

# Full Stack Development

## Lab Maven 2

### Maven Archetypes

#### 1. Lab objectives

This lab creates a hello world project from an archetype

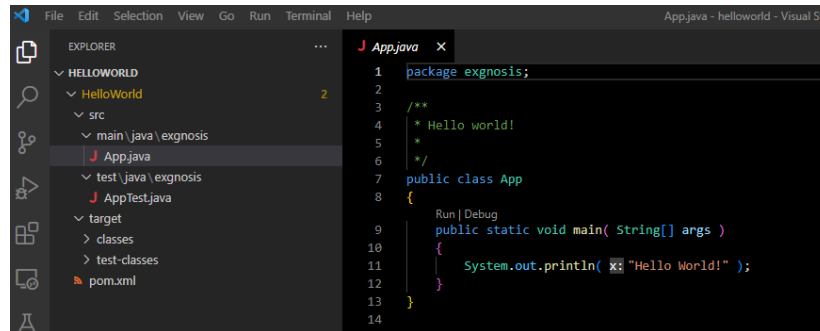
#### 2. Create the project

Create a new folder for the project and locate to it. Enter the command as shown to build a project from the **maven-archetype-quickstart**. The command is also in the file “command.txt” in the Lab 2 Assets directory

```
D:\Maven\helloworld>mvn archetype:generate -DgroupId=exgnosis -DartifactId=HelloWorld -DarchetypeArtifactId=maven-archetype-quickstart -DinteractiveMode=false
[INFO] Scanning for projects...

--- lots of stuff cut out ---
[INFO] -----
[INFO] Using following parameters for creating project from Old (1.x) Archetype: maven-archetype-quickstart:1.0
[INFO] -----
[INFO] Parameter: basedir, Value: D:\Maven\helloworld
[INFO] Parameter: package, Value: exgnosis
[INFO] Parameter: groupId, Value: exgnosis
[INFO] Parameter: artifactId, Value: HelloWorld
[INFO] Parameter: packageName, Value: exgnosis
[INFO] Parameter: version, Value: 1.0-SNAPSHOT
[INFO] project created from Old (1.x) Archetype in dir: D:\Maven\helloworld\HelloWorld
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 6.247 s
[INFO] Finished at: 2022-11-24T17:17:47-05:00
[INFO] -----
```

Open the project in VSCode using “code .” You should see the standard project layout.



### 3. Compiling the code

Open up a terminal window in VSCode, make sure you are in the main project directory, and run mvn compile. But the result has warnings and errors.

```
[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 D:\Maven\helloworld\HelloWorld\target\classes
[INFO] -----
[ERROR] COMPILATION ERROR :
[INFO] -----
[ERROR] Source option 5 is no longer supported. Use 7 or later.
[ERROR] Target option 5 is no longer supported. Use 7 or later.
```

This is because the defaults for Maven are incompatible with the current build environment. To fix this, add the requisite properties into the pom.xml. First find out what the settings should be for your computer.

```
D:\Maven\helloworld\HelloWorld>mvn -v
Apache Maven 3.8.6 (84538c9988a25aec085021c365c560670ad80f63)
Maven home: D:\tools\maven
Java version: 18.0.1.1, vendor: Oracle Corporation, runtime: C:\tools\java\Java18
Default locale: en_CA, platform encoding: UTF-8
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"
```

Add the lines in the commands.txt file that you need. Change the version to the one you have on your machine

```
<name>HelloWorld</name>

<properties>
  <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
  <maven.compiler.source>18</maven.compiler.source>
  <maven.compiler.target>18</maven.compiler.target>
</properties>
```

Rerun the mvn compile command and see it work.

```
D:\Maven\helloworld\HelloWorld>mvn compile
[INFO] Scanning for projects...
[INFO]
[INFO] -----< exgnosis:HelloWorld >-----
[INFO] Building HelloWorld 1.0-SNAPSHOT
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ HelloWorld ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory D:\Maven\helloworld\HelloWorld\src\main\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ HelloWorld ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 0.420 s
[INFO] Finished at: 2022-11-24T18:16:48-05:00
[INFO] -----
```

## 4. Testing the code

Running **mvn clean test** runs the unit tests. Notice that because we removed the compiled code with the clean command, in order to test the code it has to be automatically recompiled

```
-----  
T E S T S  
-----  
Running exgnosis.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] BUILD SUCCESS  
[INFO] -----  
[INFO] Total time: 1.957 s  
[INFO] Finished at: 2022-11-24T18:31:14-05:00  
[INFO] -----
```

The results of the test are in the **target/surefire-reports** directory.

Now invalidate the test like so in the **AppTest.java** file

```
/**  
 * Rigorous Test :-)  
 */  
public void testApp()  
{  
    assertTrue( false );  
}
```

Run the **mvn clean package** command. Notice that the resulting jar file will not be build if any of the tests fail.

```
Failed tests:  testApp(exgnosis.AppTest)

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

[INFO] -----
[INFO] BUILD FAILURE
[INFO] -----
[INFO] Total time:  1.199 s
[INFO] Finished at: 2022-11-24T18:37:17-05:00
[INFO] -----
[ERROR] Failed to execute goal org.apache.maven.plugins:maven-surefire-plugin:2.12.1:
oWorld: There are test failures.
[ERROR]
[ERROR] Please refer to D:\Maven\helloworld\HelloWorld\target\surefire-reports for
[ERROR] -> [Help 1]
```

Change the code back so the test passes and confirm that the package command works.

## 5. Adding a plugin

By default, the jar file build by Maven is not a stand-alone application. Jar files that contain everything the need to run, including all dependencies are call fat jar file or uber jar file. These are the sort of jar file Spring Boot produces.

Test this out by going into the target directory and running the jar file.

```
D:\Maven\helloworld\HelloWorld\target>java -jar HelloWorld-1.0-SNAPSHOT.jar
no main manifest attribute, in HelloWorld-1.0-SNAPSHOT.jar
```

To fix this, we will add a plug-in which will add that information into the jar file. The plug-in we will be using is the **maven-shade-plugin** which produces an uber-jar. We can use this plugin to also tell Java where to find the main method.

The changes to the pom.xml look like this. This pom.xml file is in the Lab 2 assets as shade.xml

```
<build>
  <plugins>
    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-shade-plugin</artifactId>
      <version>3.4.1</version>
      <executions>
        <execution>
          <phase>package</phase>
          <goals>
            <goal>shade</goal>
          </goals>
          <configuration>
            <transformers>
              <transformer implementation="org.apache.maven.plugins.shade.resource.ManifestResourceTransformer">
                <mainClass>exgnosis.App</mainClass>
              </transformer>
            </transformers>
          </configuration>
        </execution>
      </executions>
    </plugin>
  </plugins>
</build>
```

Run the mvn clean package again and then run the jar file

```
D:\Maven\helloworld\HelloWorld>java -jar target/HelloWorld-1.0-SNAPSHOT.jar
Hello World!
```

## End Lab