2. Maven and Gradle environmental setup for Java application

1)MAVEN

➢ **Check it's version**

   o **mvn -v**

```
C:\Users\Lenovo>mvn -v
Apache Maven 3.9.8 (36645f6c9b5079805ea5009217e36f2cffd34256)
Maven home: C:\Users\Lenovo\Desktop\devops lab\apache-maven-3.9.8
Java version: 19.0.1, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk-19
Default locale: en_US, platform encoding: UTF-8
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"
```

   o **mvn archetype:generate**

```
C:\Users\Lenovo>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] >>> archetype:3.2.1:generate (default-cli) > generate-sources @ standalone-pom >>>
[INFO]
[INFO] <<< archetype:3.2.1:generate (default-cli) < generate-sources @ standalone-pom <<<
[INFO]
[INFO]
[INFO] --- archetype:3.2.1: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 a number or apply filter (format: [groupId:]artifactId, case sensitive contains): 2161: 2158
Choose org.apache.maven.archetypes:maven-archetype-plugin-site version:
1: 1.0
2: 1.1
3: 1.3
4: 1.4
Choose a number: 4: 4
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/archetypes/maven-archetype-pl
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/archetypes/maven-archetype-plu
  kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/archetypes/maven-archetype-pl
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/archetypes/maven-archetype-plu
B/s)
Define value for property 'groupId': com.second.app
Define value for property 'artifactId': second
Define value for property 'version' 1.0-SNAPSHOT: : 1.0-snapshot
Define value for property 'package' com.second.app: :
Confirm properties configuration:
groupId: com.second.app
artifactId: second
version: 1.0-snapshot
package: com.second.app
 Y: : y
[INFO] ----------------------------------------------------------------------------
[INFO] Using following parameters for creating project from Archetype: maven-archetype-plugin-site:1.4
[INFO] ----------------------------------------------------------------------------
[INFO] Parameter: groupId, Value: com.second.app
[INFO] Parameter: artifactId, Value: second
[INFO] Parameter: version, Value: 1.0-snapshot
[INFO] Parameter: package, Value: com.second.app
[INFO] Parameter: packageInPathFormat, Value: com/second/app
[INFO] Parameter: package, Value: com.second.app
[INFO] Parameter: groupId, Value: com.second.app
[INFO] Parameter: artifactId, Value: second
[INFO] Parameter: version, Value: 1.0-snapshot
[INFO] Project created from Archetype in dir: C:\Users\Lenovo\second
[INFO] ----------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ----------------------------------------------------------------------------
[INFO] Total time:  03:04 min
[INFO] Finished at: 2024-08-02T19:17:59-06:00
[INFO]
```

➢ **Go to the second folder then open cmd**

   o **mvn validate**

```
C:\Users\Lenovo\Desktop\devops lab\second>mvn validate
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------------< com.second.app:second >------------------------
[INFO] Building second 1.0-snapshot
[INFO]    from pom.xml
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] BUILD SUCCESS
[INFO] ----------------------------------------------------------------------------
[INFO] Total time:  0.127 s
[INFO] Finished at: 2024-08-02T19:26:41-06:00
[INFO] ----------------------------------------------------------------------------
```

o **mvn compile**

```
:\Users\Lenovo\Desktop\devops lab\second>mvn compile
INFO] Scanning for projects...
INFO]
INFO] ----------------------< com.second.app:second >----------------------
INFO] Building second 1.0-snapshot
INFO]   from pom.xml
INFO] --------------------------------[ jar ]---------------------------------
INFO]
INFO] --- resources:3.0.2:resources (default-resources) @ second ---
INFO] Using 'UTF-8' encoding to copy filtered resources.
INFO] skip non existing resourceDirectory C:\Users\Lenovo\Desktop\devops lab\second\src\main\resources
INFO]
INFO] --- compiler:3.8.0:compile (default-compile) @ second ---
INFO] Changes detected - recompiling the module!
INFO] Compiling 1 source file to C:\Users\Lenovo\Desktop\devops lab\second\target\classes
INFO] ------------------------------------------------------------------------
INFO] BUILD SUCCESS
INFO] ------------------------------------------------------------------------
INFO] Total time:  2.232 s
INFO] Finished at: 2024-08-02T19:27:07-06:00
INFO] ------------------------------------------------------------------------
```

o **mvn test**

```
C:\Users\Lenovo\Desktop\devops lab\second>mvn test
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------------< com.second.app:second >----------------------
[INFO] Building second 1.0-snapshot
[INFO]   from pom.xml
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- resources:3.0.2:resources (default-resources) @ second ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\Lenovo\Desktop\devops lab\second\src\main\resources
[INFO]
[INFO] --- compiler:3.8.0:compile (default-compile) @ second ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- resources:3.0.2:testResources (default-testResources) @ second ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\Lenovo\Desktop\devops lab\second\src\test\resources
[INFO]
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ second ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\Lenovo\Desktop\devops lab\second\target\test-classes
[INFO]
[INFO] --- surefire:2.22.1:test (default-test) @ second ---
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running com.second.app.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.05 s - in com.second.app.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  2.969 s
[INFO] Finished at: 2024-08-02T19:27:19-06:00
[INFO] ------------------------------------------------------------------------
```

o **mvn package**

```
C:\Users\Lenovo\Desktop\devops lab\second>mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------------< com.second.app:second >----------------------
[INFO] Building second 1.0-snapshot
[INFO]   from pom.xml
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- resources:3.0.2:resources (default-resources) @ second ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\Lenovo\Desktop\devops lab\second\src\main\resources
[INFO]
[INFO] --- compiler:3.8.0:compile (default-compile) @ second ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- resources:3.0.2:testResources (default-testResources) @ second ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\Lenovo\Desktop\devops lab\second\src\test\resources
[INFO]
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ second ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- surefire:2.22.1:test (default-test) @ second ---
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running com.second.app.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.052 s - in com.second.app.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- jar:3.0.2:jar (default-jar) @ second ---
[INFO] Building jar: C:\Users\Lenovo\Desktop\devops lab\second\target\second-1.0-snapshot.jar
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  3.278 s
[INFO] Finished at: 2024-08-02T19:27:35-06:00
[INFO] ------------------------------------------------------------------------
```

Add this code in pom.xml file

```xml
<plugin>
        <artifactId>maven-jar-plugin</artifactId>
        <version>3.0.2</version>
        <configuration>
          <archive>
            <manifest>
              <addClasspath>true</addClasspath>
              <mainClass>com.second.app.App</mainClass>
            </manifest>
          </archive>
        </configuration>
      </plugin>
```

o mvn clean package
o java -jar second-1.0-snapshot.jar

```
C:\Users\Lenovo\Desktop\devops lab\second>mvn clean package
[INFO] Scanning for projects...
[INFO]
[INFO] ---------------------< com.second.app:second >---------------------
[INFO] Building second 1.0-snapshot
[INFO]   from pom.xml
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- clean:3.1.0:clean (default-clean) @ second ---
[INFO] Deleting C:\Users\Lenovo\Desktop\devops lab\second\target
[INFO]
[INFO] --- resources:3.0.2:resources (default-resources) @ second ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\Lenovo\Desktop\devops lab\second\src\main\resources
[INFO]
[INFO] --- compiler:3.8.0:compile (default-compile) @ second ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\Lenovo\Desktop\devops lab\second\target\classes
[INFO]
[INFO] --- resources:3.0.2:testResources (default-testResources) @ second ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\Lenovo\Desktop\devops lab\second\src\test\resources
[INFO]
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ second ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\Lenovo\Desktop\devops lab\second\target\test-classes
[INFO]
[INFO] --- surefire:2.22.1:test (default-test) @ second ---
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running com.second.app.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.039 s - in com.second.app.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] --- jar:3.0.2:jar (default-jar) @ second ---
[INFO] Building jar: C:\Users\Lenovo\Desktop\devops lab\second\target\second-1.0-snapshot.jar
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  3.484 s
[INFO] Finished at: 2024-08-06T09:42:56-06:00
[INFO] ------------------------------------------------------------------------

C:\Users\Lenovo\Desktop\devops lab\second>cd target

C:\Users\Lenovo\Desktop\devops lab\second\target>java -jar second-1.0-snapshot.jar
Hello!
```

2)GRADLE

➢ **Check it's version**
   ○ **gradle -v**

```
Microsoft Windows [Version 10.0.19043.928]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo>gradle -v

Welcome to Gradle 8.9!

Here are the highlights of this release:
 - Enhanced Error and Warning Messages
 - IDE Integration Improvements
 - Daemon JVM Information

For more details see https://docs.gradle.org/8.9/release-notes.html


------------------------------------------------------
Gradle 8.9
------------------------------------------------------

Build time:    2024-07-11 14:37:41 UTC
Revision:      d536ef36a19186ccc596d8817123e5445f30fef8

Kotlin:        1.9.23
Groovy:        3.0.21
Ant:           Apache Ant(TM) version 1.10.13 compiled on January 4 2023
Launcher JVM:  19.0.1 (Oracle Corporation 19.0.1+10-21)
Daemon JVM:    C:\Program Files\Java\jdk-19 (no JDK specified, using current Java home)
OS:            Windows 10 10.0 amd64
```

   ○ **gradle init**

```
C:\Users\Lenovo\Desktop\devops lab\pract_2>gradle init
Starting a Gradle Daemon, 1 incompatible and 1 stopped Daemons could not be reused, use --status for details

Found existing files in the project directory: 'C:\Users\Lenovo\Desktop\devops lab\pract_2'.
Directory will be modified and existing files may be overwritten.  Continue? (default: no) [yes, no] yes

Select type of build to generate:
  1: Application
  2: Library
  3: Gradle plugin
  4: Basic (build structure only)
Enter selection (default: Application) [1..4] 1

Select implementation language:
  1: Java
  2: Kotlin
  3: Groovy
  4: Scala
  5: C++
  6: Swift
Enter selection (default: Java) [1..6] 1

Enter target Java version (min: 7, default: 21): 21

Project name (default: pract_2): pract_2

Select application structure:
  1: Single application project
  2: Application and library project
Enter selection (default: Single application project) [1..2] 1

Select build script DSL:
  1: Kotlin
  2: Groovy
Enter selection (default: Kotlin) [1..2] 1

Select test framework:
  1: JUnit 4
  2: TestNG
  3: Spock
  4: JUnit Jupiter
Enter selection (default: JUnit Jupiter) [1..4] 1

Generate build using new APIs and behavior (some features may change in the next minor release)? (default: no) [yes, no] no


> Task :init
Learn more about Gradle by exploring our Samples at https://docs.gradle.org/8.9/samples/sample_building_java_applications.html

BUILD SUCCESSFUL in 47s
1 actionable task: 1 executed
```

- o **gradle tasks**

```
C:\Users\Lenovo\Desktop\devops lab\pract_2>gradle tasks

> Task :tasks

------------------------------------------------------------
Tasks runnable from root project 'gradle'
------------------------------------------------------------

Application tasks
-----------------
run - Runs this project as a JVM application

Build tasks
-----------
assemble - Assembles the outputs of this project.
build - Assembles and tests this project.
buildDependents - Assembles and tests this project and all projects that depend on it.
buildNeeded - Assembles and tests this project and all projects it depends on.
classes - Assembles main classes.
clean - Deletes the build directory.
jar - Assembles a jar archive containing the classes of the 'main' feature.
testClasses - Assembles test classes.

Build Setup tasks
-----------------
init - Initializes a new Gradle build.
updateDaemonJvm - Generates or updates the Gradle Daemon JVM criteria.
wrapper - Generates Gradle wrapper files.

Distribution tasks
------------------
assembleDist - Assembles the main distributions
distTar - Bundles the project as a distribution.
distZip - Bundles the project as a distribution.
installDist - Installs the project as a distribution as-is.

Documentation tasks
-------------------
javadoc - Generates Javadoc API documentation for the 'main' feature.
Help tasks
----------
buildEnvironment - Displays all buildscript dependencies declared in root project 'gradle'.
dependencies - Displays all dependencies declared in root project 'gradle'.
dependencyInsight - Displays the insight into a specific dependency in root project 'gradle'.
help - Displays a help message.
javaToolchains - Displays the detected java toolchains.
kotlinDslAccessorsReport - Prints the Kotlin code for accessing the currently available project extensions and conventions.
outgoingVariants - Displays the outgoing variants of root project 'gradle'.
projects - Displays the sub-projects of root project 'gradle'.
properties - Displays the properties of root project 'gradle'.
resolvableConfigurations - Displays the configurations that can be resolved in root project 'gradle'.
tasks - Displays the tasks runnable from root project 'gradle' (some of the displayed tasks may belong to subprojects).

Verification tasks
------------------
check - Runs all checks.
test - Runs the test suite.

To see all tasks and more detail, run gradle tasks --all

To see more detail about a task, run gradle help --task <task>

BUILD SUCCESSFUL in 1s
1 actionable task: 1 executed
```

- o **gradle build**

```
C:\Users\Lenovo\Desktop\devops lab\pract_2>gradle build
Invalid Java installation found at 'C:\Users\Lenovo\.gradle\.tmp\jdks\OpenJDK21U-jdk_x64_windows_hotspot_2175195587
isioned toolchain) auto-detected auto-provisioned. It will be re-checked in the next build. This might have perform
s failing. Run the 'javaToolchains' task for more details.

BUILD SUCCESSFUL in 23m 53s
7 actionable tasks: 7 executed
```

- o **gradle run**

```
C:\Users\Lenovo\Desktop\devops lab\pract_2>gradle run
Starting a Gradle Daemon, 1 incompatible and 1 stopped Daemons could not be reused, use --statu

> Task :app:run
Hello World!

BUILD SUCCESSFUL in 29s
2 actionable tasks: 1 executed, 1 up-to-date
```