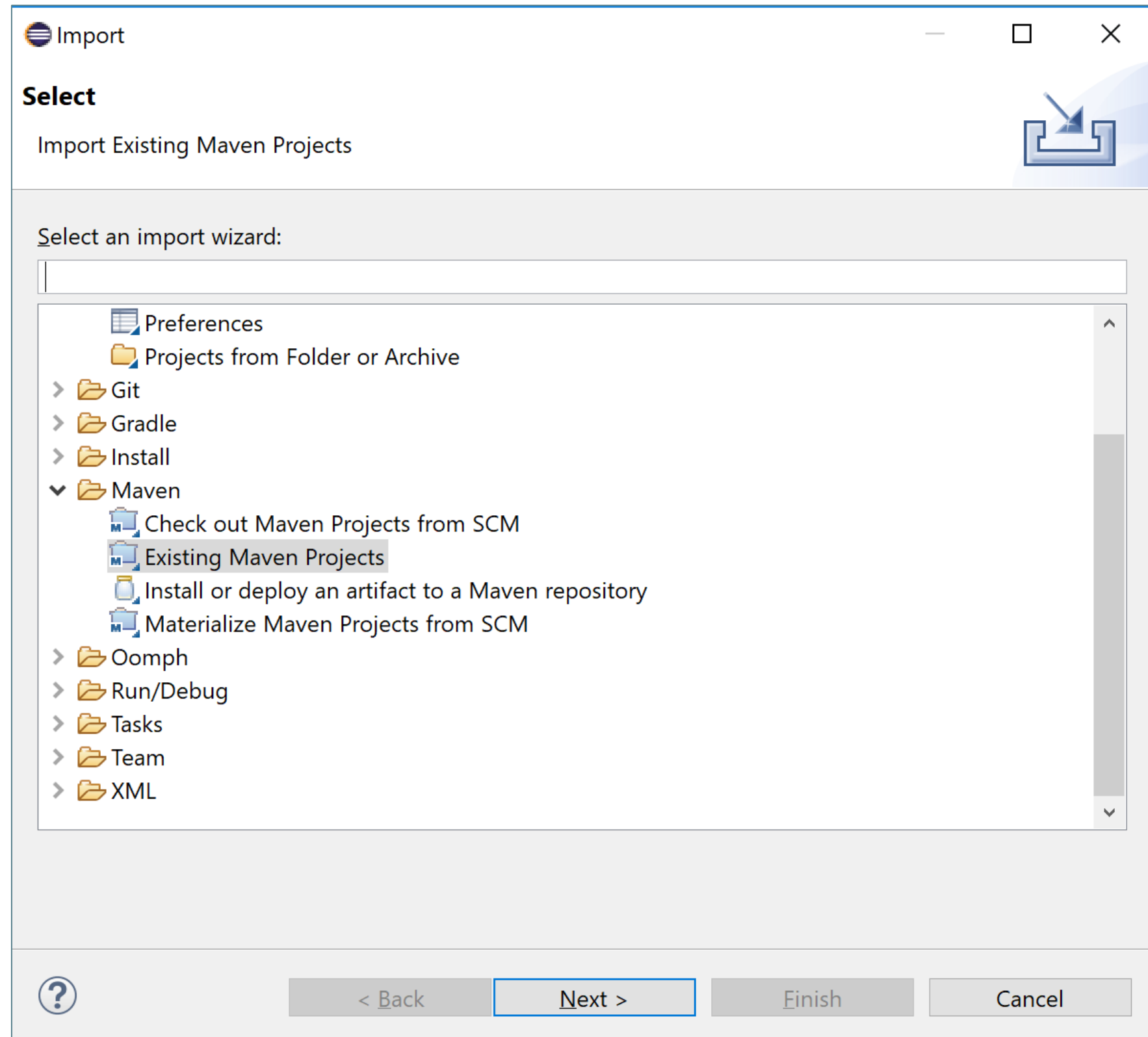
Importing into Eclipse

Import into Eclipse

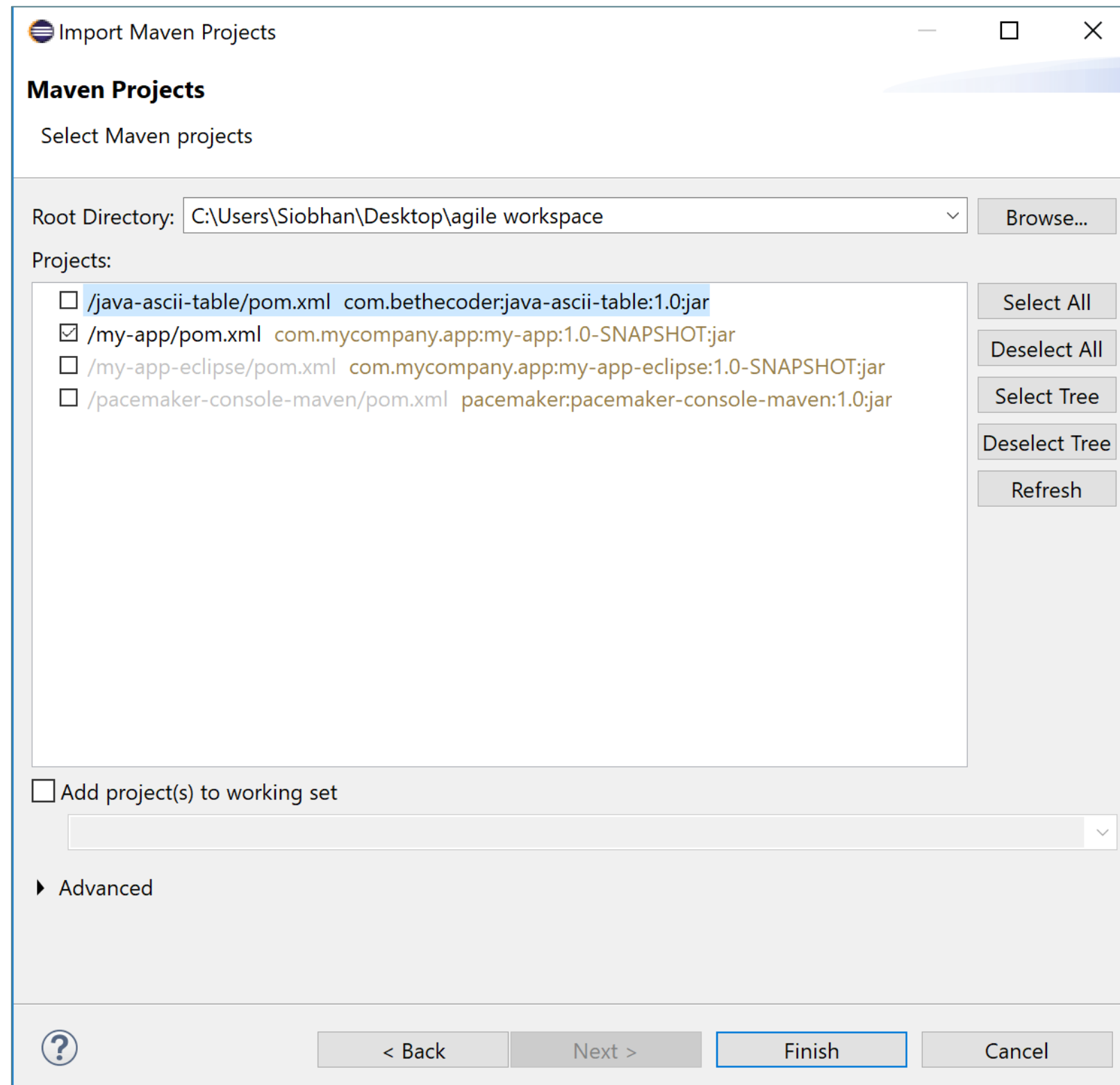
Menu Items:

→ File

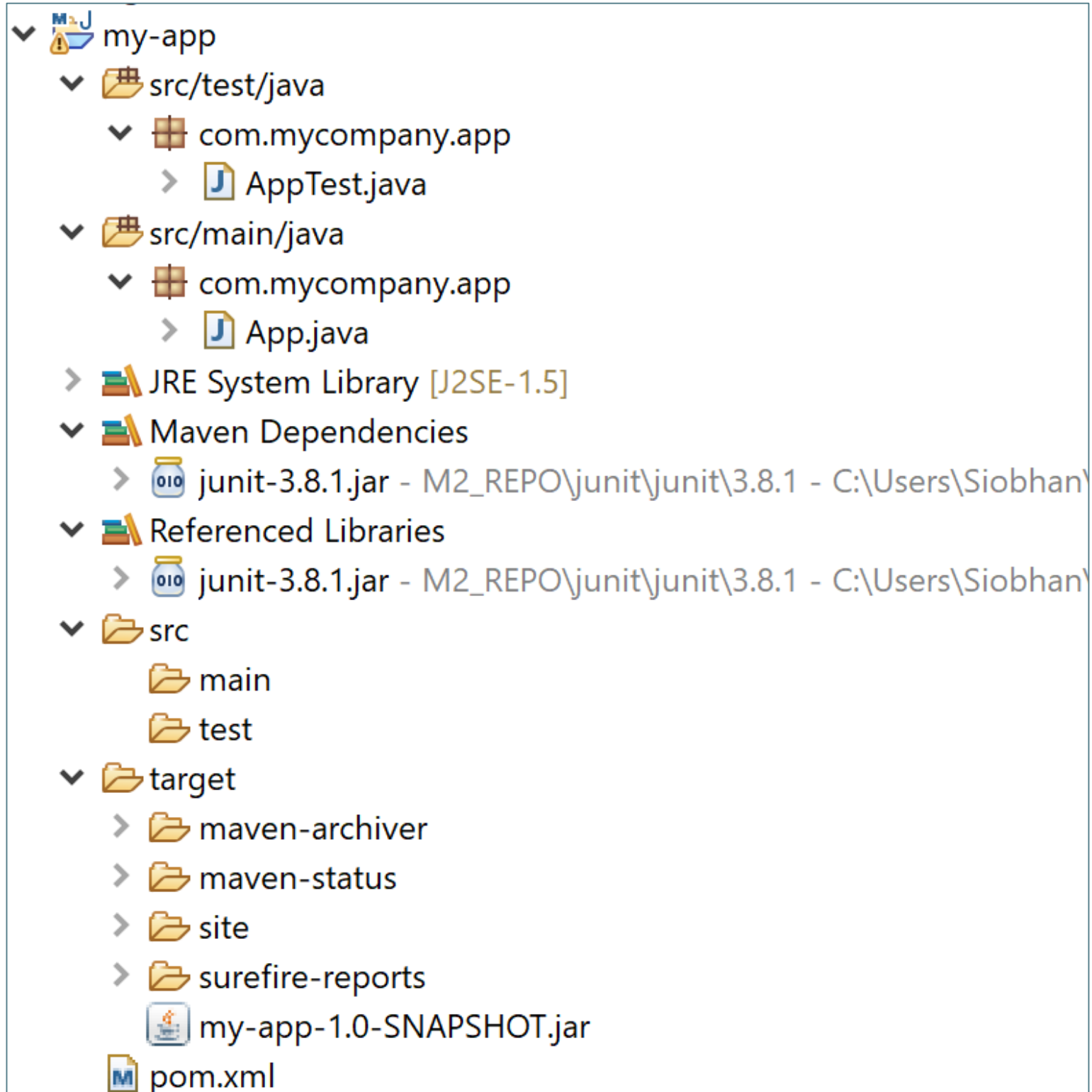
→ Import...



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] --- 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>
```

Maven™

The logo for Maven features the word "Maven" in a bold, black, sans-serif font. The letter "v" is replaced by a stylized feather with a gradient of colors from purple at the base to orange at the tip. A small "TM" trademark symbol is positioned to the upper right of the "n".

Labs this week

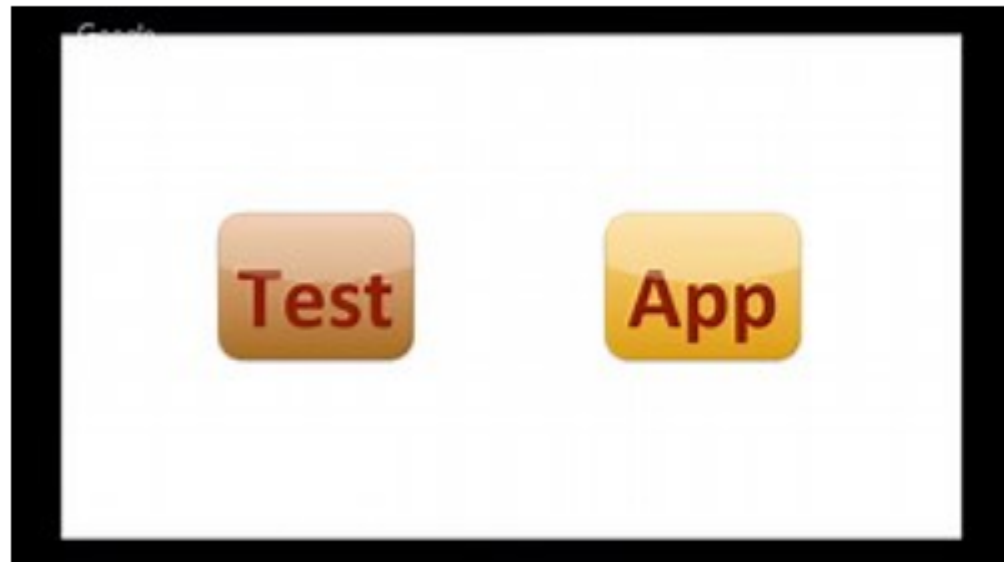
Maven Labs

- 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™



A good video on Eclipse Oxygen and Code Coverage



Eclipse Oxygen Series: EclEmma - Code Coverage in Practice

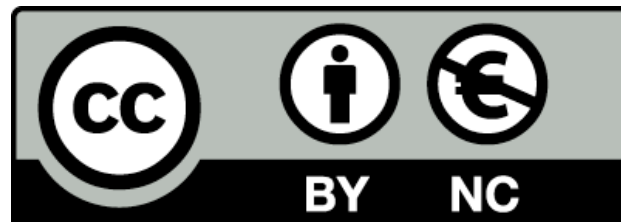
www.youtube.com

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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