Task 1: Build Lifecycle  
Demonstrate the use of Maven lifecycle phases (clean, compile, test, package, install, deploy) by executing them on a sample project and documenting what happens in each phase.

**Create a Sample Maven Project:** Start by creating a simple Maven project. You can either use an IDE like IntelliJ IDEA or Eclipse to create a Maven project, or you can use the Maven command-line tool to generate a project structure.

**Bash Command :** mvn archetype:generate -DgroupId=com.example -DartifactId=my-project -DarchetypeArtifactId=maven-archetype-quickstart -DinteractiveMode=false

**Navigate to the Project Directory:** Change your current directory to the newly created project directory.

**Bash Command :** cd my-project

**Understanding Maven Lifecycle Phases:** Before we execute the Maven lifecycle phases, let's understand what each phase does:

* **clean:** Cleans the project by removing any files generated by the previous build.
* **compile:** Compiles the source code of the project.
* **test:** Runs unit tests using a suitable unit testing framework.
* **package:** Takes the compiled code and packages it in its distributable format, such as a JAR, WAR, or EAR.
* **install:** Installs the package into the local repository, for use as a dependency in other projects locally.
* **deploy:** Copies the final package to the remote repository for sharing with other developers and projects.

**Execute Maven Lifecycle Phases:** Let's execute each Maven lifecycle phase one by one and observe what happens.

**1 . Clean :** mvn clean (This phase should remove any existing compiled files and artifacts from the target directory.)

**2. Compile :** mvm compile ( This phase should compile the Java source code located in **src/main/java**.)

**3. Test :** mvm test (This phase should execute the unit tests located in **src/test/java.**)

**4. Package :** mvm package (This phase should package the compiled code into a distributable format, such as a JAR file.

**5. Install :** mvm install(This phase should install the packaged artifact into the local Maven repository)

**6. Deploy :** mvm deploy (This phase should deploy the packaged artifact to a remote Maven repository.)

**Observation:** After executing each phase, observe the output in the console to see what Maven is doing at each step. Pay attention to any errors or warnings that may occur.

**Context Menu:**  If you're using an IDE like IntelliJ IDEA or Eclipse, you can usually find Maven lifecycle phases in the context menu of the project or the pom.xml file. Right-click on the project or pom.xml and look for options related to Maven. You should find options to execute various Maven lifecycle phases from the context menu.