What is Maven?

Why used in Test Automation?

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What is Maven?

Maven is a powerful build automation and project management tool primarily used for Java projects.

Need of Maven?

It simplifies the process of building, managing, and deploying Java-based applications by providing a standardized way to manage project dependencies, build configurations, and project lifecycles.

What does building mean?

"building" refers to the process of transforming the source code of a project into a distributable format or artifact, such as a JAR (Java Archive).

Why do we need Jar?

- Maven allows you to package your Java application or library into a JAR file. This makes it convenient to distribute the application to end-users.
- When you create a JAR using Maven, it can include your project's compiled code, resources, and other necessary files.

Primary use of Jar files:-

- JAR files are commonly used for deploying Java applications. They encapsulate the application code and resources, making it easier to distribute and run the application on different environments

What are different project life cycle in Maven?

01

Validation

validates the project structure, configuration files, etc., ensuring that everything is set up correctly.

02

Compilation

compiles the source code (Java files) into bytecode (.class files).

03

Testing

runs tests defined in the project to ensure the code functions as expected.Maven distinguishes test sources from main sources and runs appropriate tests.

04

Packaging

takes compiled code, resources, and other files and packages them into a distributable format, such as JAR, WAR, or others

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05

Installation

copies the packaged artifact into the local Maven repository for use as a dependency in other projects on the same machine.

06

Deployment

deploys the artifact to a remote repository or server, making it available for other developers or environments.

What is the project structure for Maven Projects?

src: Contains the main source code and resources.

main: The main codebase.

java: Java source files for the main application.

resources: Configuration files, properties, XML, etc., used by the main application.

webapp: For web applications, contains web-specific resources like JSPs, HTML files, WEB-INF, etc.

test: Contains test code and resources.

java: Java source files for tests (unit tests, integration tests).

resources: Test-specific resources or configurations.

pom.xml: The Project Object Model (POM) file that contains project configurations, dependencies, build settings, and plugins.

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How to setup Parallel execution in Maven?

Configure TestNG for Parallel Execution:

In your TestNG suite XML file (e.g., testng.xml), specify parallel execution attributes for the test suite or test methods/classes that you want to run in parallel

```
<suite name="Test Suite" parallel="tests" thread-count="3">
    <test name="Test1">
        <!-- Your test classes, methods, or configurations -->
    </test>
    <test name="Test2">
        <!-- Your test classes, methods, or configurations -->
    </test>
    <!-- Add more test tags for parallel execution -->
</suite>
```

Here, parallel="tests" specifies that individual tests defined within the <test> tags will run in parallel, and thread-count="3" sets the number of parallel threads to use.

Configure Maven Surefire Plugin:

Update your Maven pom.xml file to configure the Surefire or Failsafe plugin (depending on your testing phase - unit tests or integration tests) to execute the TestNG XML suite file in parallel.

```
<build>
    <plugins>
        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-surefire-plugin</artifactId>
            <version>3.0.0-M5</version> <!-- Use the appropriate version -->
            <configuration>
                <suiteXmlFiles>
```

```
<suiteXmlFile>path/to/testng.xml</suiteXmlFile>
            </suiteXmlFiles>
            <parallel>methods</parallel> <!-- Configure parallel mode -->
            <threadCount>3</threadCount> <!-- Set the thread count -->
          </configuration>
        </plugin>
    </plugins>
</build>
```

- `<parallel>` sets the mode for parallel execution (e.g., `methods`, `tests`, `classes`).
- `<threadCount>` specifies the number of threads to use for parallel execution.

How to execute tests using Maven?

Run Maven Command:

Execute Maven build commands to trigger the test execution. For example:

Command = mvn clean test

What are different commands in Maven?

mvn clean: Deletes the target directory, which contains the build artifacts and compiled classes. It helps in cleaning the project before a new build.

mvn compile: Compiles the source code of the project

mvn test: Runs tests present in the project

mvn package: Packages the compiled code and resources into a distributable format (e.g., JAR, WAR).

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What are maven dependencies?

They represent the external components that your project relies on and are specified in the project's pom.xml

When Maven builds a project, it automatically manages these dependencies by downloading the required libraries from remote repositories like Maven Central Repository

What is the structure of a dependency defined in Maven Pom.xml

```
<dependencies>
    <dependency>
        <groupId>org.seleniumhq.selenium</groupId>
        <artifactId>selenium-java</artifactId>
        <version>4.4.1</version>
    </dependency>
</dependencies>
```

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Maven based Interview Questions & Answers

What is Maven?

Ans: In previous slides

Explain the Maven lifecycle.

Ans: In previous slides

What is a POM file in Maven?

Ans: In previous slides

How does Maven handle dependencies?

Ans: In previous slides

What is the difference between clean and install goals in Maven?

Differentiation between the clean goal, which removes the build artifacts, and the install goal, which installs the project artifact into the local repository.

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