Week 8: Jenkins Automation

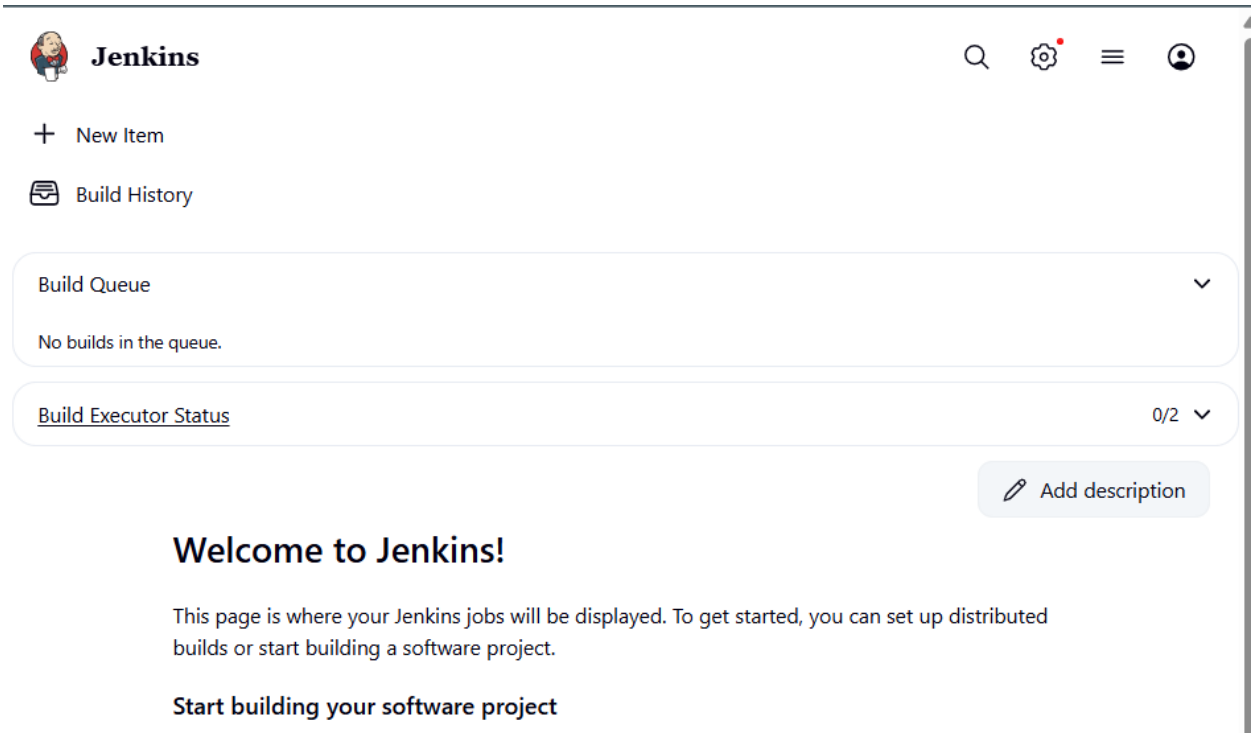
I. Hands-on practice on manual creation of Jenkins pipeline using Maven projects from Github
II. Create the job and build the pipeline for maven-java and maven-web project.
III. Questions on Jenkins
IV. Upload the Screenshots.

I. Steps for MavenJava Automation:

Maven Java Automation Steps:

Step 1: Open Jenkins (localhost:8080)

├── Click on "New Item" (left side menu



Step 2: Create Freestyle Project (e.g., MavenJava_Build)

├── Enter project name (e.g., MavenJava_Build)

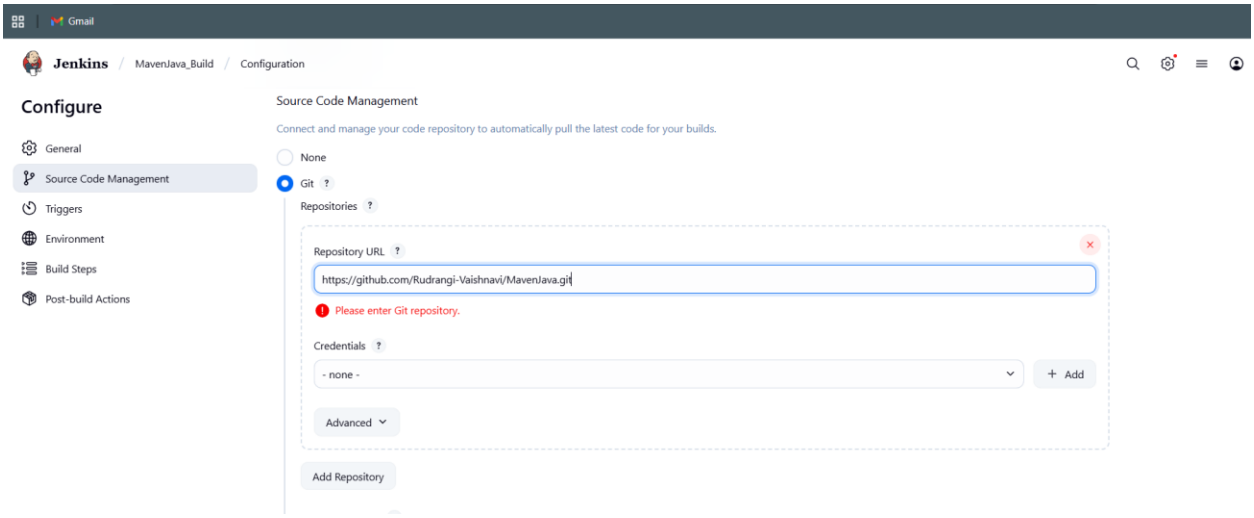
├── Click "OK"

└── **Configure the project:**

├── **Description**: "Java Build demo"

├── **Source Code Management**:

└── Git repository URL: [GitMavenJava repo URL]



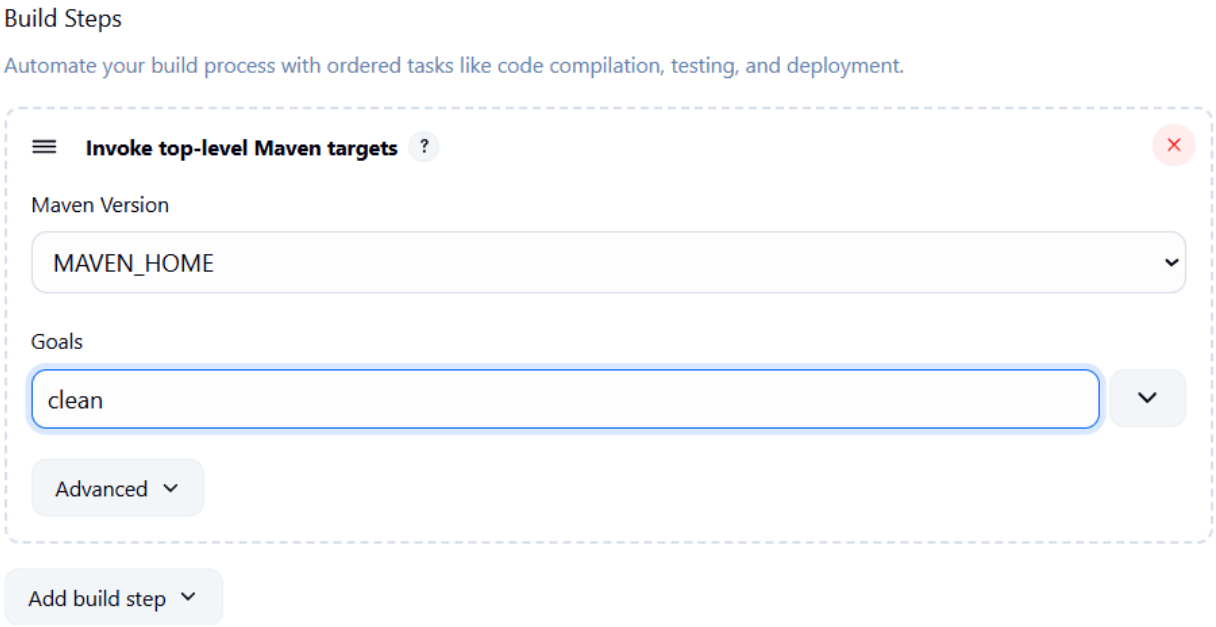
├── **Branches to build**: */Main or */master

└── **Build Steps**:

├── **Add Build Step** -> "Invoke top-level Maven targets"

└── Maven version: MAVEN_HOME

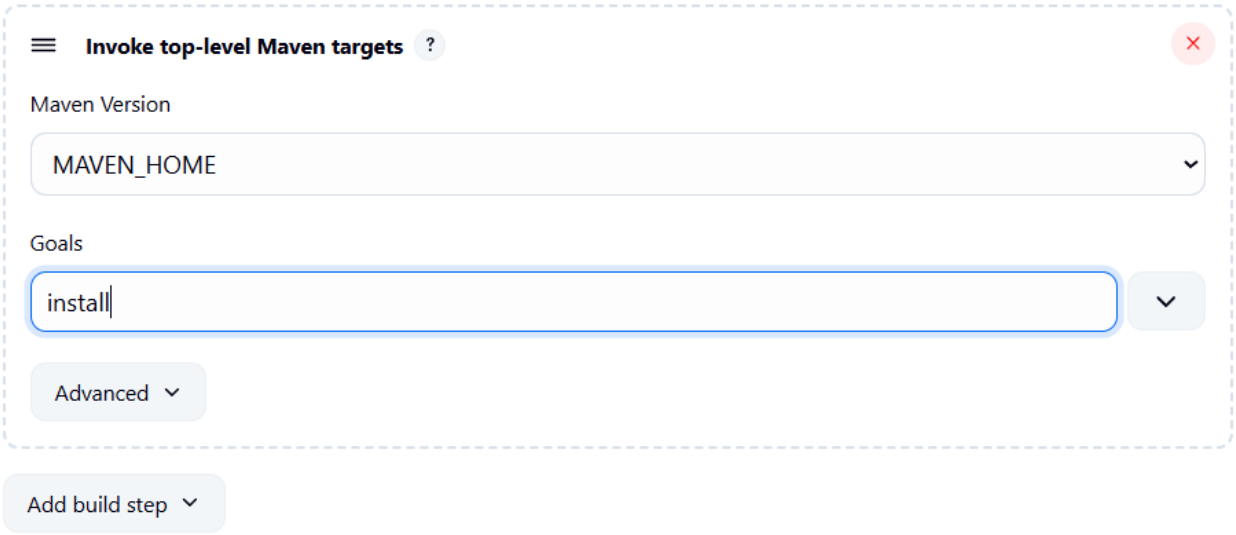
└── Goals: clean



├── **Add Build Step** -> "Invoke top-level Maven targets"

└── Maven version: MAVEN_HOME

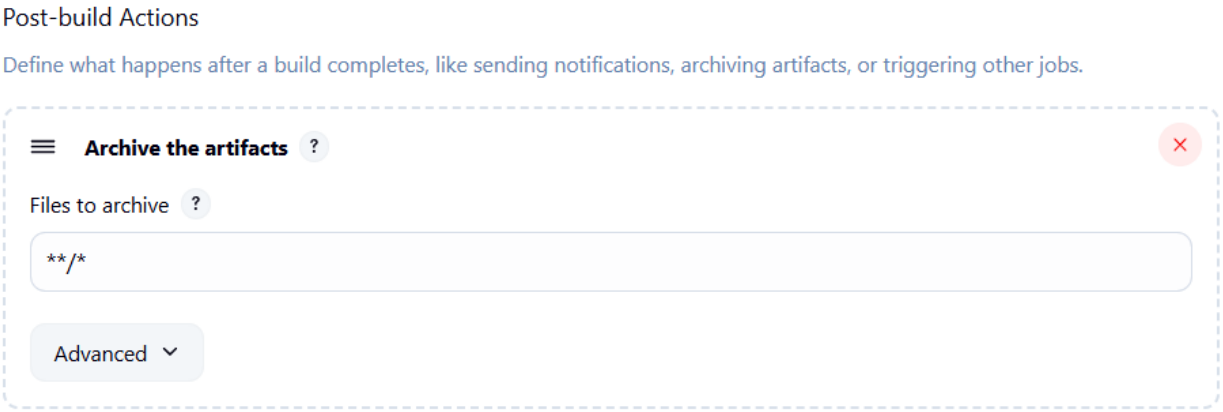
└── Goals: install



└── **Post-build Actions**:

├── Add Post Build Action -> "Archive the artifacts"

└── Files to archive: **/*



├── Add Post Build Action -> "Build other projects"

└── Projects to build: MavenJava_Test

└── Trigger: Only if build is stable

└── Apply and Save

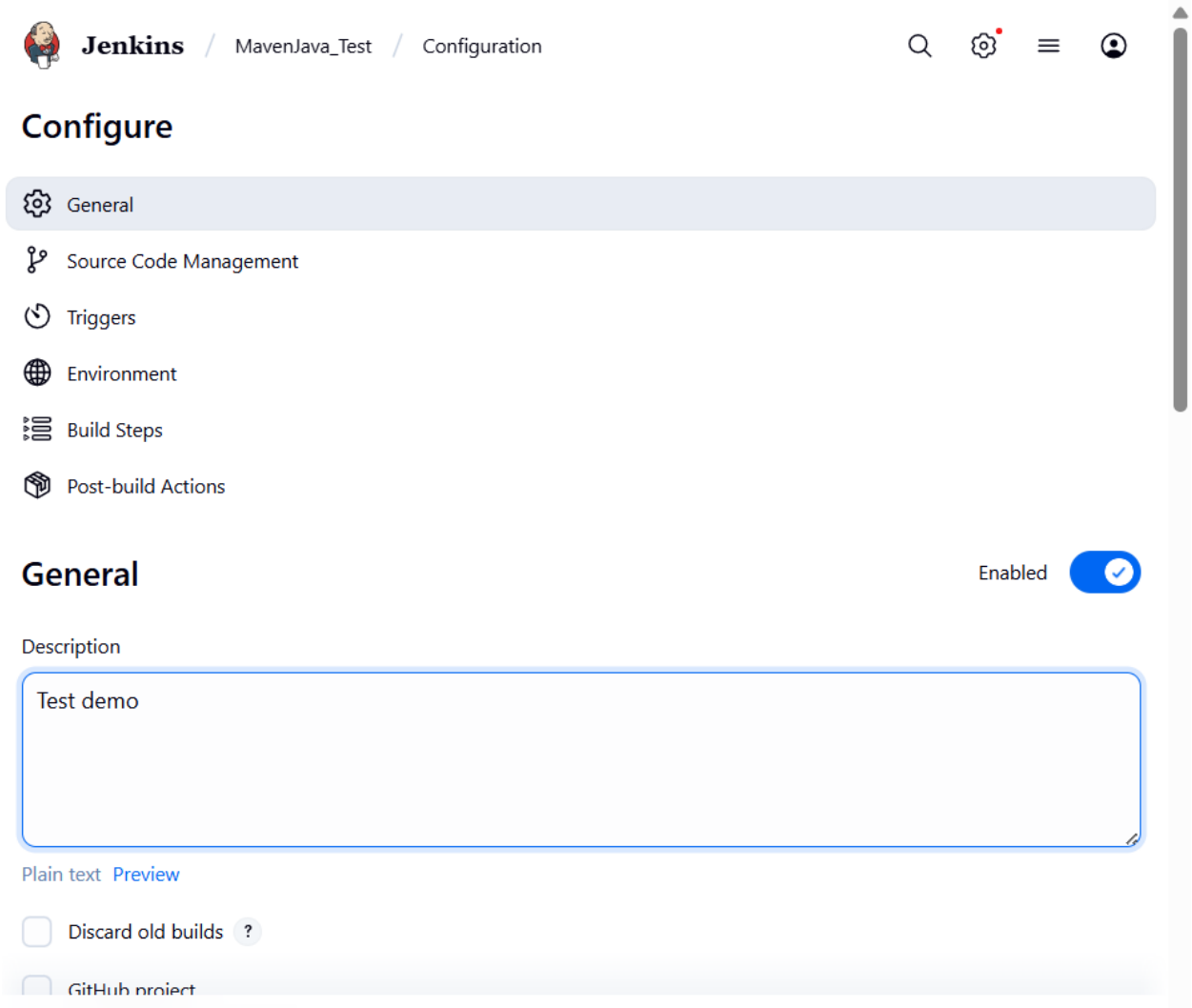
└── **Step 3: Create Freestyle Project (e.g., MavenJava_Test)**

├── Enter project name (e.g., MavenJava_Test)

├── Click "OK"

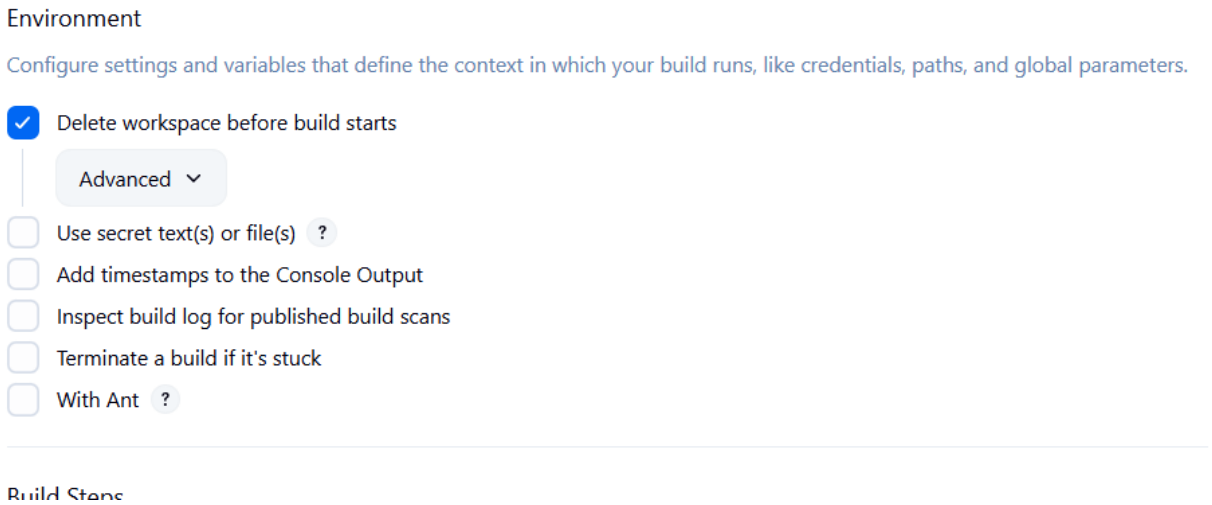
└── **Configure the project**:

├── **Description**: "Test demo"



├── **Build Environment**:

└── Check: "Delete the workspace before build starts"



├── **Add Build Step** -> "Copy artifacts from another project"

└── Project name: MavenJava_Build

└── Build: Stable build only // tick at this

└── Artifacts to copy: **/*

Build Steps

Automate your build process with ordered tasks like code compilation, testing, and deployment.

Copy artifacts from another project

Project name ?

MavenJava_Build

Which build ?

Latest successful build

Stable build only

Artifacts to copy ?

**/*

Artifacts not to copy ?

Target directory ?

Parameter filters ?

├── **Add Build Step** -> "Invoke top-level Maven targets"

└── Maven version: MAVEN_HOME

└── Goals: test

Invoke top-level Maven targets ?

Maven Version

MAVEN_HOME

Goals

test

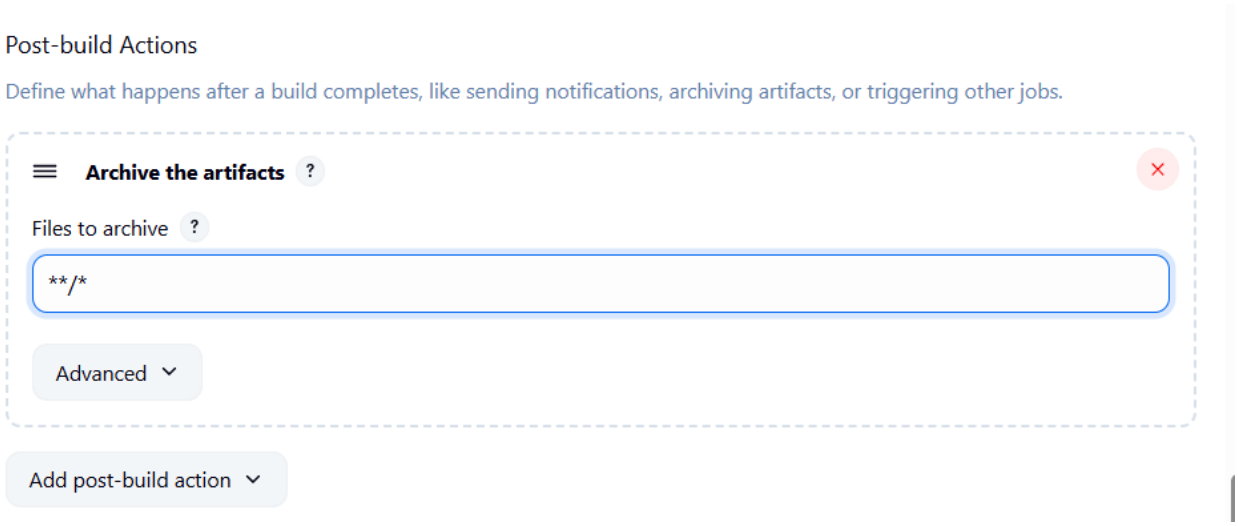
Advanced

Add build step

├── **Add Post Build Action** -> "Archive the artifacts"

└── Files to archive: **/*

└── Apply and Save



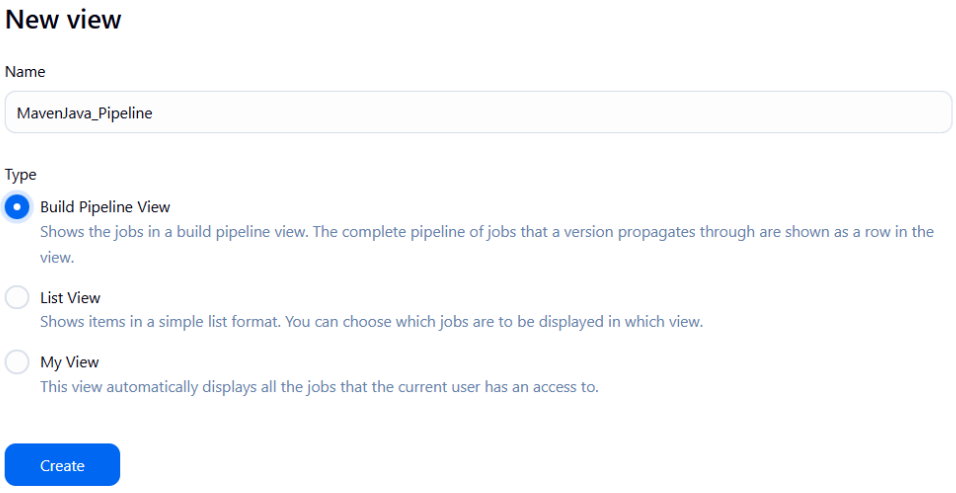
└── **Step 4**: Create Pipeline View for Maven Java project

├── Click "+" beside "All" on the dashboard

├── Enter name: MavenJava_Pipeline

├── **Select "Build pipeline view" // tick here**

├--- **create**

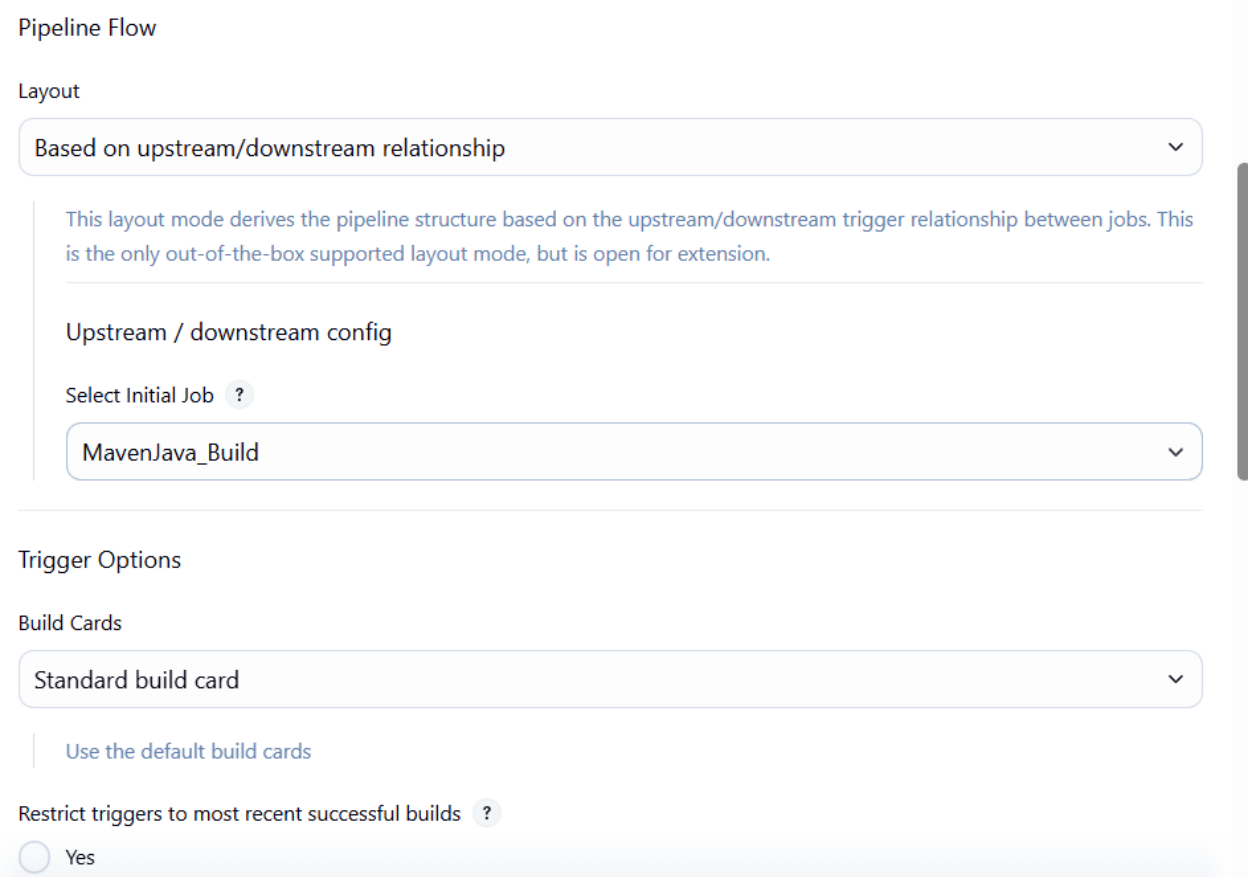


└── **Pipeline Flow**:

├── **Layout**: Based on upstream/downstream relationship

├── Initial job: MavenJava_Build

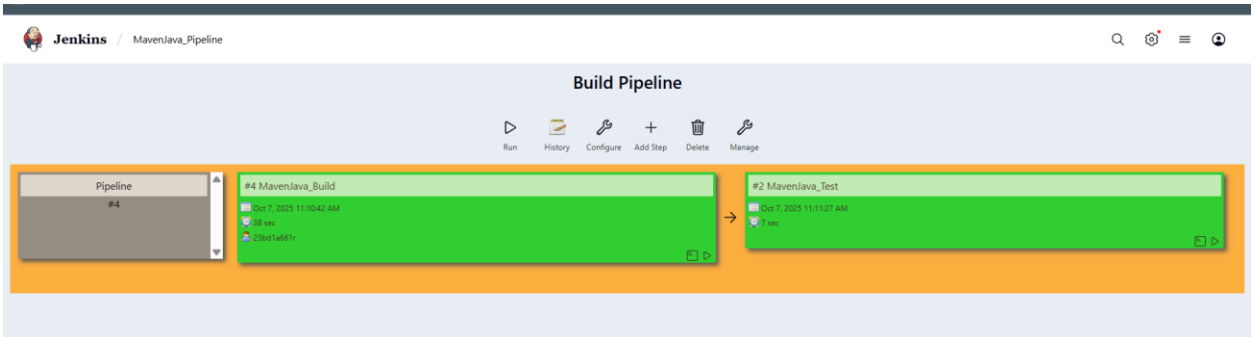
└── Apply and Save OK



└── **Step 5**: Run the Pipeline and Check Output

├── Click on the trigger to run the pipeline

├── click on the small black box to open the console to check if the build is success



Note :

1. If build is success and the test project is also automatically triggered with name

   “MavenJava_Test”

2. The pipeline is successful if it is in green color as shown ->check the console of the test project
3. The test project is successful and all the artifacts are archived successfully

II. Maven Web Automation Steps:

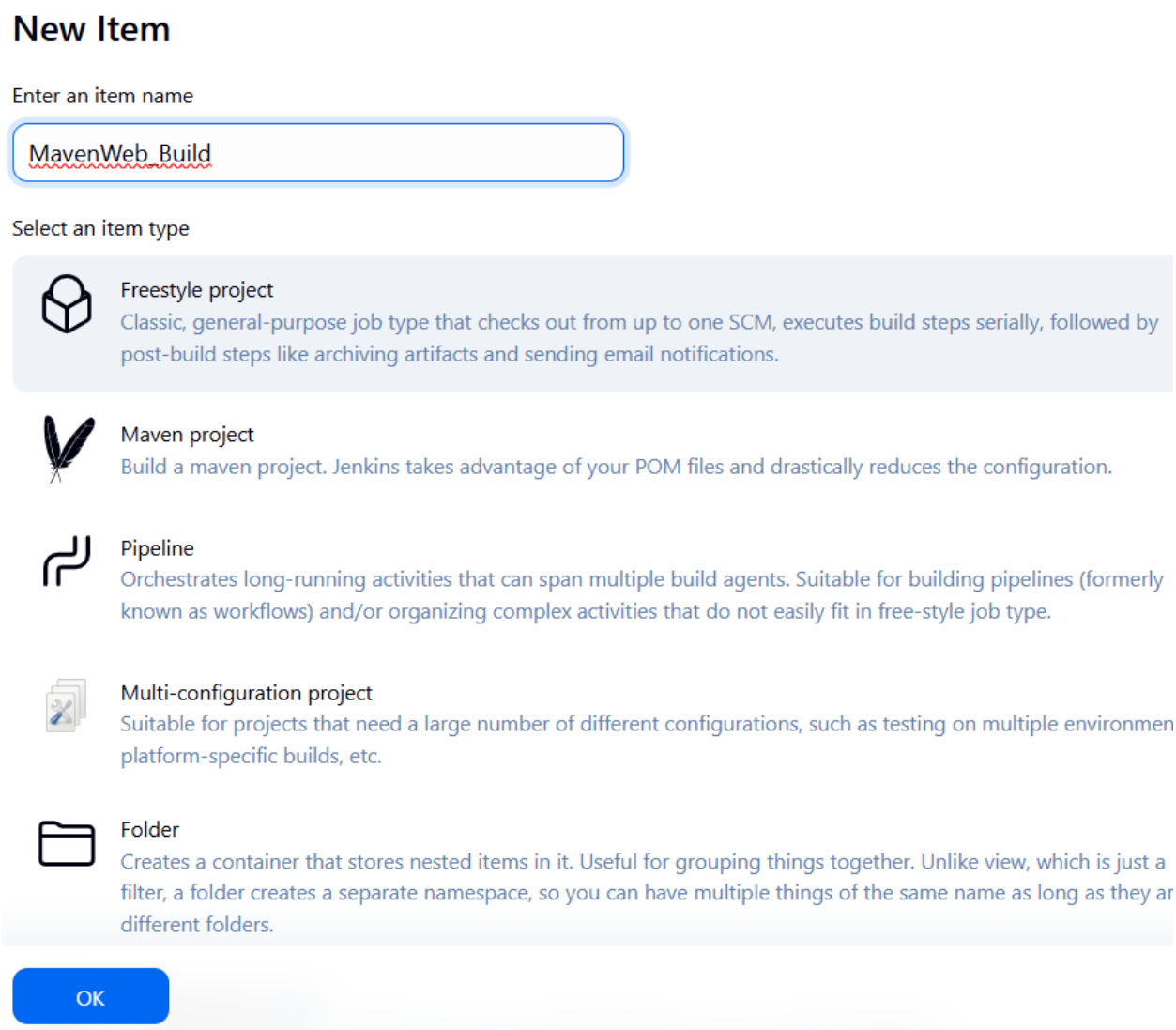
└── **Step 1:** Open Jenkins (localhost:8080)

├── Click on "New Item" (left side menu)

└── **Step 2**: Create Freestyle Project (e.g., MavenWeb_Build)

├── Enter project name (e.g., MavenWeb_Build)

├── Click "OK"



└── **Configure the project**:

├── **Description**: "Web Build demo"

├── **Source Code Management:**

└── Git repository URL: [GitMavenWeb repo URL]

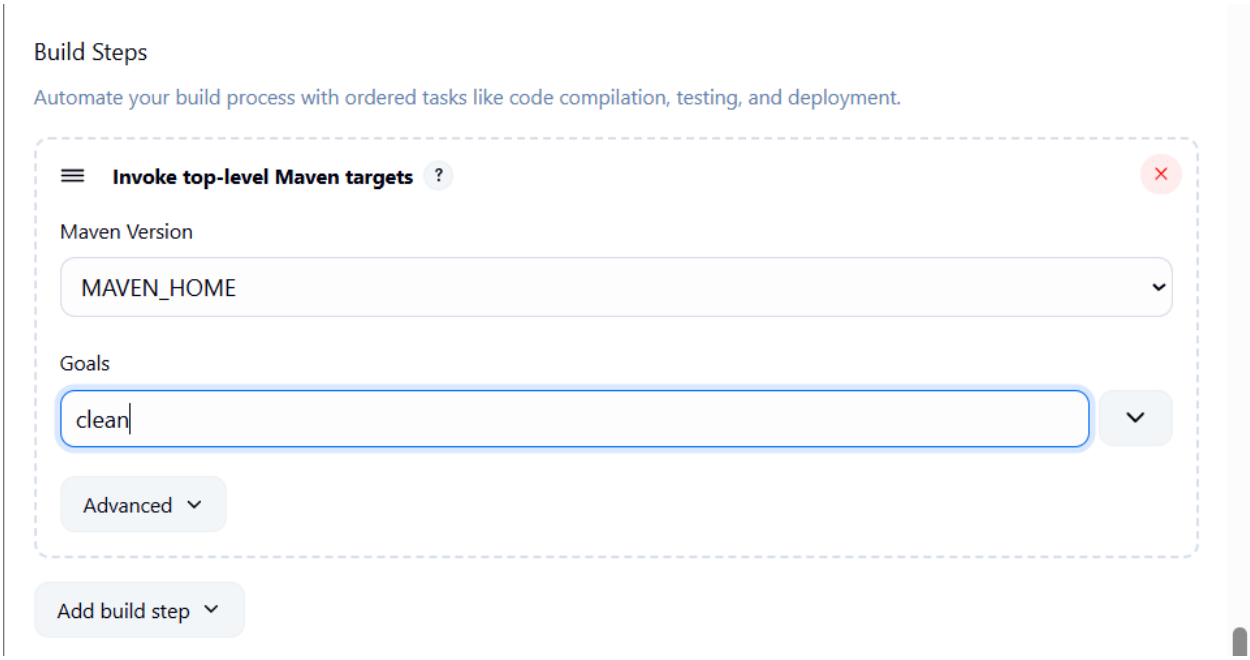
├── *Branches to build*: */Main or master

└── **Build Steps**:

├── **Add Build Step** -> "Invoke top-level Maven targets"

└── Maven version: MAVEN_HOME

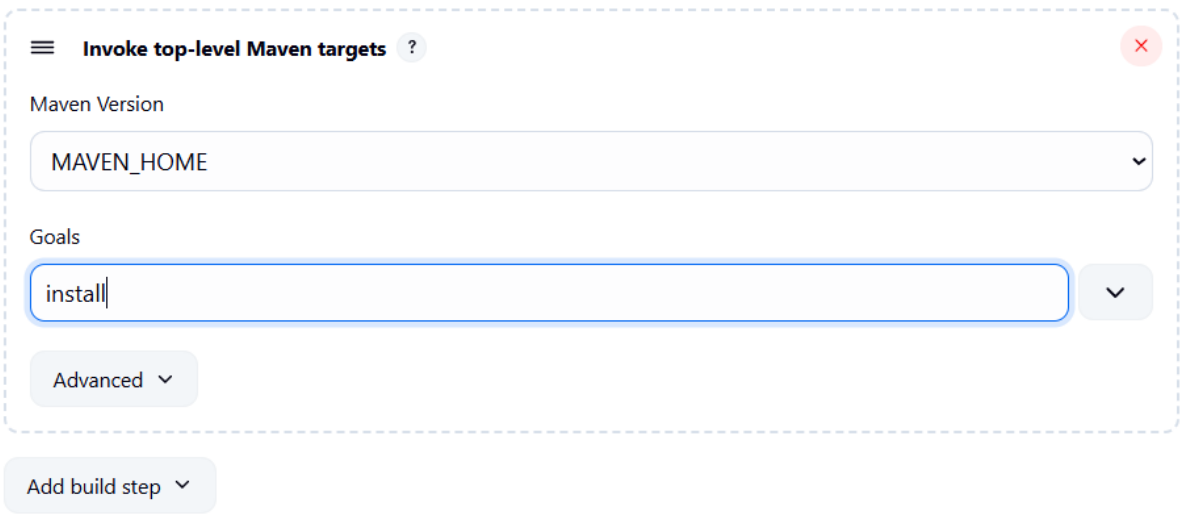
└── Goals: clean



├── **Add Build Step** -> "Invoke top-level Maven targets"

└── Maven version: MAVEN_HOME

└── Goals: install

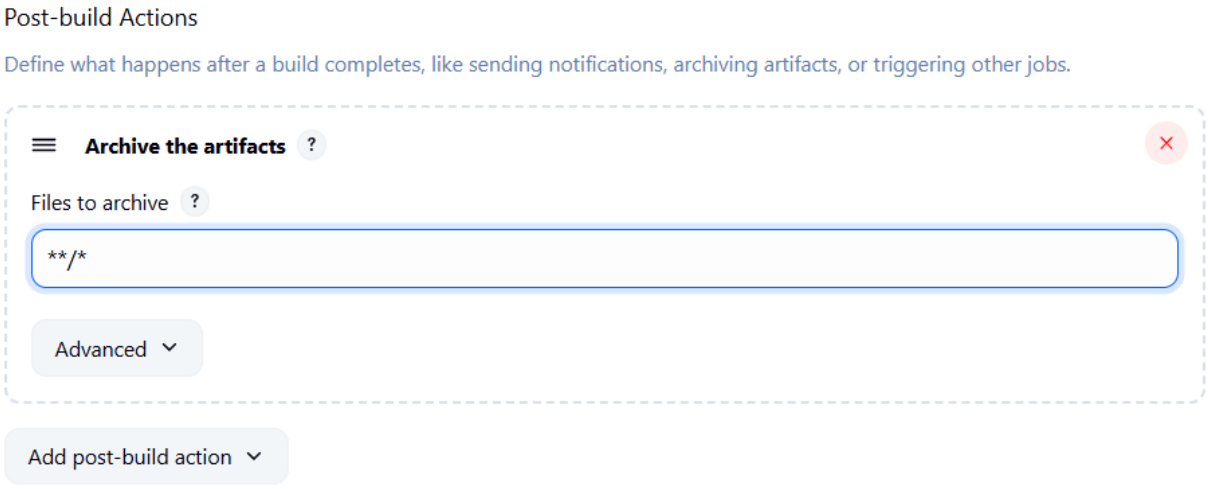


Post-build Actions

└── **Post-build Actions**:

├── **Add Post Build Action** -> "Archive the artifacts"

└── Files to archive: **/*

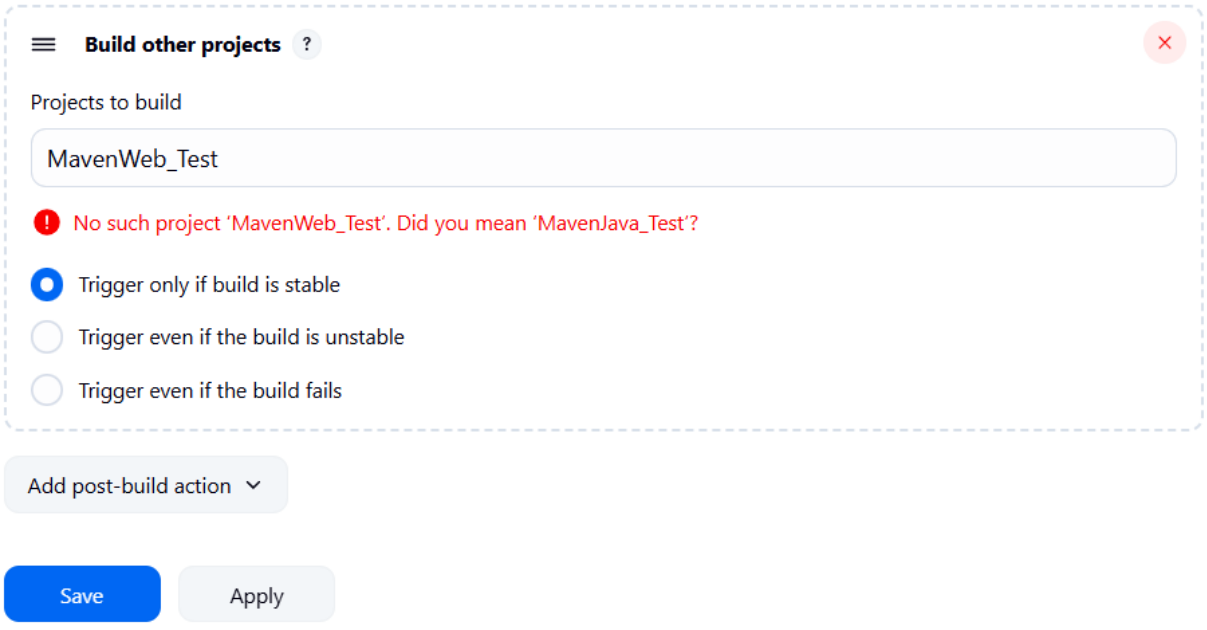


├── **Add Post Build Action** -> "Build other projects"

│ └── Projects to build: MavenWeb_Test

│ └── Trigger: Only if build is stable

└── Apply and Save



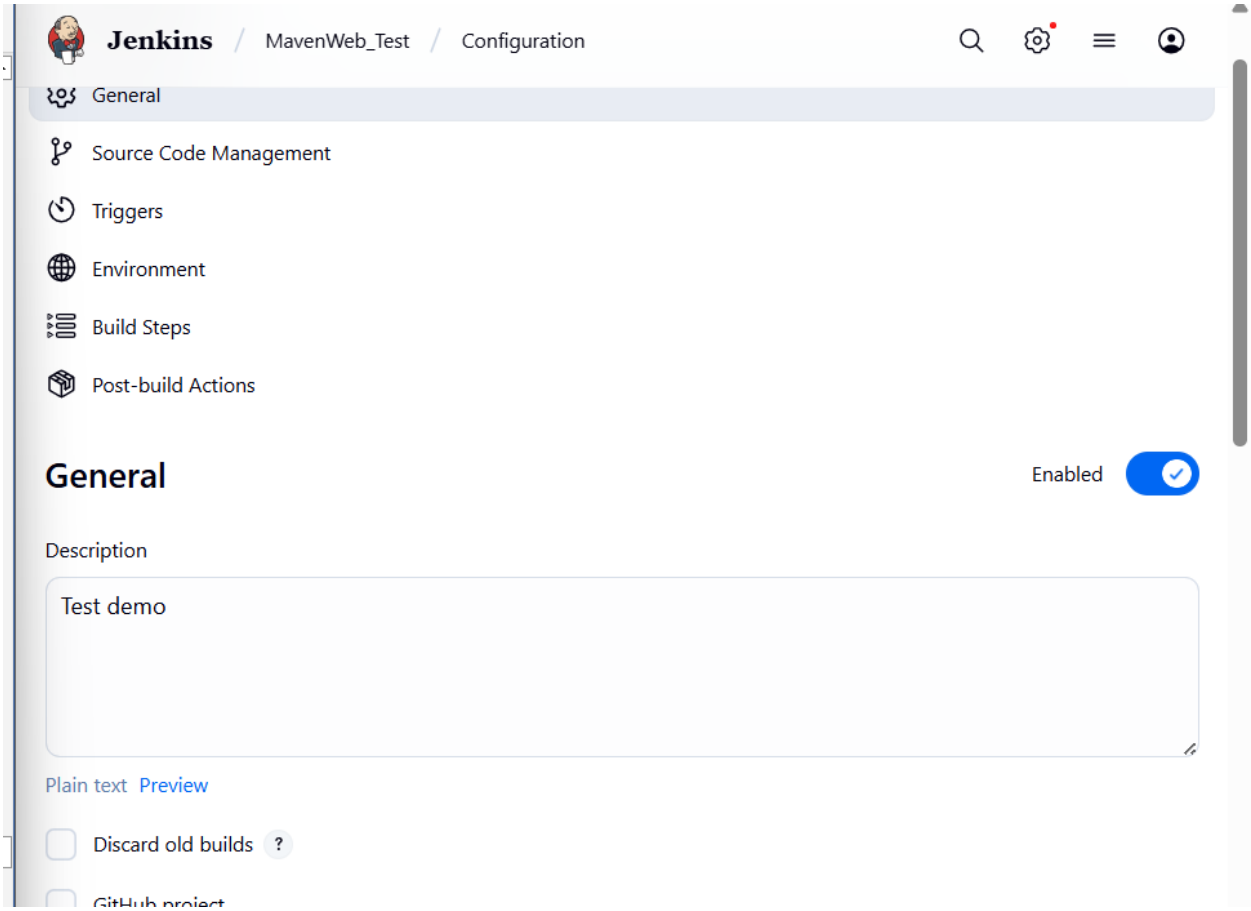
└── **Step 3**: Create Freestyle Project (e.g., MavenWeb_Test)

├── Enter project name (e.g., MavenWeb_Test)

├── Click "OK"

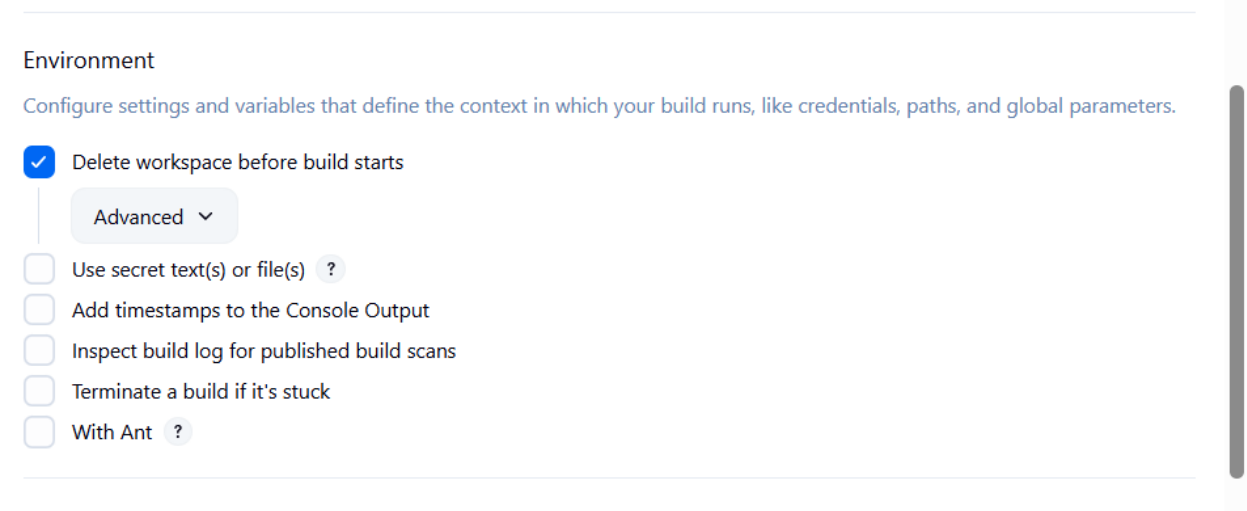
└── **Configure the project:**

├── **Description:** "Test demo"



├── **Build Environment**:

└── Check: "Delete the workspace before build starts"

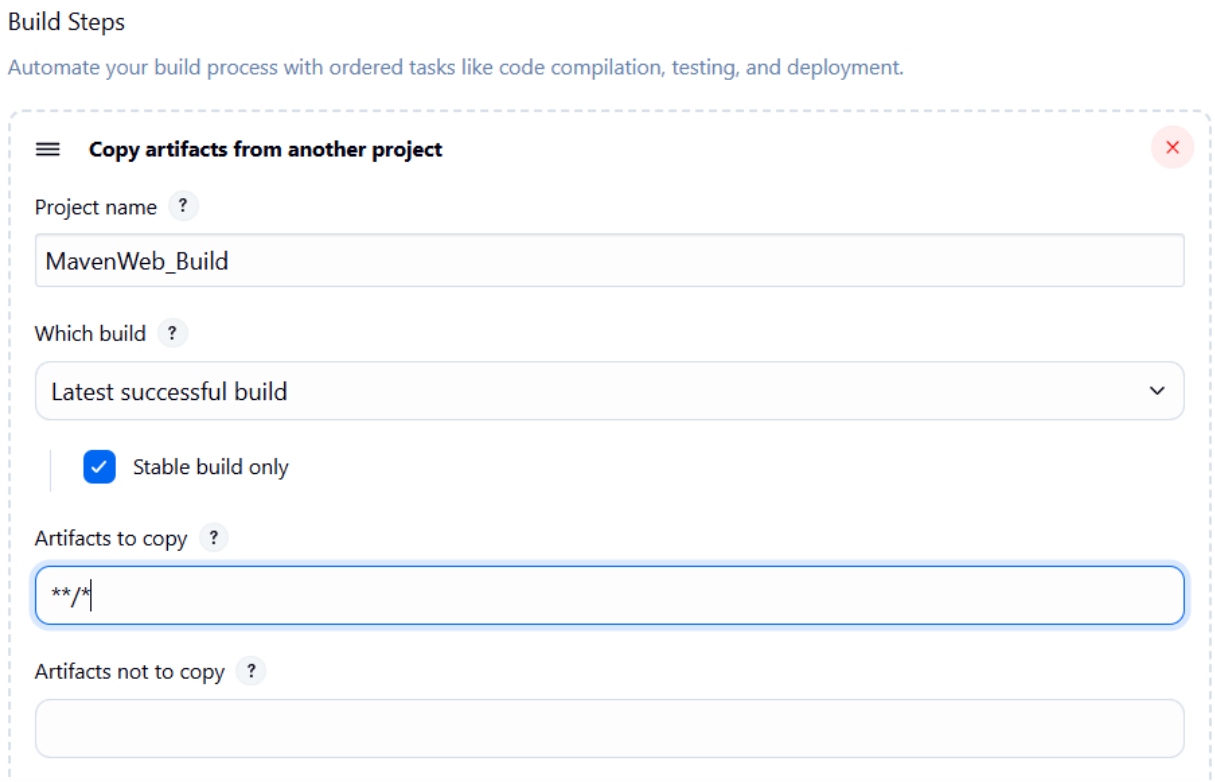


├── **Add Build Step** -> "Copy artifacts from another project"

└── Project name: MavenWeb_Build

└── Build: Stable build only

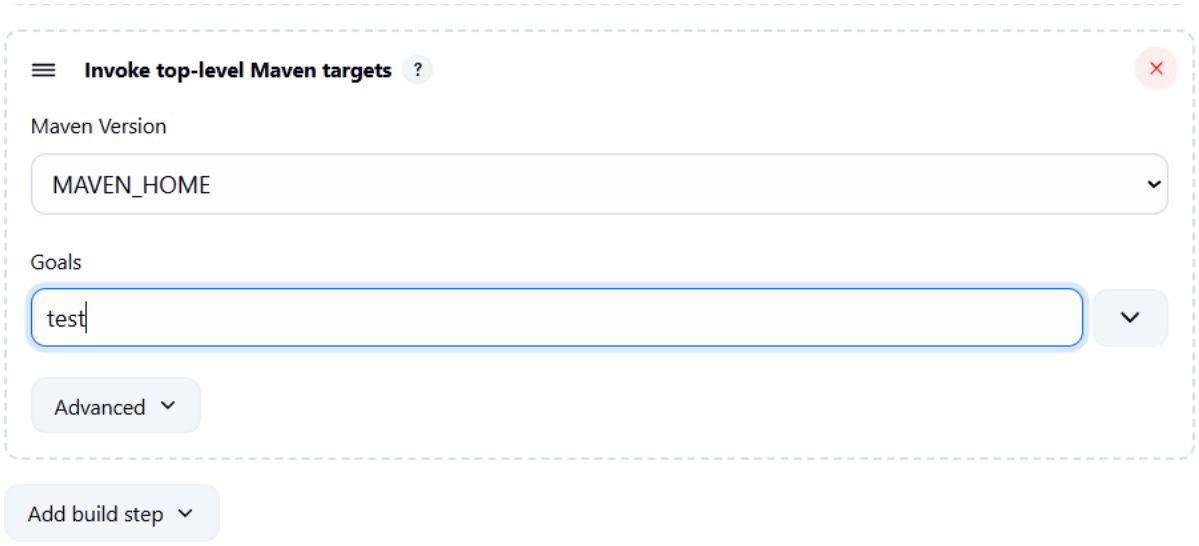
└── Artifacts to copy: **/*



├── **Add Build Step** -> "Invoke top-level Maven targets"

└── Maven version: MAVEN_HOME

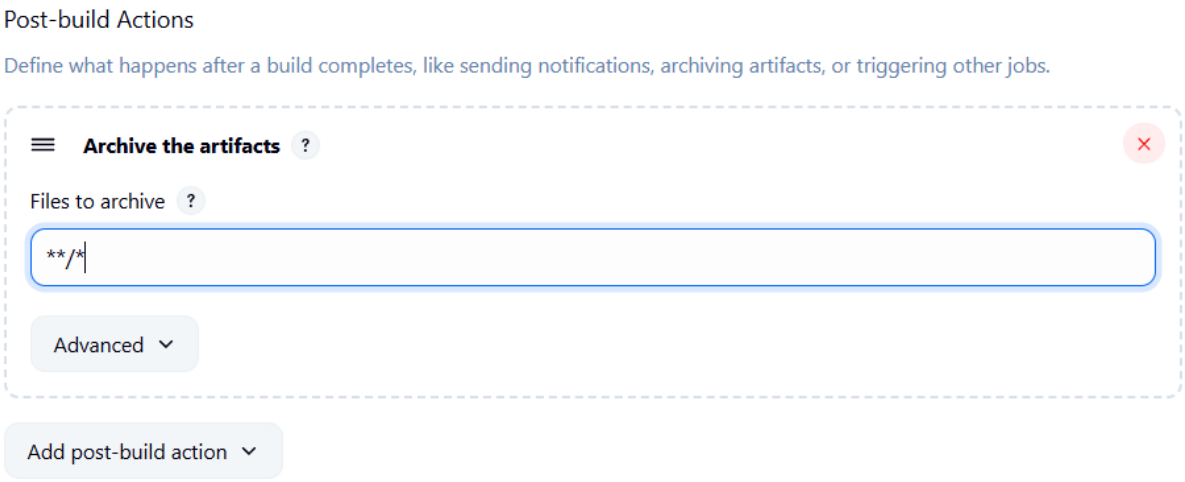
└── Goals: test



└── **Post-build Actions**:

├── **Add Post Build Action** -> "Archive the artifacts"

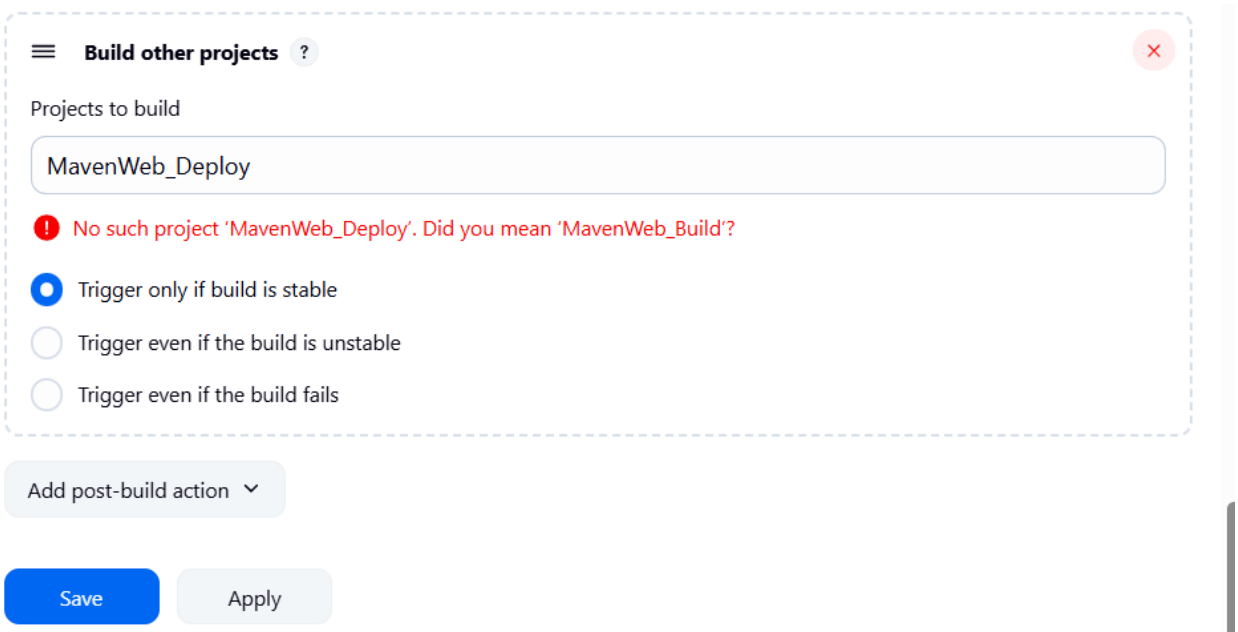
└── Files to archive: **/*



├── **Add Post Build Action** -> "Build other projects"

└── Projects to build: MavenWeb_Deploy

└── Apply and Save



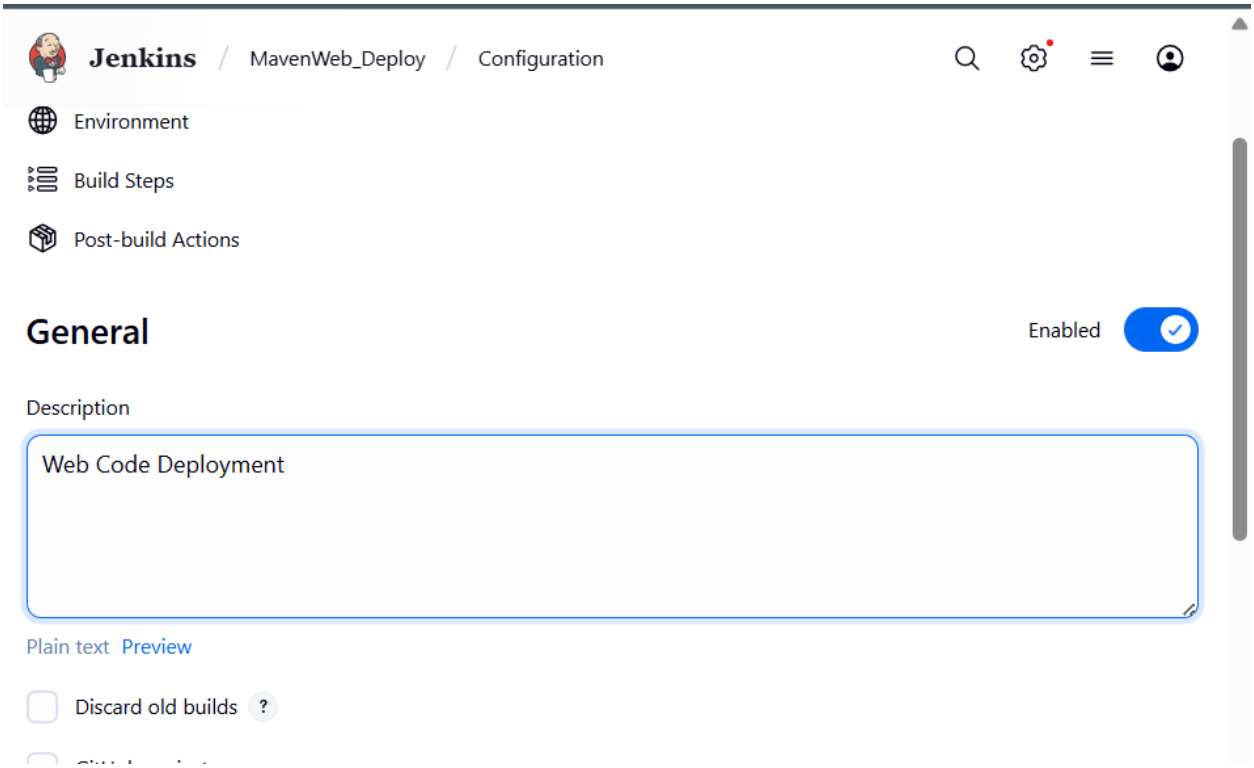
└── **Step 4**: Create Freestyle Project (e.g., MavenWeb_Deploy)

  ├── Enter project name (e.g., MavenWeb_Deploy)

  ├── Click "OK"

  └── **Configure the projec**t:

    ├── **Description**: "Web Code Deployment"



├── **Build Environment**:

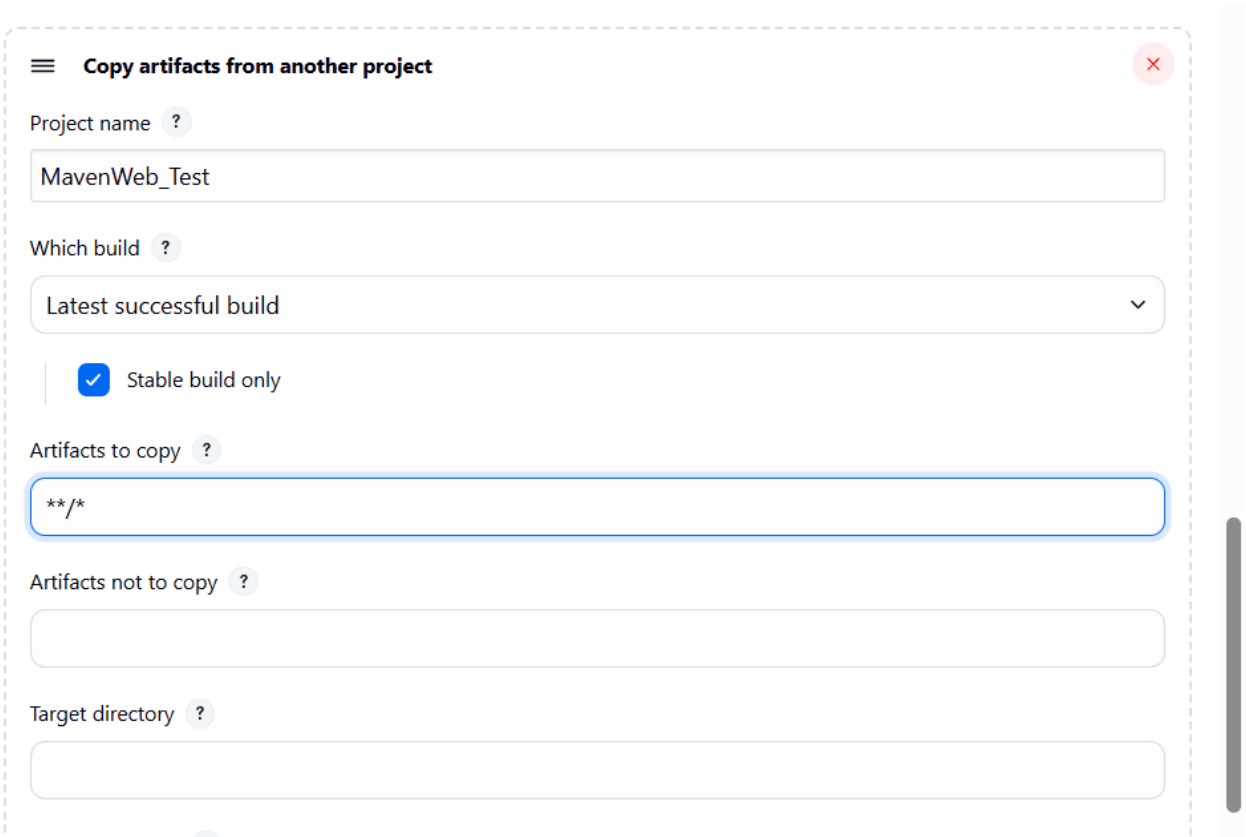
└── Check: "Delete the workspace before build starts"

├── **Add Build Step** -> "Copy artifacts from another project"

└── Project name: MavenWeb_Test

└── Build: Stable build only

└── Artifacts to copy: **/*



└── **Post-build Actions**:

├── **Add Post Build Action** -> "Deploy WAR/EAR to a container"

└── WAR/EAR File: **/*.war

└── Context path: Webpath

└── Add container -> Tomcat 9.x remote

└── Credentials: Username: admin, Password: 1234

── Tomcat URL: https://localhost:8085/

└── Apply and Save

└── **Step 5**: Create Pipeline View for MavenWeb

├── Click "+" beside "All" on the dashboard

├── Enter name: MavenWeb_Pipeline

├── **Select "Build pipeline view"**

New view

Name

MavenWeb_Pipeline

Type

- (•) **Build Pipeline View**
  Shows the jobs in a build pipeline view. The complete pipeline of jobs that a version propagates through are shown as a row in the view.
- ( ) **List View**
  Shows items in a simple list format. You can choose which jobs are to be displayed in which view.
- ( ) **My View**
  This view automatically displays all the jobs that the current user has an access to.

Create

└── **Pipeline Flow**:

  ├── **Layout**: Based on upstream/downstream relationship

  ├── Initial job: MavenWeb_Build

  └── Apply and Save

Pipeline Flow

Layout

Based on upstream/downstream relationship

This layout mode derives the pipeline structure based on the upstream/downstream trigger relationship between jobs. This is the only out-of-the-box supported layout mode, but is open for extension.

Upstream / downstream config

Select Initial Job ?

MavenWeb_Build

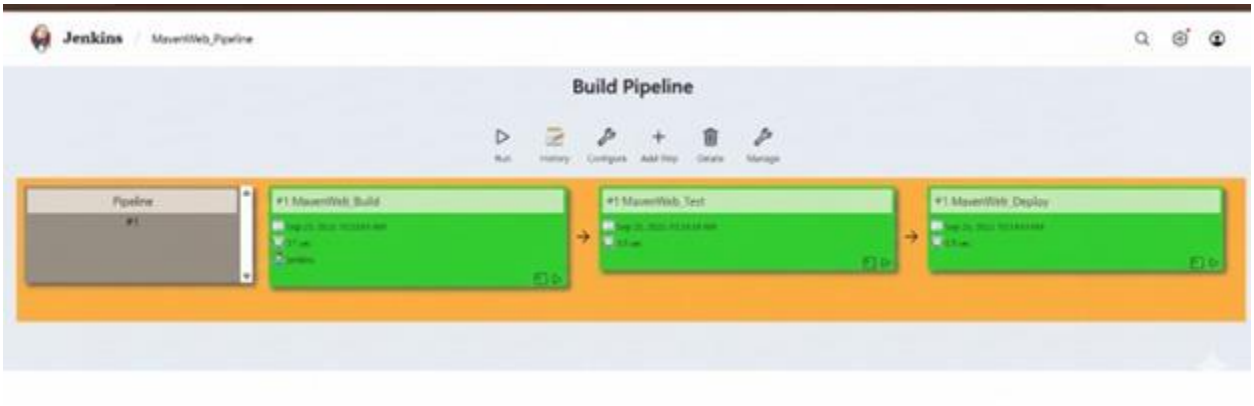
Trigger Options

└── **Step 6**: Run the Pipeline and Check Output

├── Click on the trigger **"RUN"** to run the pipeline

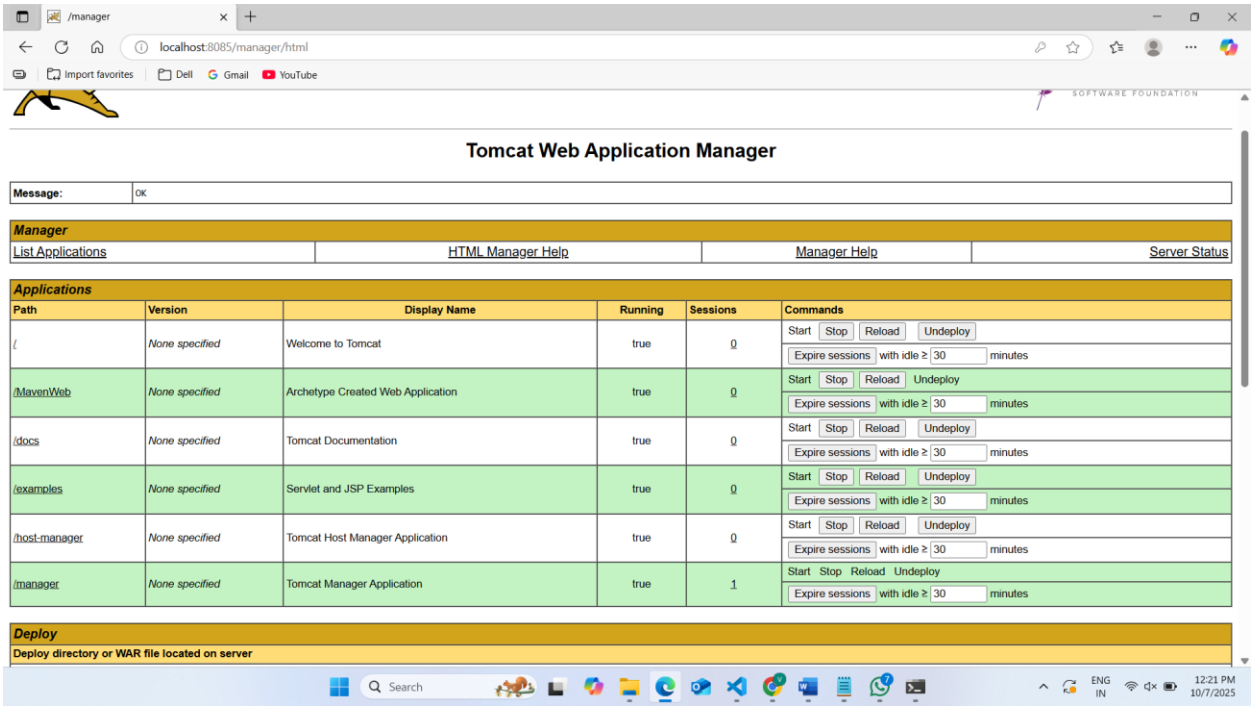
Note:

1. After Click on Run -> click on the small black box to open the console to check if the build is success
2. Now we see all the build has success if it appears in green color



├── Open Tomcat homepage in another tab

├── Click on the "/webpath" option under the manager app



Note:

1. It ask for user credentials for login ,provide the credentials of tomcat.

2. It provide the page with out project name which is highlighted.
3. After clicking on our project we can see output.

III. Questions on Jenkins

1. What is Jenkins primarily used for?

A. Jenkins is used for Continuous Integration and Continuous Deployment (CI/CD) — automating build, test, and deployment processes.

2. What is feature of Jenkins?

A. Jenkins is open-source, extensible with plugins, supports pipeline automation, and integrates with many tools (Git, Docker, etc.).

3. What is the default port on which Jenkins runs?

A. Port 8080.

4. What can be integrated with Jenkins for version control?

A. Git, GitHub etc

5. What is the purpose of Jenkins plugins?

A. Plugins extend Jenkins functionality

6. Which type of Jenkins job is best suited for running one-off tasks or small scripts?

A. Freestyle Project

7. How can you manage sensitive information such as API keys in Jenkins?

A. Use Credentials Manager to securely store and access secrets like passwords, tokens, and API keys.

8. What does the "blue ocean" feature in Jenkins refer to?

A. A modern, user-friendly UI for visualizing and managing Jenkins pipelines.

9. What does the "blue ocean" feature in Jenkins refer to?

A. A modern, user-friendly UI .

10. Which Jenkins component allows for distributed builds across multiple machines?

A. Jenkins Master-Agent (Node) Architecture

11. List at least five Jenkins plugins that you would consider important for a microservices-based application CI/CD pipeline. Briefly explain the purpose of each plugin.

A. Git Plugin - Integrates Jenkins with Git repositories , Pipeline Plugin - Enables code-based CI/CD pipelines, Docker Plugin - Builds and deploys Docker containers.

12. Explain the steps you would take to install a plugin in Jenkins through the Jenkins UI. What considerations would you keep in mind regarding plugin compatibility and updates?

A. Manage Jenkins->Manage Plugins->open available tab-> search install without restart

13. Explain the steps you would take to install a plugin in Jenkins through the Jenkins UI. What considerations would you keep in mind regarding plugin compatibility and updates?

A. Manage Jenkins->Manage Plugins->open available tab-> search install without restart.

14. After installing a plugin, explain how you would configure it within Jenkins. For example, if you installed the Git Plugin, what steps would you take to set it up for your pipeline?

A. Manage Jerkins->Configure System->Find git section-> set the credentials ->choose source code management->git and enter the url, branch

15. Discuss common issues that might arise when using Jenkins plugins, such as dependency conflicts or version compatibility problems. How would you troubleshoot these issues?

A. Dependency conflicts → update or roll back plugins
Version incompatibility → check Jenkins + plugin versions
Missing dependencies → install required plugins

Conclusion: In this week student learnt automating Maven projects through Jenkins.