Lab 1. Introduction to Maven and Gradle: Overview of Build Automation Tools, Key Differences Between Maven and Gradle, Installation and Setup.

Introduction to Maven and Gradle

Overview of Build Automation Tools

Build automation tools help developers streamline the process of building, testing, and deploying software projects. They take care of repetitive tasks like compiling code, managing dependencies, and packaging applications, which makes development more efficient and error-free.

Two popular tools in the Java ecosystem are **Maven and Gradle**. Both are great for managing project builds and dependencies, but they have some key differences.

Maven

- **What is Maven?** Maven is a build automation tool primarily used for Java projects. It uses an XML configuration file called pom.xml (Project Object Model) to define project settings, dependencies, and build steps.
- **Main Features:**
  - Predefined project structure and lifecycle phases.
  - Automatic dependency management through Maven Central.
  - Wide range of plugins for things like testing and deployment.
  - Supports complex projects with multiple modules.

Gradle

- **What is Gradle?** Gradle is a more modern and versatile build tool that supports multiple programming languages, including Java, Groovy, and Kotlin. It uses a domain-specific language (DSL) for build scripts, written in Groovy or Kotlin.
- **Main Features:**
  - Faster builds thanks to task caching and incremental builds.
  - Flexible and customizable build scripts.
  - Works with Maven repositories for dependency management.
  - Excellent support for multi-module and cross-language projects.
  - Integrates easily with CI/CD pipelines.

Key Differences Between Maven and Gradle

Aspect	Maven	Gradle
Configuration	XML (pom.xml)	Groovy or Kotlin DSL
Performance	Slower	Faster due to caching
Flexibility	Less flexible	Highly customizable
Learning Curve	Easier to pick up	Slightly steeper
Script Size	Verbose	More concise
Dependency Management	Uses Maven Central	Compatible with Maven too
Plugin Support	Large ecosystem	Extensible and versatile

Installation and Setup

How to Install Maven:

1. **Download Maven:**
   - Go to the Maven Download Page and download the latest binary ZIP file.

Extract the ZIP File:

- Right-click the downloaded ZIP file and select **Extract All…** or use any extraction tool like WinRAR or 7-Zip.

Move the Folder:

- After extraction, move the extracted **Maven folder** (usually named **apache-maven-x.x.x**) to a convenient directory like C:\Program Files\.

Navigate to the bin Folder:

- Open the **Maven folder**, then navigate to the **bin** folder inside.

- Copy the path from the File Explorer address bar(e.g., **C:\Program Files\apache-maven-x.x.x\bin**).

Set Environment Variables:

- Open the **Start Menu**, search for **Environment Variables**, and select **Edit the system environment variables**.
- Click **Environment Variables**.
- Under **System Variables**:
  - Find the **path**, double click on it and click **New**.
  - Paste the full path to the bin folder of your Maven directory (e.g., **C:\Program Files\apache-maven-x.x.x\bin**).

Save the Changes:

- Click **OK** to close the windows and save your changes.

Verify the Installation:

- Open Command Prompt and run: **mvn -v** If Maven is correctly installed, it will display the version number.

How to install Gradle

1. **Download**
2. **Gradle:**
   Visit the Gradle Downloads Page and download the latest binary ZIP file.
3. **Extract the ZIP File:**
   - Right-click the downloaded ZIP file and select **Extract All…** or use any extraction tool like WinRAR or 7-Zip.

Move the Folder:

- After extraction, move the extracted **Gradle folder** (usually named **gradle-x.x.x**) to a convenient directory like C:\Program Files\.

Navigate to the bin Folder:

- Open the **Gradle folder**, then navigate to the **bin** folder inside.
- Copy the path from the File Explorer address bar (e.g., **C:\Program Files\gradle-x.x\bin**).

Set Environment Variables:

- Open the **Start Menu**, search for **Environment Variables**, and select **Edit the system environment variables**.
- Click **Environment Variables**.
- Under **System Variables**:
  - Find the **path**, double click on it and click **New**.
  - Paste the full path to the bin folder of your Gradle directory (e.g., **C:\Program Files\gradle-x.x.x\bin**).

Save the Changes:

- Click **OK** to close the windows and save your changes.

Verify the Installation:

- Open a terminal or Command Prompt and run: **gradle -v** If it shows the Gradle version, the setup is complete.

Evaluation of Industrial Internship

Marks awarded by Internship Coordinator& HOD/HOD Nominee based on the Progress of the project evaluated periodically (2 times)– 30 Marks +20 Marks Consolidated marks list is signed by the industrial Internship Coordinator. Final Marks are entered by Industrial internship coordinator. Internship Coordinator & HOD/HOD Nominee will conduct the Examination.

Internships: The students are encouraged to take up internship programs during their semester break. Faculty members give their guidelines, suggestions and scope and contact details of an internship. They also help the students by interacting with the industrial experts, provide the students recommendation letters and other necessary supports. The alumni coordinator constantly interacts with alumni those who are working in the industries and request them to provide necessary guide lines and supports for their junior's internship.

i. Summer training is a compulsory credit course to be completed in the summers after I and II years. The duration after I year is 30 days and the duration after II year is 40 days.

ii. Some of the industries / Institutes where the students regularly go for summer training include but are not limited to BHEL, Torrent Power, UPPCL, IIT Delhi, ADRDE, Kirloskar, DEI USIC etc.

iii. After the Third Year, the students go for a 5 month Co-op Internship to various Industries. The duration is long enough for them to be given some live project work and most industries do take advantage. Many students also get some monetary incentives for the training period going upto Rs 25,000 per month. Some industries offer free boarding and / or lodging.

iv. Some of the industries where the students regularly go for co-op internship include Analog Devices, Texas Instruments, Essar Steel, Maruti, IIT Delhi, Cadence Design Systems, start-ups in Bangalore / NOIDA etc.

Implementation details:

i. The Department has a strong Alumni Network across thestate and country. The Alumni not only help arranging for the Co-op Internships but also mentor the students in their internship. The Placement cell coordinates this effort and ensures that every student gets the summer training / co-op internship opportunity in some industry / educational / R&D Institution.

ii. Training sessions are conducted in DEI by the Alumni before the students go for their Internship on the dos and donts during the Internship.

iii. The Alumni mentors also mentor the students during the Internship so that they get the maximum benefit by working on live projects.

iv. Faculty members are assigned students that they have to evaluate according to the geographical spread of the industries. The industries are clustered into clusters based on the geographical location and one cluster is assigned to one Faculty member. Faculty members coordinate with the Industry personnel mentoring the students in their internship and get

feedback on their performance through telephone / email interaction on a regular basis. This enables mid-course correction in case some student has some performance issues. They may also visit the industries where the students are in their internship and get first hand feedback.

v. Students are required to submit a report of the work done during their Summer training / co-op internship when they come back to the Institute after the completion of these endeavours. They need to make a presentation to a Departmental committee that is set up for the purpose and face a Viva examination.

vi. There is an external end semester examination also where the external examiner who is typically an Industry person evaluates their performance. These evaluations ensure that the training / coop Internships are taken up very seriously by the students.