**Maven in 5 Minutes**

**Prerequisites**

You must have an understanding of how to install software on your computer. If you do not know how to do this, please ask someone at your office, school, etc or pay someone to explain this to you. The Maven mailing lists are not the best place to ask for this advice.

**Installation**

*Maven is a Java tool, so you must have*[*Java*](http://www.oracle.com/technetwork/java/javase/downloads/index.html)*installed in order to proceed.*

First, [download Maven](https://maven.apache.org/download.html) and follow the [installation instructions](https://maven.apache.org/install.html). After that, type the following in a terminal or in a command prompt:

1. mvn --version

It should print out your installed version of Maven, for example:

1. Apache Maven 3.6.0 (97c98ec64a1fdfee7767ce5ffb20918da4f719f3; 2018-10-24T20:41:47+02:00)
2. Maven home: D:\apache-maven-3.6.0\bin\..
3. Java version: 1.8.0\_161, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk1.8.0\_161\jre
4. Default locale: nl\_NL, platform encoding: Cp1252
5. OS name: "windows 7", version: "6.1", arch: "amd64", family: "windows"

Depending upon your network setup, you may require extra configuration. Check out the [Guide to Configuring Maven](https://maven.apache.org/guides/mini/guide-configuring-maven.html) if necessary.

**If you are using Windows, you should look at** [Windows Prerequisites](https://maven.apache.org/guides/getting-started/windows-prerequisites.html) **to ensure that you are prepared to use Maven on Windows.**

**Creating a Project**

You will need somewhere for your project to reside, create a directory somewhere and start a shell in that directory. On your command line, execute the following Maven goal:

1. mvn archetype:generate -DgroupId=com.mycompany.app -DartifactId=my-app -DarchetypeArtifactId=maven-archetype-quickstart -DarchetypeVersion=1.4 -DinteractiveMode=false

*If you have just installed Maven, it may take a while on the first run. This is because Maven is downloading the most recent artifacts (plugin jars and other files) into your local repository. You may also need to execute the command a couple of times before it succeeds. This is because the remote server may time out before your downloads are complete. Don't worry, there are ways to fix that.*

You will notice that the *generate* goal created a directory with the same name given as the artifactId. Change into that directory.

1. cd my-app

Under this directory you will notice the following [standard project structure](https://maven.apache.org/guides/introduction/introduction-to-the-standard-directory-layout.html).

1. my-app
2. |-- pom.xml
3. `-- src
4. |-- main
5. | `-- java
6. | `-- com
7. | `-- mycompany
8. | `-- app
9. | `-- App.java
10. `-- test
11. `-- java
12. `-- com
13. `-- mycompany
14. `-- app
15. `-- AppTest.java

The src/main/java directory contains the project source code, the src/test/java directory contains the test source, and the pom.xml file is the project's Project Object Model, or POM.

**The POM**

The pom.xml file is the core of a project's configuration in Maven. It is a single configuration file that contains the majority of information required to build a project in just the way you want. The POM is huge and can be daunting in its complexity, but it is not necessary to understand all of the intricacies just yet to use it effectively. This project's POM is:

1. <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
2. xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
3. <modelVersion>4.0.0</modelVersion>
5. <groupId>com.mycompany.app</groupId>
6. <artifactId>my-app</artifactId>
7. <version>1.0-SNAPSHOT</version>
9. <properties>
10. <maven.compiler.source>1.7</maven.compiler.source>
11. <maven.compiler.target>1.7</maven.compiler.target>
12. </properties>
14. <dependencies>
15. <dependency>
16. <groupId>junit</groupId>
17. <artifactId>junit</artifactId>
18. <version>4.12</version>
19. <scope>test</scope>
20. </dependency>
21. </dependencies>
22. </project>

**What did I just do?**

You executed the Maven goal *archetype:generate*, and passed in various parameters to that goal. The prefix *archetype* is the [plugin](https://maven.apache.org/plugins/index.html) that provides the goal. If you are familiar with [Ant](http://ant.apache.org/), you may conceive of this as similar to a task. This *archetype:generate* goal created a simple project based upon a [maven-archetype-quickstart](https://maven.apache.org/archetypes/maven-archetype-quickstart/) archetype. Suffice it to say for now that a *plugin* is a collection of *goals* with a general common purpose. For example the jboss-maven-plugin, whose purpose is "deal with various jboss items".

**Build the Project**

1. mvn package

The command line will print out various actions, and end with the following:

1. ...
2. [INFO] ------------------------------------------------------------------------
3. [INFO] BUILD SUCCESSFUL
4. [INFO] ------------------------------------------------------------------------
5. [INFO] Total time: 2 seconds
6. [INFO] Finished at: Thu Jul 07 21:34:52 CEST 2011
7. [INFO] Final Memory: 3M/6M
8. [INFO] ------------------------------------------------------------------------

Unlike the first command executed (*archetype:generate*) you may notice the second is simply a single word - *package*. Rather than a *goal*, this is a *phase*. A phase is a step in the [build lifecycle](https://maven.apache.org/guides/introduction/introduction-to-the-lifecycle.html), which is an ordered sequence of phases. When a phase is given, Maven will execute every phase in the sequence up to and including the one defined. For example, if we execute the *compile* phase, the phases that actually get executed are:

1. validate
2. generate-sources
3. process-sources
4. generate-resources
5. process-resources
6. compile

You may test the newly compiled and packaged JAR with the following command:

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

Which will print the quintessential:

1. Hello World!

**Running Maven Tools**

**Maven Phases**

Although hardly a comprehensive list, these are the most common *default* lifecycle phases executed.

* **validate**: validate the project is correct and all necessary information is available
* **compile**: compile the source code of the project
* **test**: test the compiled source code using a suitable unit testing framework. These tests should not require the code be packaged or deployed
* **package**: take the compiled code and package it in its distributable format, such as a JAR.
* **integration-test**: process and deploy the package if necessary into an environment where integration tests can be run
* **verify**: run any checks to verify the package is valid and meets quality criteria
* **install**: install the package into the local repository, for use as a dependency in other projects locally
* **deploy**: done in an integration or release environment, copies the final package to the remote repository for sharing with other developers and projects.

There are two other Maven lifecycles of note beyond the *default* list above. They are

* **clean**: cleans up artifacts created by prior builds
* **site**: generates site documentation for this project

Phases are actually mapped to underlying goals. The specific goals executed per phase is dependant upon the packaging type of the project. For example, *package* executes *jar:jar* if the project type is a JAR, and *war:war* if the project type is - you guessed it - a WAR.

An interesting thing to note is that phases and goals may be executed in sequence.

1. mvn clean dependency:copy-dependencies package

This command will clean the project, copy dependencies, and package the project (executing all phases up to *package*, of course).

**Generating the Site**

1. mvn site

This phase generates a site based upon information on the project's pom. You can look at the documentation generated under target/site.

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1. What is maven?

2. Maven download & installation?

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

3. Major advantages of maven?

3.1. Project Management tool. (auto generate the file/folder structure).

3.2. Automated Build tool. - lifecycle phases

3.3. Managing repositories.

4.3.1. Local repo.

4.3.2. Central repo.

4.3.3. Remote repo.

4. Maven project setup?

4.1. Before project setup, create & run HelloWorld.java, Addition.java - Compiling & converting to \*.class files.

4.2. Generate a unitility/jar project using maven archetypes. & observe how the folder/file strucutre generated by maven.

4.3. Different types of archetypes.

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Different types of projects/packages in JAVA:

| **Project Type** | **Purpose** | **Package type** | **Files to be packaged** | | **maven archetype** | **Where can excecute?** |
| --- | --- | --- | --- | --- | --- | --- |
| Executable JARs | we can execute these application whenre Java is installed. | jar | .class, .proeprties etc | | maven-archetype-quickstart | Can execute on java installed machine |
| Utility JARs | Reusable applications. We can use these JARs in another project. | jar | .class, .proeprties etc | | maven-archetype-quickstart | Can't execute, just reuse the login in another application |
| Web Applications | Web projects which we can run on any application servers. | war | | .class, .proeprties + .html, .jsp, .xml + .jar etc | maven-archetype-webapp | Can be executed only on Application servers i.e., Tomcat, jboss, weblogic etc |
| Enterprise Applications | these projects which we can run on any application servers. | ear | jar(s) + war(s) etc | | maven-archetype-j2ee-simple | Can be executed only on Application servers i.e., jboss, weblogic, WAS etc |