**MAVEN**

Maven is a build automation tool and project management tool primarily used for Java projects. It was developed by Apache Software Foundation.

**Features:**

1. **Dependency Management:** Automatically downloads and manages libraries (JAR files) your project depends on.
2. **Standardized Project Structure:** Creates the project structure.
3. **Documentation:** Prepares the documentation.
4. **Build Automation:** Compiles codes, run tests, packages applications (into JAR/WAR files), and deploys them.
5. **Central Repository:** Connects to the central maven repository to fetch dependencies and plugins.
6. **POM file(pom.xml):** Provides pom.xml which is a core configuration file where you define project details, dependencies, plugins, etc.

**Maven Lifecycle:**

1. **Validate:** This step validates if the project structure is correct, and all the dependencies have been downloaded and available in the local repository.
2. **Compile**: It compiles the source code.
3. **Test**: Run unit tests for the project.
4. **Package**: Packages the compiled code into a distributable format like JAR or WAR.
5. **Integration** Tests: Runs integration tests for the project.
6. **Verify**: Runs checks to ensure that project is valid and meets quality standards.
7. **Install**: Installs the package into local repository for use in other projects.
8. **Deploy**: Copies the final package to remote repositpory for sharing with other developers pr systems.

**Maven Commands:**

1. **mvn clean: cleans the project and removes all files generate by previous build.**
2. **mvn compile: compiles source code of the project.**
3. **mvn test-compile: compile the test source code.**
4. **mvn test: runs tests for the project.**
5. **mvn package: create JAR or WAR file for the project to convert into distributable format.**
6. **mvn install: Deploys the packaged JAR/WAR file to the local repository**
7. **mvn site: generate the project documentation**
8. **mvn validate: validates the project’s POM and configuration**

**Plugins:** Plugins are components that add specific capabilities to Maven’s build process. Each plugin a set of goals/tasks that perform actions like compiling, executing tests, generating documentation, etc.

* **Build Plugins:** Execute tasks during the build process, such as compilation or packaging.
* **Reporting Plugins:** Generate reports about the project, such as test results or code quality metrics.

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**Types of repositories:**

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**Order of Dependency Resolution: Local 🡪 Remote 🡪 Central**