

# Introduction to Maven



# Agenda

- Apache Maven

# Maven

- What is Apache Maven?
  - Apache Maven is a software management and comprehension tool for java development

# Maven

- Objectives
  - Dependency Management
  - Compile Source Code
  - Run Unit Test
  - Build Project
  - Deploy Code

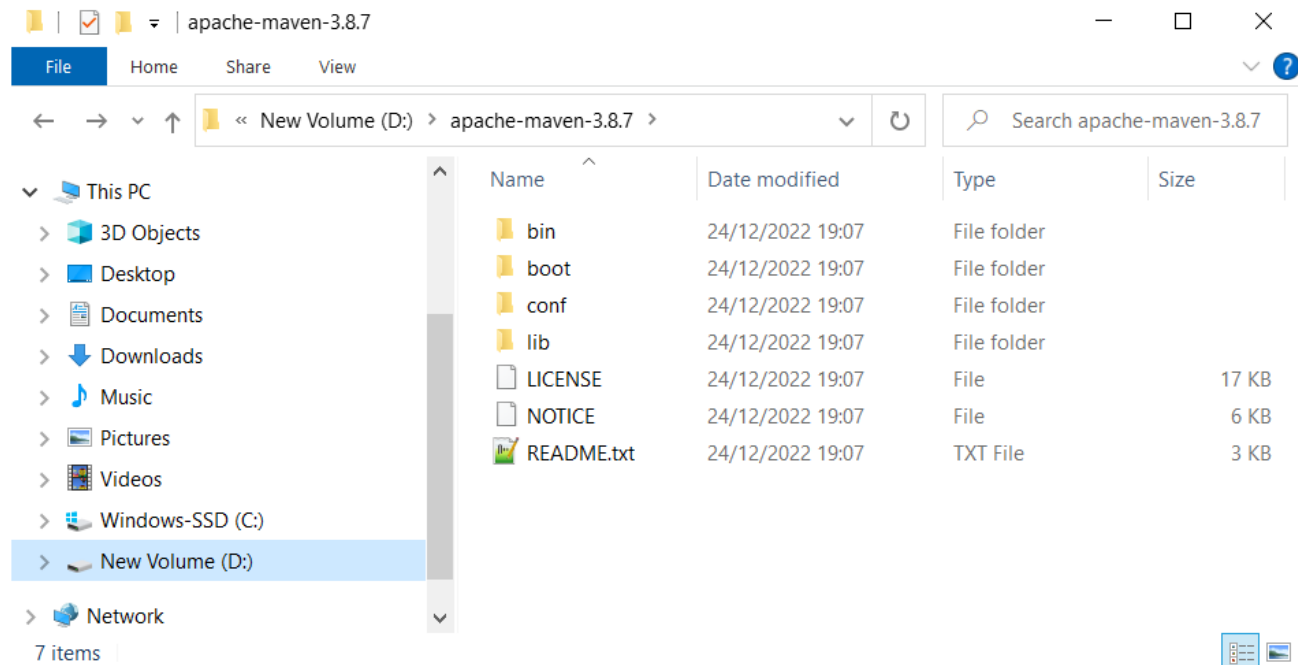


# Maven

- Repository
  - Central Repository
    - maven repository or internet repository
  - Remote Repository
    - organization repository
  - Local Repository
    - client repository (cache into .m2 folder under user home directory)

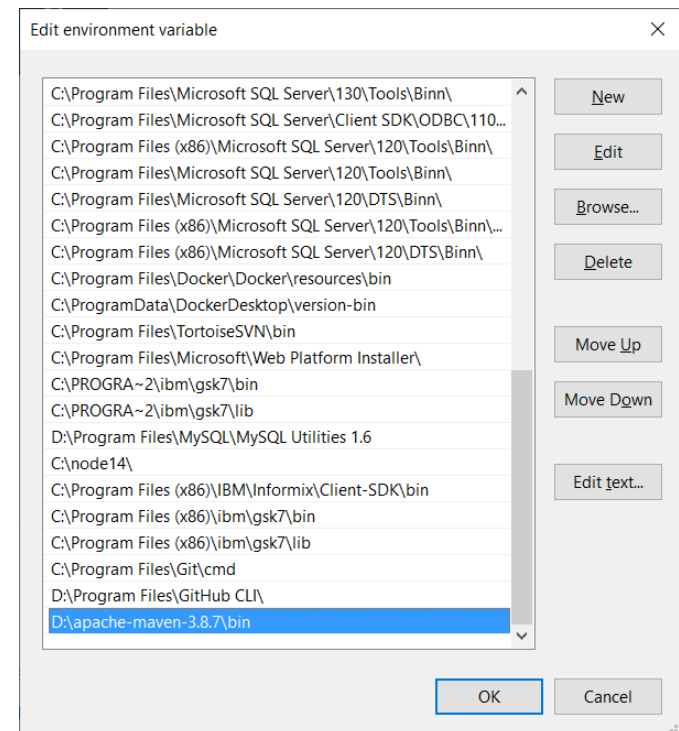
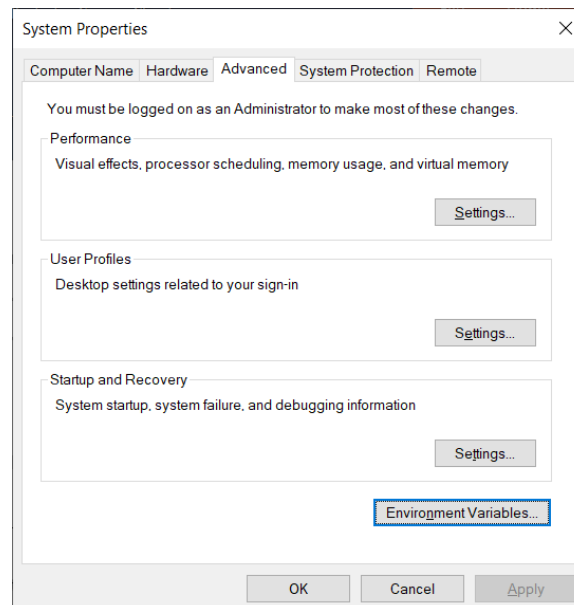
# Maven

- How To Maven
  - Go to <https://maven.apache.org>
  - Download & Install
    - ex. apache-maven-3.8.7-bin.zip



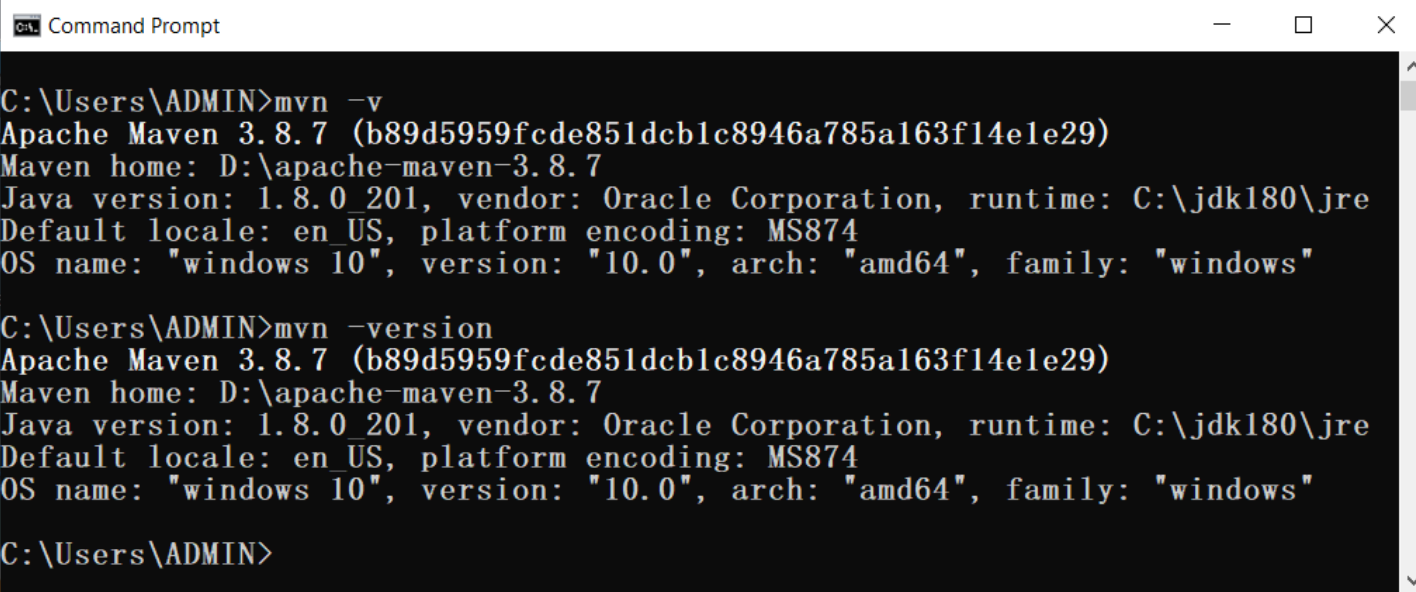
# Maven

- How To Maven
  - Setting Environment
    - Settings -> System -> About -> Advanced System Setting -> Advanced -> Environment Variables



# Maven

- How To Maven
  - Examine
    - mvn -v or mvn --version



```
C:\Users\ADMIN>mvn -v
Apache Maven 3.8.7 (b89d5959fcde851dcb1c8946a785a163f14ele29)
Maven home: D:\apache-maven-3.8.7
Java version: 1.8.0_201, vendor: Oracle Corporation, runtime: C:\jdk180\jre
Default locale: en_US, platform encoding: MS874
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"

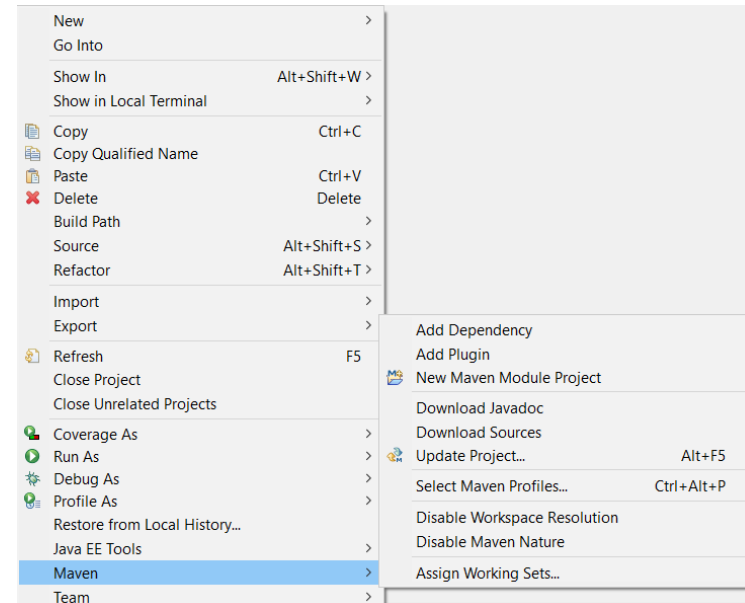
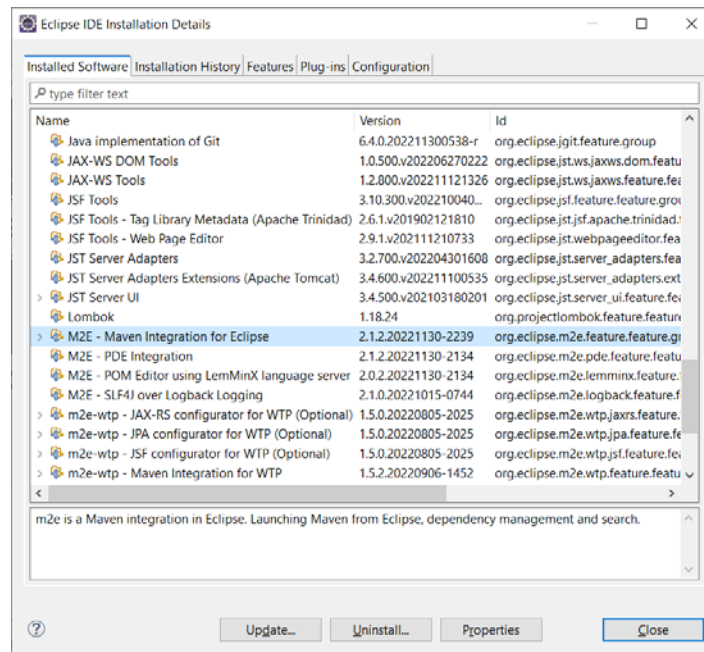
C:\Users\ADMIN>mvn --version
Apache Maven 3.8.7 (b89d5959fcde851dcb1c8946a785a163f14ele29)
Maven home: D:\apache-maven-3.8.7
Java version: 1.8.0_201, vendor: Oracle Corporation, runtime: C:\jdk180\jre
Default locale: en_US, platform encoding: MS874
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"

C:\Users\ADMIN>
```



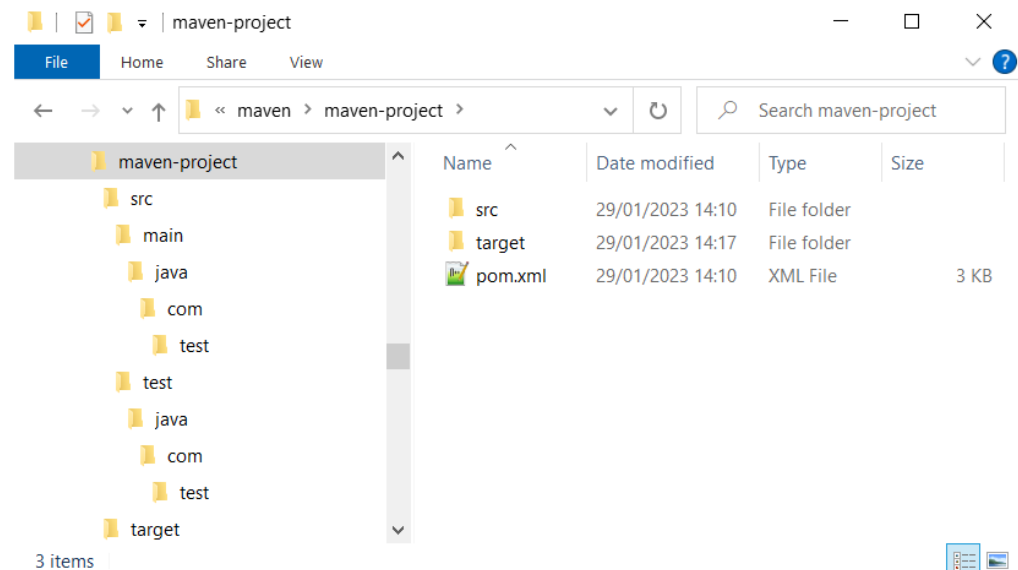
# Maven

- How To Maven
  - IDE Plugin



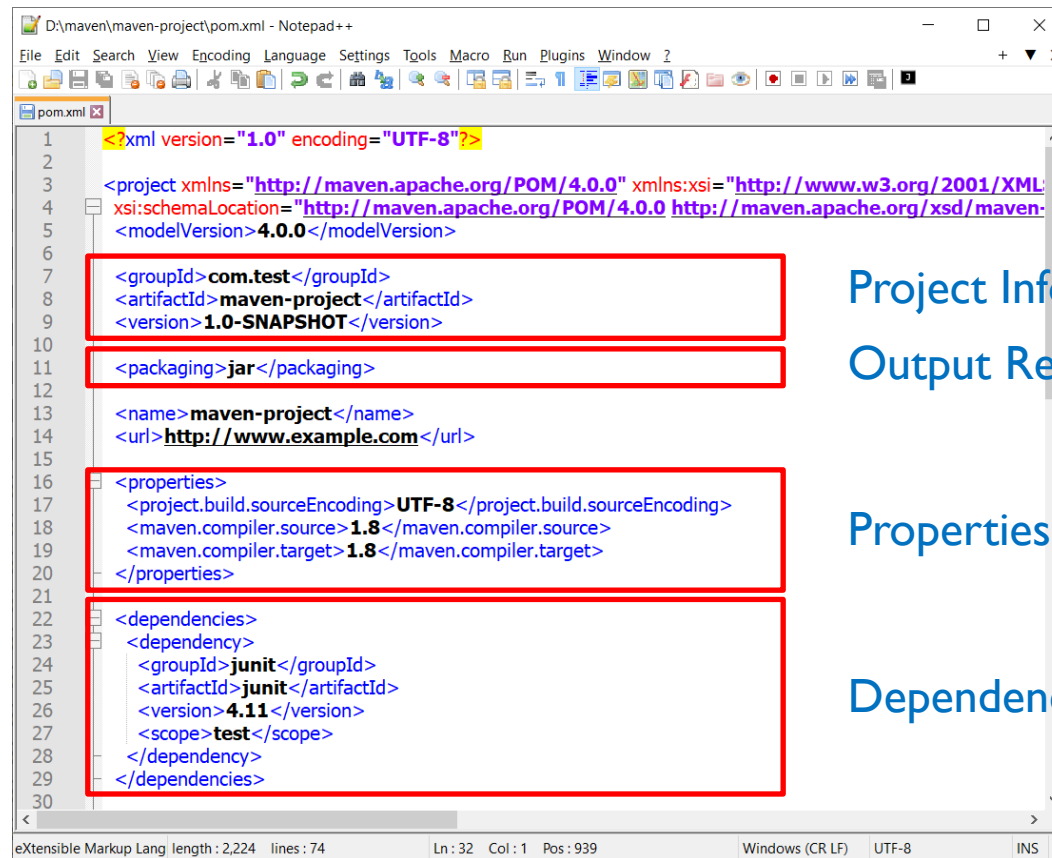
# Maven

- Project Structure
  - src folder – keep java file
  - target folder – keep class file
  - pom.xml – configuration file



# Maven

- Project Object Model
  - pom.xml configuration file - I



```
<?xml version="1.0" encoding="UTF-8"?>
<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/xsd/maven-
<modelVersion>4.0.0</modelVersion>
<groupId>com.test</groupId>
<artifactId>maven-project</artifactId>
<version>1.0-SNAPSHOT</version>
<packaging>jar</packaging>
<name>maven-project</name>
<url>http://www.example.com</url>
<properties>
<project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
<maven.compiler.source>1.8</maven.compiler.source>
<maven.compiler.target>1.8</maven.compiler.target>
</properties>
<dependencies>
<dependency>
<groupId>junit</groupId>
<artifactId>junit</artifactId>
<version>4.11</version>
<scope>test</scope>
</dependency>
</dependencies>
```

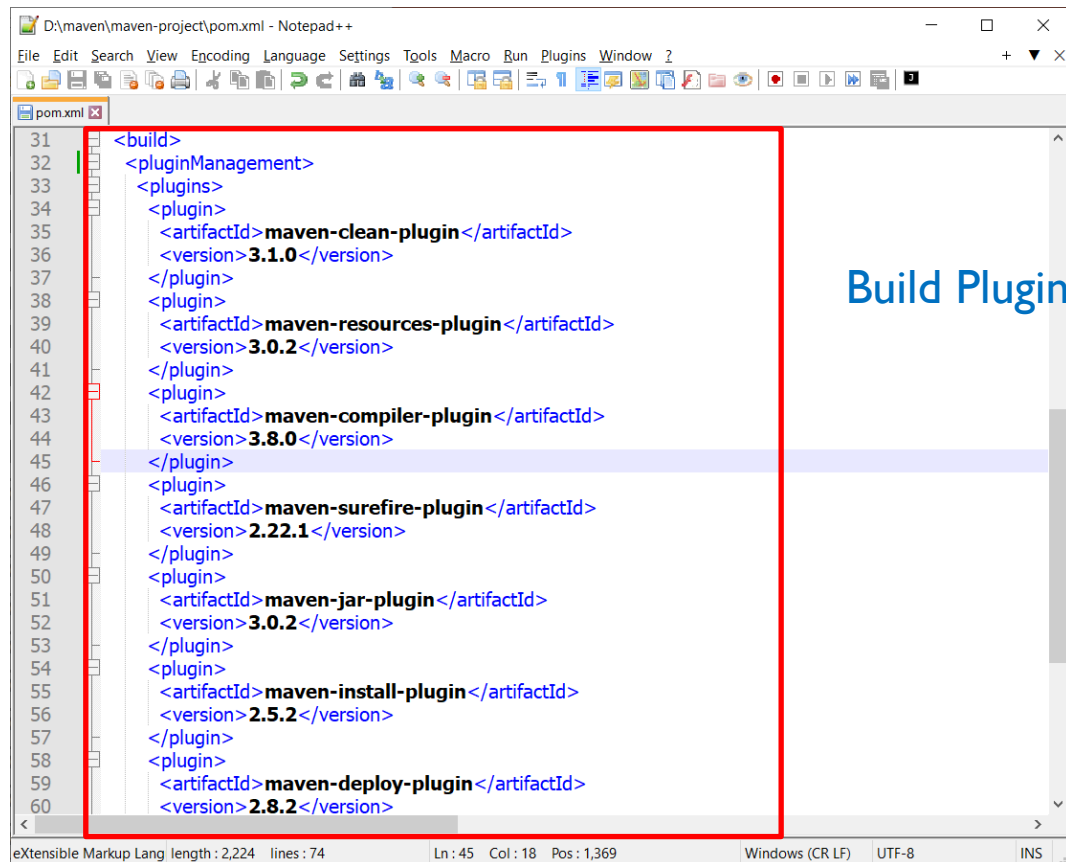
Project Information  
Output Result

Properties

Dependencies

# Maven

- Project Object Model
  - pom.xml configuration file - II



```
31 <build>
32   <pluginManagement>
33     <plugins>
34       <plugin>
35         <artifactId>maven-clean-plugin</artifactId>
36         <version>3.1.0</version>
37       </plugin>
38       <plugin>
39         <artifactId>maven-resources-plugin</artifactId>
40         <version>3.0.2</version>
41       </plugin>
42       <plugin>
43         <artifactId>maven-compiler-plugin</artifactId>
44         <version>3.8.0</version>
45       </plugin>
46       <plugin>
47         <artifactId>maven-surefire-plugin</artifactId>
48         <version>2.22.1</version>
49       </plugin>
50       <plugin>
51         <artifactId>maven-jar-plugin</artifactId>
52         <version>3.0.2</version>
53       </plugin>
54       <plugin>
55         <artifactId>maven-install-plugin</artifactId>
56         <version>2.5.2</version>
57       </plugin>
58       <plugin>
59         <artifactId>maven-deploy-plugin</artifactId>
60         <version>2.8.2</version>
```

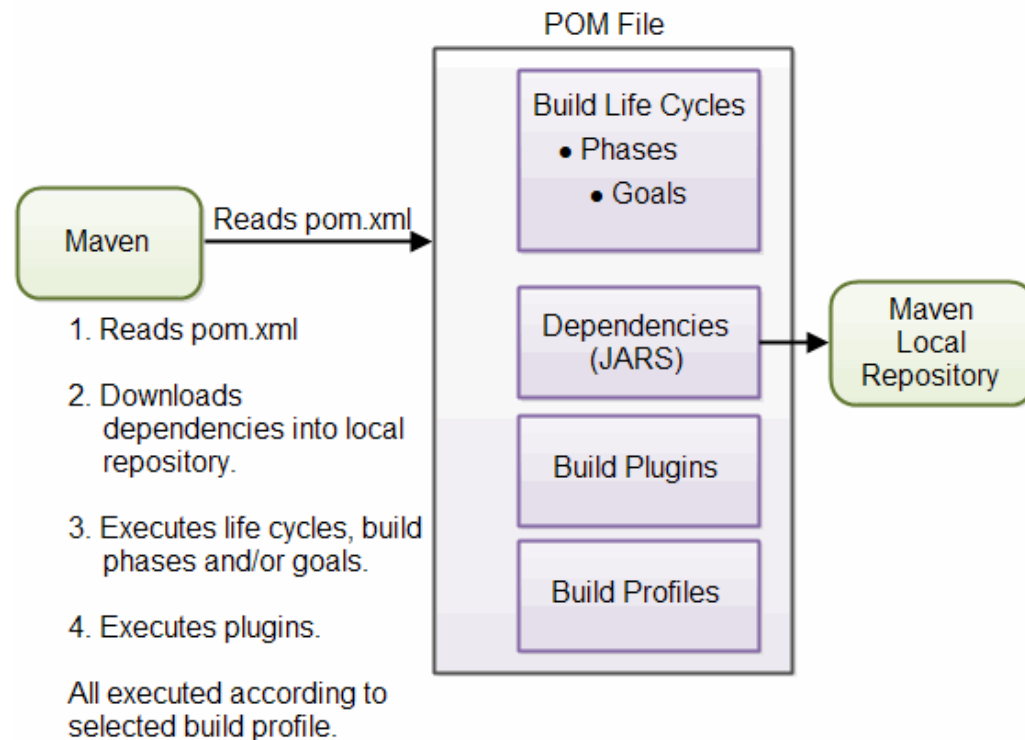
Build Plugins

# Maven

- Project Object Model
  - Project Information
    - groupId – name space or project package
    - artifactId – unique application name
    - version – current version of artifact
  - Output Result – jar/war/ear
  - Properties – project configurations
  - Dependencies – project libraries
  - Build
    - plugins – requirement plugins

# Maven

- Project Object Model
  - Life Cycle



# Maven

- Command Line

Command	Description
mvn archetype:generate	Create new maven project
mvn compile	Compile java source code files
mvn test	Run test classes
mvn clean	Delete all class files
mvn package	Build jar/war file
mvn install	Build jar file and register to local repository (.m2 folder)

# Maven

- Command Line
  - mvn archetype:generate
    - jar package

```
Command Prompt - mvn archetype:generate

D:\maven>mvn archetype:generate
[INFO] Scanning for projects...
[INFO]
[INFO] -----< org.apache.maven:standalone-pom >-----
[INFO] Building Maven Stub Project (No POM) 1
[INFO] -----[ pom ]-----
[INFO]
[INFO] >>> maven-archetype-plugin:3.2.0:generate (default-cli) > generate-sources @ standalone-pom >>>
[INFO]
[INFO] <<< maven-archetype-plugin:3.2.0:generate (default-cli) < generate-sources @ standalone-pom <<<
[INFO]
[INFO] --- maven-archetype-plugin:3.2.0:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[INFO] No archetype defined. Using maven-archetype-quickstart (org.apache.maven.archetypes:maven-archetype-quickstart:1.0)
Choose archetype:
1: remote -> am.ik.archetype:elm-spring-boot-blank-archetype (Blank multi project for Spring Boot + Elm)
2: remote -> am.ik.archetype:graalvm-blank-archetype (Blank project for GraalVM)
3: remote -> am.ik.archetype:graalvm-springmvc-blank-archetype (Blank project for GraalVM + Spring MVC)
4: remote -> am.ik.archetype:graalvm-springwebflux-blank-archetype (Blank project for GraalVM + Spring MVC)
5: remote -> am.ik.archetype:maven-reactjs-blank-archetype (Blank Project for React.js)
6: remote -> am.ik.archetype:msgpack-rpc-jersey-blank-archetype (Blank Project for Spring Boot + Jersey)
7: remote -> am.ik.archetype:mvc-1.0-blank-archetype (MVC 1.0 Blank Project)
8: remote -> am.ik.archetype:spring-boot-blank-archetype (Blank Project for Spring Boot)
9: remote -> am.ik.archetype:spring-boot-docker-blank-archetype (Docker Blank Project for Spring Boot)
10: remote -> am.ik.archetype:spring-boot-gae-blank-archetype (GAE Blank Project for Spring Boot)
11: remote -> am.ik.archetype:spring-boot-jersey-blank-archetype (Blank Project for Spring Boot + Jersey)
12: remote -> am.ik.archetype:spring-fu-jafu-blank-archetype (Blank project for Vanilla Spring WebFlux.fn)
13: remote -> am.ik.archetype:vanilla-spring-webflux-fn-blank-archetype (Blank project for Vanilla Spring WebFlu
```



# Maven

- Command Line
  - mvn archetype:generate
    - war package

```
Command Prompt - mvn archetype:generate
3215: remote -> us.fatehi:schemacrawler-archetype-maven-project (-)
3216: remote -> us.fatehi:schemacrawler-archetype-plugin-command (-)
3217: remote -> us.fatehi:schemacrawler-archetype-plugin-dbconnector (-)
3218: remote -> us.fatehi:schemacrawler-archetype-plugin-lint (-)
3219: remote -> ws.osiris:osiris-archetype (Maven Archetype for Osiris)
3220: remote -> xyz.luan.generator:xyz-gae-generator (-)
3221: remote -> xyz.luan.generator:xyz-generator (-)
3222: remote -> za.co.absa.hyperdrive:component-archetype (-)
3223: remote -> za.co.absa.hyperdrive:component-archetype_2.11 (-)
3224: remote -> za.co.absa.hyperdrive:component-archetype_2.12 (-)
Choose a number or apply filter (format: [groupId:]artifactId, case sensitive contains): 2005: 2010
Choose org.apache.maven.archetypes:maven-archetype-webapp version:
1: 1.0-alpha-1
2: 1.0-alpha-2
3: 1.0-alpha-3
4: 1.0-alpha-4
5: 1.0
6: 1.3
7: 1.4
Choose a number: 7:
Define value for property 'groupId': com.web
Define value for property 'artifactId': web1
Define value for property 'version' 1.0-SNAPSHOT: :
Define value for property 'package' com.web: :
Confirm properties configuration:
groupId: com.web
artifactId: web1
version: 1.0-SNAPSHOT
package: com.web
Y: : Y_
```

# Maven

- Command Line
  - mvn compile

```
Command Prompt

D:\maven\maven-project>mvn compile
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.test:maven-project >-----
[INFO] Building maven-project 1.0-SNAPSHOT
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- maven-resources-plugin:3.0.2:resources (default-resources) @ maven-project ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory D:\maven\maven-project\src\main\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.0:compile (default-compile) @ maven-project ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to D:\maven\maven-project\target\classes
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 1.966 s
[INFO] Finished at: 2023-01-29T14:17:09+07:00
[INFO]
D:\maven\maven-project>
```

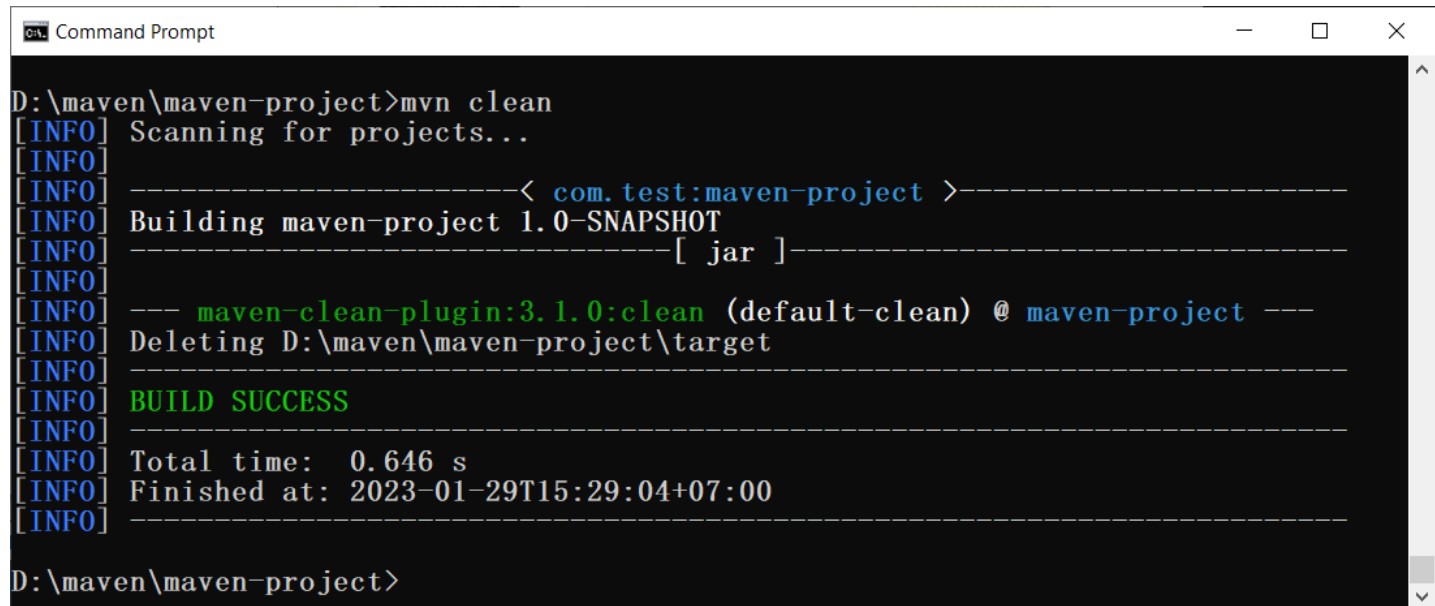
# Maven

- Command Line
  - mvn test

```
Command Prompt
D:\maven\maven-project>mvn test
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.test:maven-project >-----
[INFO] Building maven-project 1.0-SNAPSHOT
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- maven-resources-plugin:3.0.2:resources (default-resources) @ maven-project ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory D:\maven\maven-project\src\main\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.0:compile (default-compile) @ maven-project ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:3.0.2:testResources (default-testResources) @ maven-project ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory D:\maven\maven-project\src\test\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.0:testCompile (default-testCompile) @ maven-project ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:2.22.1:test (default-test) @ maven-project ---
[INFO]
[INFO] T E S T S
[INFO]
[INFO] Running com.test.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.052 s - in com.test.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 4.084 s
[INFO] Finished at: 2023-01-29T15:26:23+07:00
[INFO]
D:\maven\maven-project>
```

# Maven

- Command Line
  - mvn clean



```
Command Prompt
D:\maven\maven-project>mvn clean
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.test:maven-project >-----
[INFO] Building maven-project 1.0-SNAPSHOT
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- maven-clean-plugin:3.1.0:clean (default-clean) @ maven-project ---
[INFO] Deleting D:\maven\maven-project\target
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 0.646 s
[INFO] Finished at: 2023-01-29T15:29:04+07:00
[INFO]
D:\maven\maven-project>
```

# Maven

- Command Line
  - mvn package

```
Command Prompt
D:\maven\maven-project>mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] < com.test:maven-project >
[INFO] Building maven-project 1.0-SNAPSHOT
[INFO] [ jar ]
[INFO]
[INFO] --- maven-resources-plugin:3.0.2:resources (default-resources) @ maven-project ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory D:\maven\maven-project\src\main\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.0:compile (default-compile) @ maven-project ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to D:\maven\maven-project\target\classes
[INFO]
[INFO] --- maven-resources-plugin:3.0.2:testResources (default-testResources) @ maven-project ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory D:\maven\maven-project\src\test\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.0:testCompile (default-testCompile) @ maven-project ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to D:\maven\maven-project\target\test-classes
[INFO]
[INFO] --- maven-surefire-plugin:2.22.1:test (default-test) @ maven-project ---
[INFO]
[INFO] T E S T S
[INFO]
[INFO] Running com.test.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.041 s - in com.test.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- maven-jar-plugin:3.0.2:jar (default-jar) @ maven-project ---
[INFO] Building jar: D:\maven\maven-project\target\maven-project-1.0-SNAPSHOT.jar
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 5.219 s
```

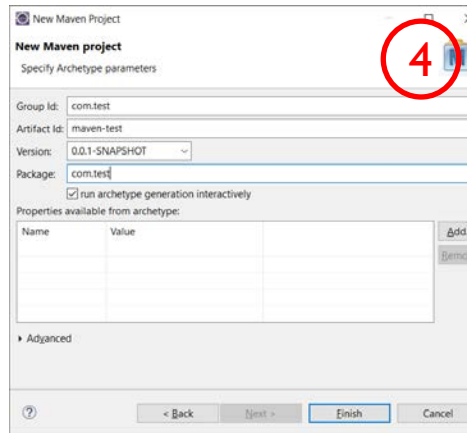
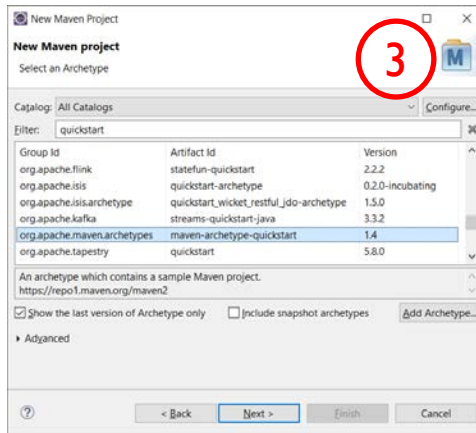
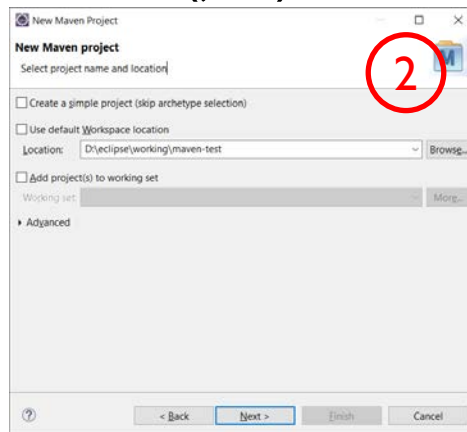
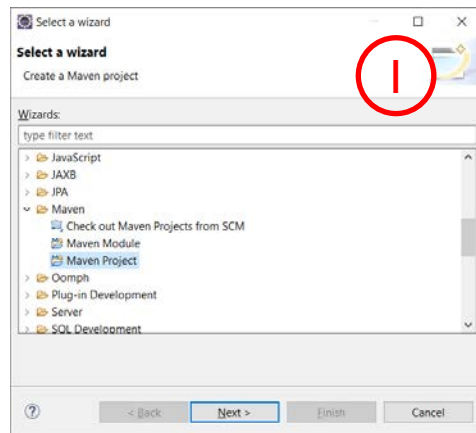
# Maven

- Command Line
  - mvn install

```
Command Prompt
D:\maven\maven-project>mvn install
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.test:maven-project >-----
[INFO] Building maven-project 1.0-SNAPSHOT
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- maven-resources-plugin:3.0.2:resources (default-resources) @ maven-project ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory D:\maven\maven-project\src\main\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.0:compile (default-compile) @ maven-project ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:3.0.2:testResources (default-testResources) @ maven-project ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory D:\maven\maven-project\src\test\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.0:testCompile (default-testCompile) @ maven-project ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:2.22.1:test (default-test) @ maven-project ---
[INFO]
[INFO] T E S T S
[INFO]
[INFO] Running com.test.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.044 s - in com.test.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- maven-jar-plugin:3.0.2:jar (default-jar) @ maven-project ---
[INFO]
[INFO] --- maven-install-plugin:2.5.2:install (default-install) @ maven-project ---
[INFO] Installing D:\maven\maven-project\target\maven-project-1.0-SNAPSHOT.jar to C:\Users\ADMIN\.m2\repository\com\test\maven-project\1.0-SNAPSHOT\maven-project-1.0-SNAPSHOT.jar
[INFO] Installing D:\maven\maven-project\pom.xml to C:\Users\ADMIN\.m2\repository\com\test\maven-project\1.0-SNAPSHOT\maven-project-1.0-SNAPSHOT.pom
[INFO]
```

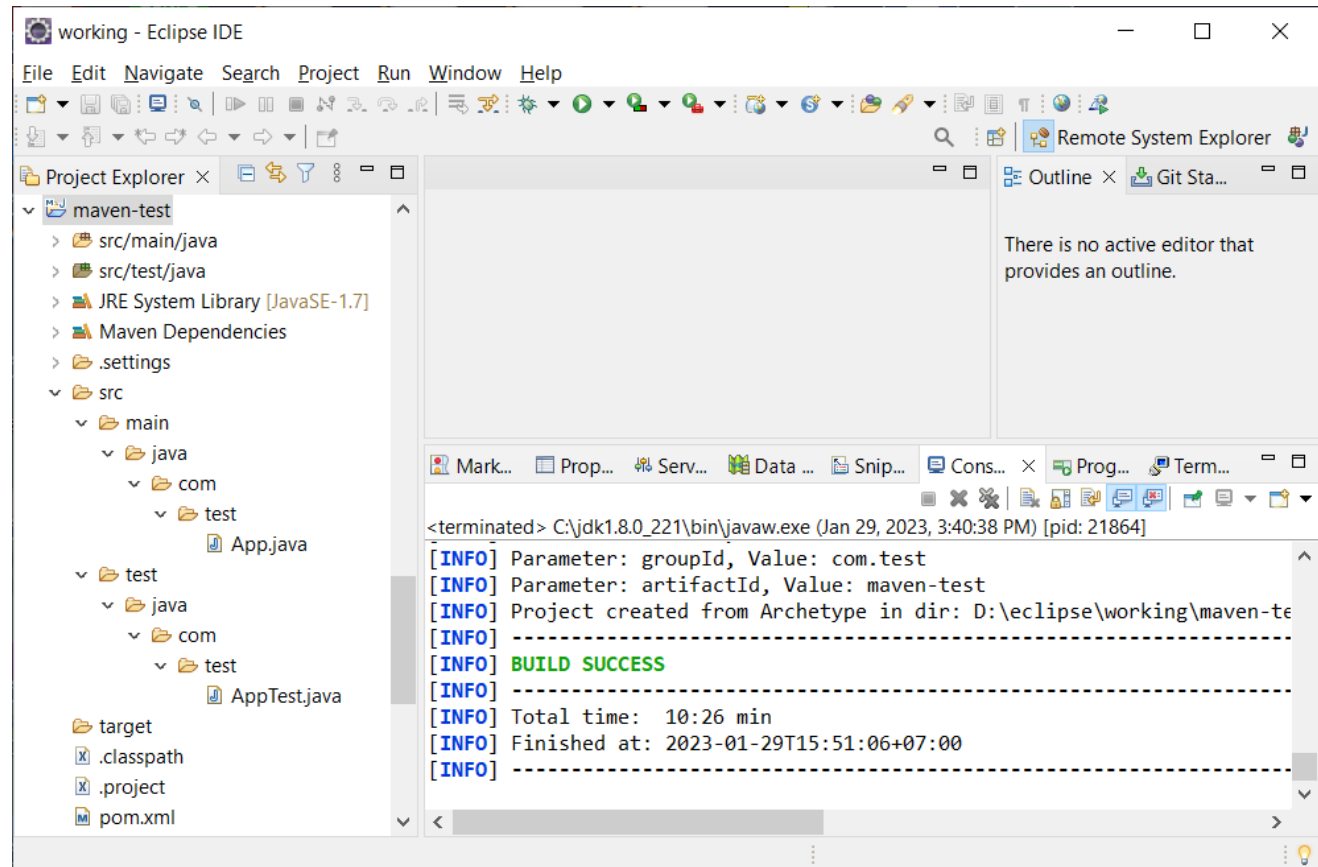
# Maven

- Eclipse IDE Plugin
  - File -> New -> Other (jar)



# Maven

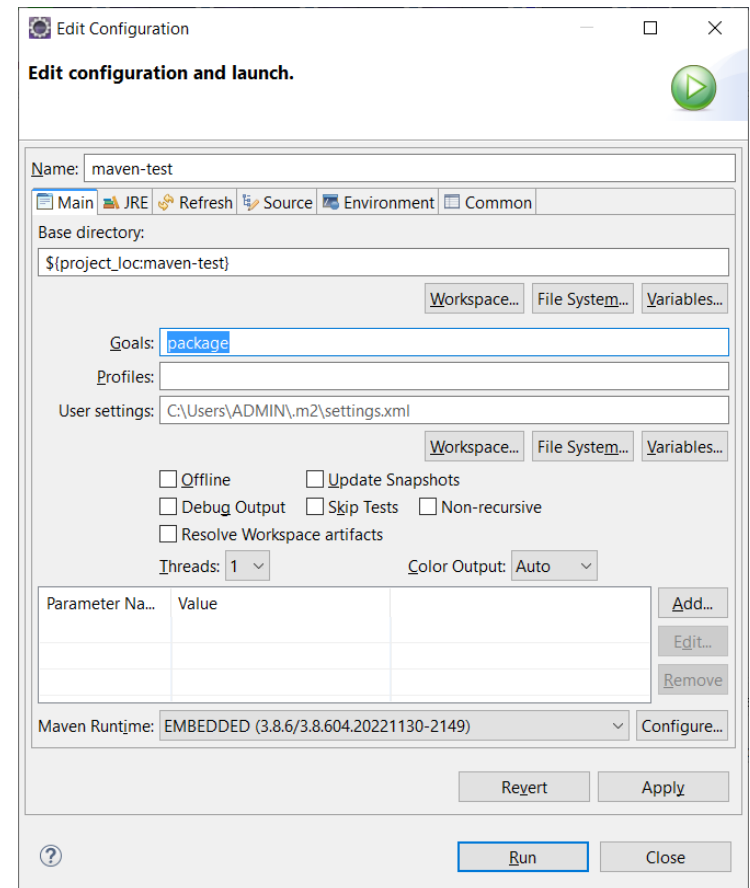
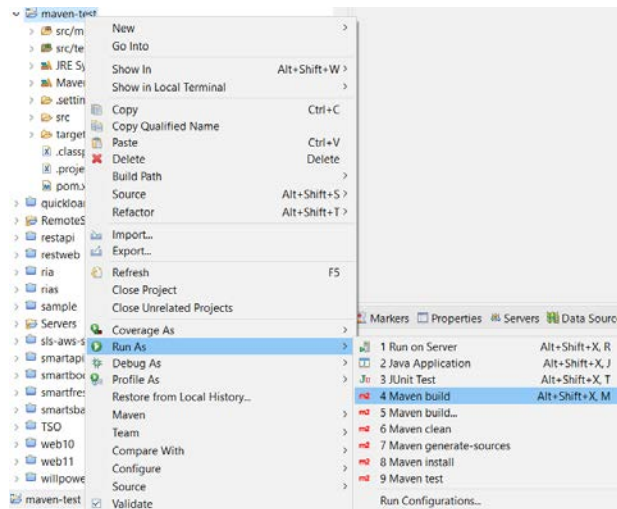
- Eclipse IDE Plugin
  - java project





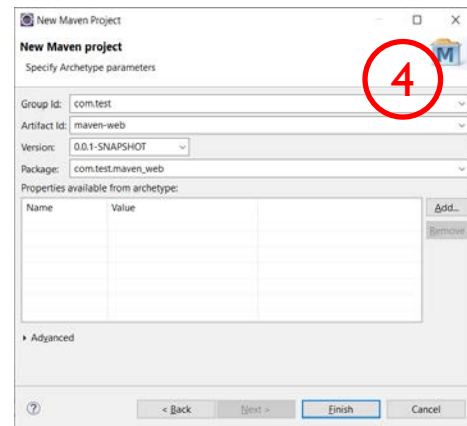
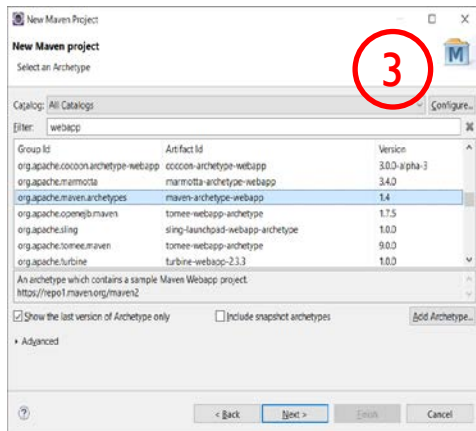
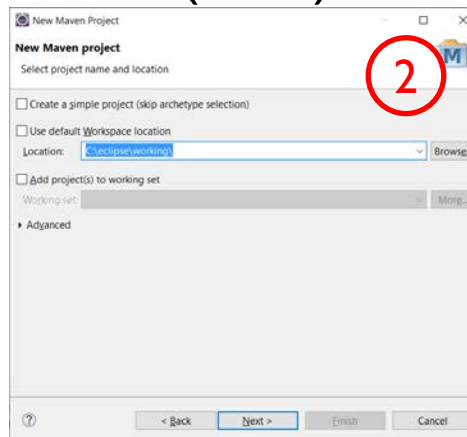
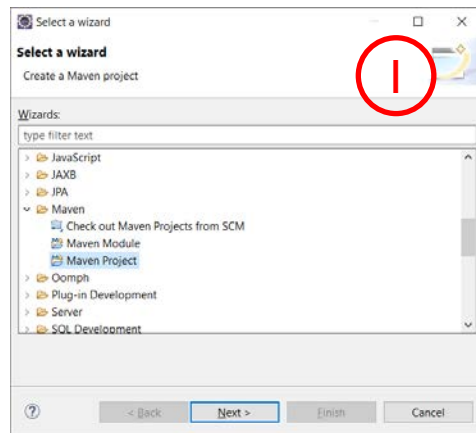
# Maven

- Eclipse IDE Plugin
  - build



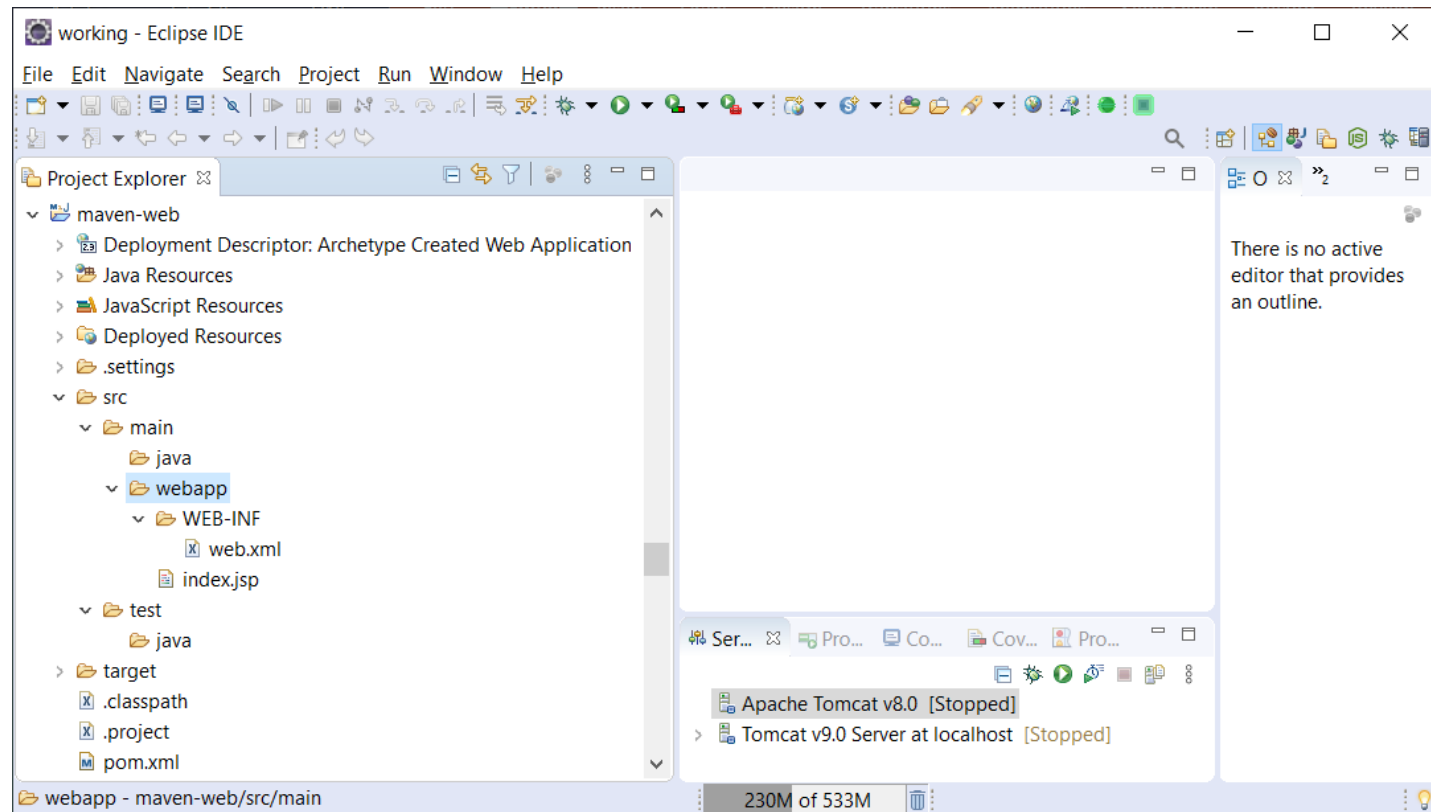
# Maven

- Eclipse IDE Plugin
  - File -> New -> Other (war)



# Maven

- Eclipse IDE Plugin
  - web project



# Reference

- <https://maven.apache.org>
- <https://www.jittagornp.me/blog/what-is-apache-maven/>
- <https://www.jittagornp.me/blog/basic-maven-command-line/>
- <https://www.baeldung.com/maven-archetype>



Q & A