Week 8: Jenkins Automation

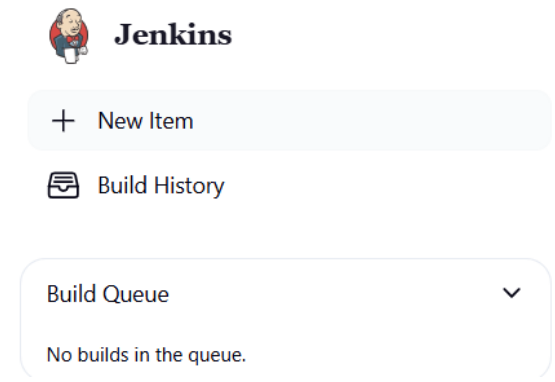
I. Hands-on practice on manual creation of Jenkins pipeline using Maven projects from Github
II. Create the job and build the pipeline for maven-java and maven-web project.
III. Questions on Jenkins
IV. Upload the Screenshots.

I. Steps for MavenJava Automation:

Maven Java Automation Steps:

Step 1: Open Jenkins (localhost:8080)

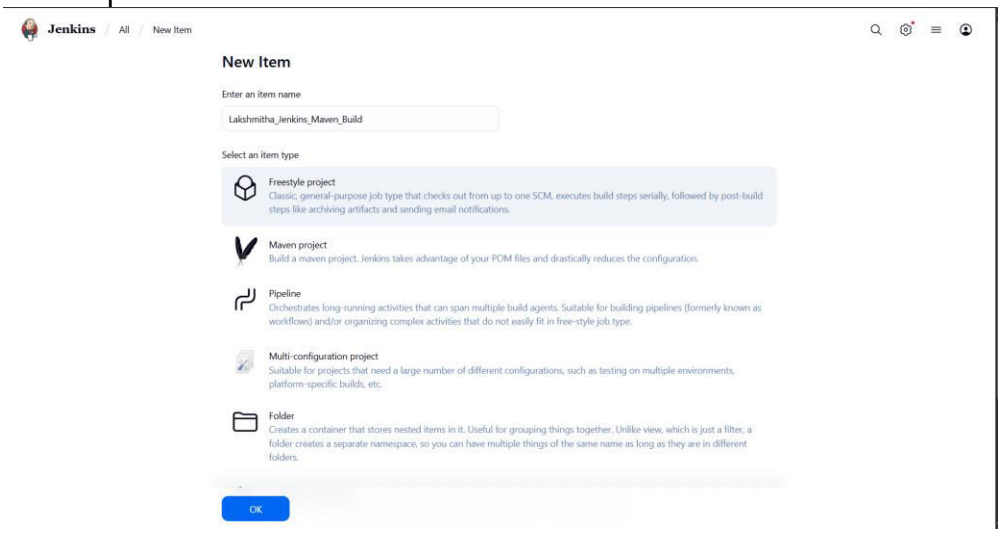
├── Click on "New Item" (left side menu



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

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

├── Click "OK"



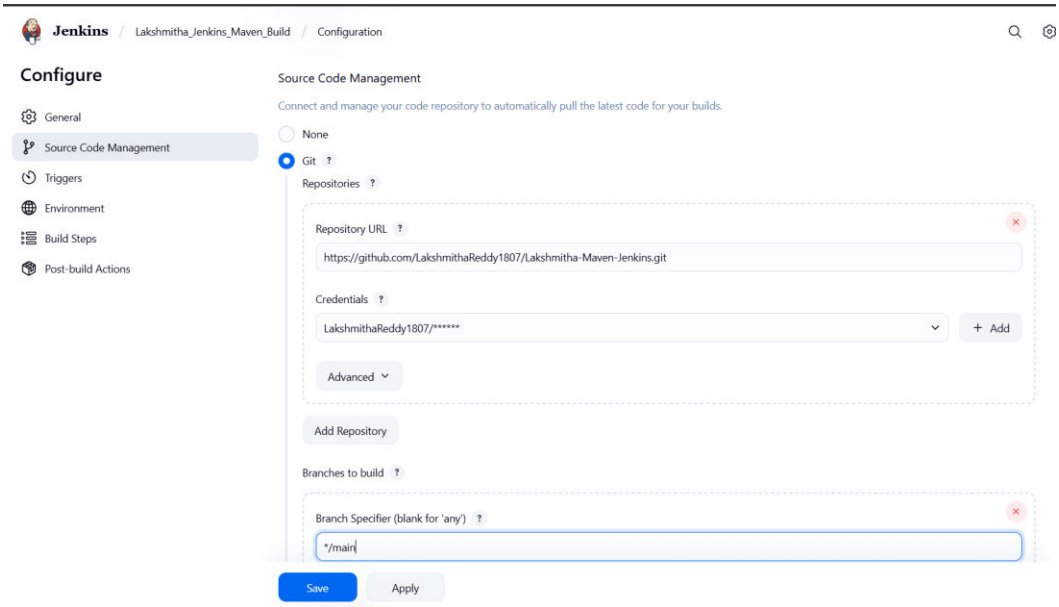
└── **Configure the project:**

├── **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"

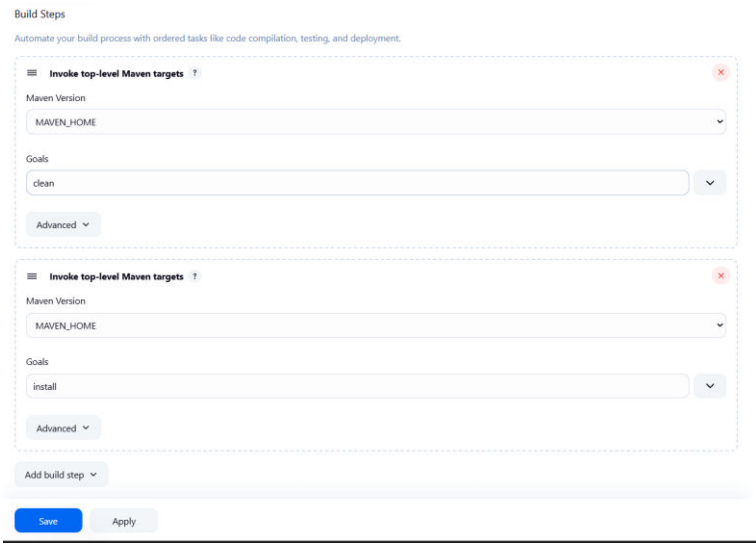
└── Maven version: MAVEN_HOME

└── 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"

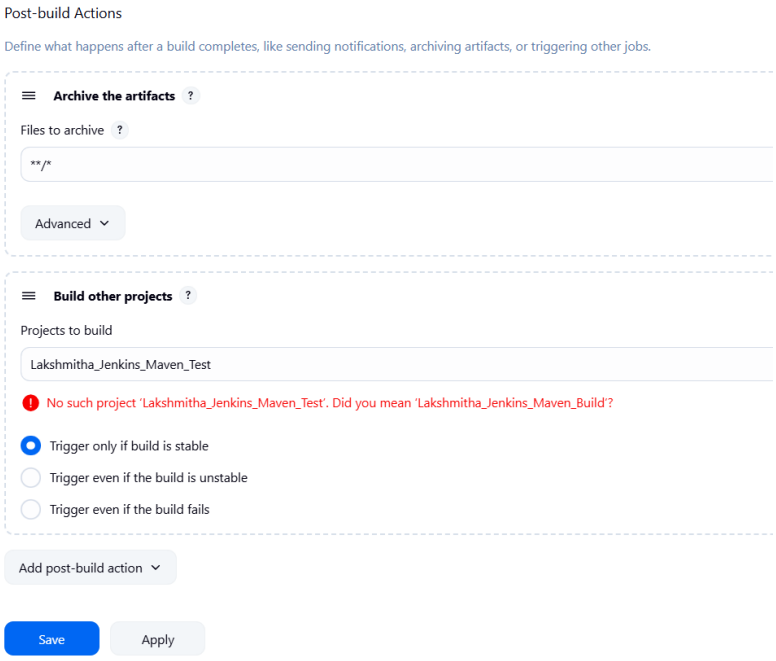
└── Files to archive: **/*

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

└── Projects to build: MavenJava_Test

└── Trigger: Only if build is stable

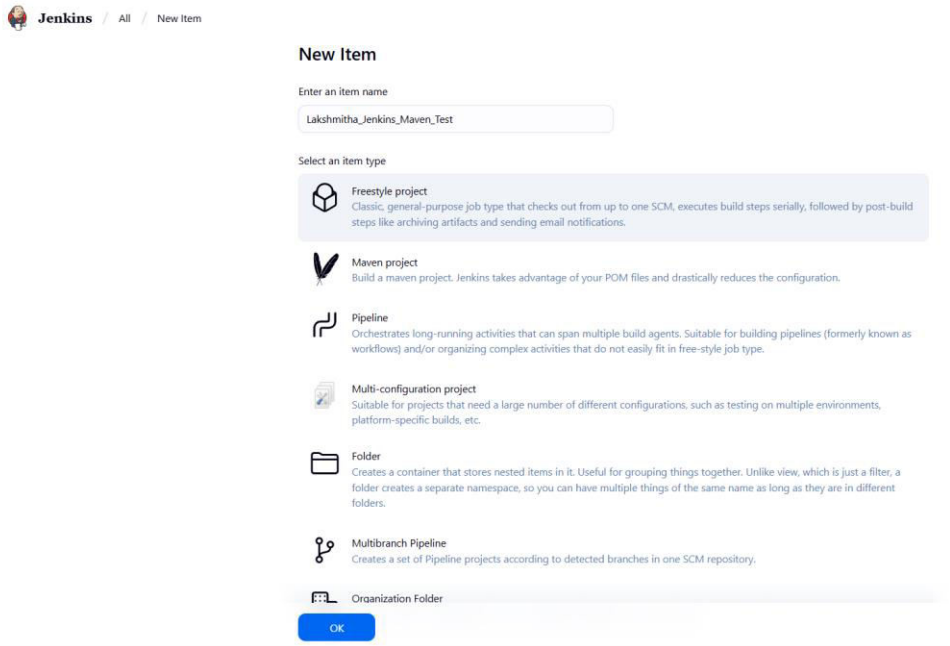
└── Apply and Save



└── **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**:

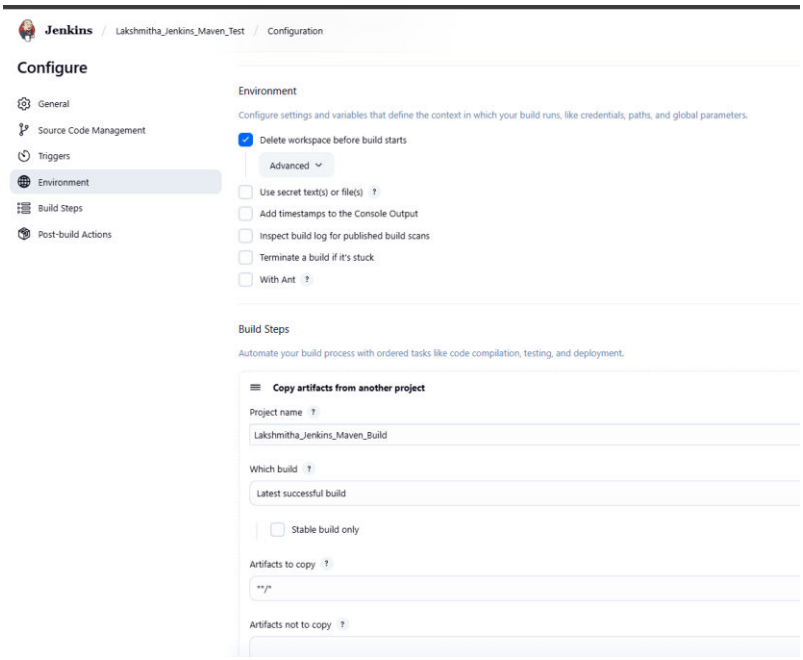
└── Check: "Delete the workspace before build starts"

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

└── Project name: MavenJava_Build

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

└── Artifacts to copy: **/*



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

└── Maven version: MAVEN_HOME

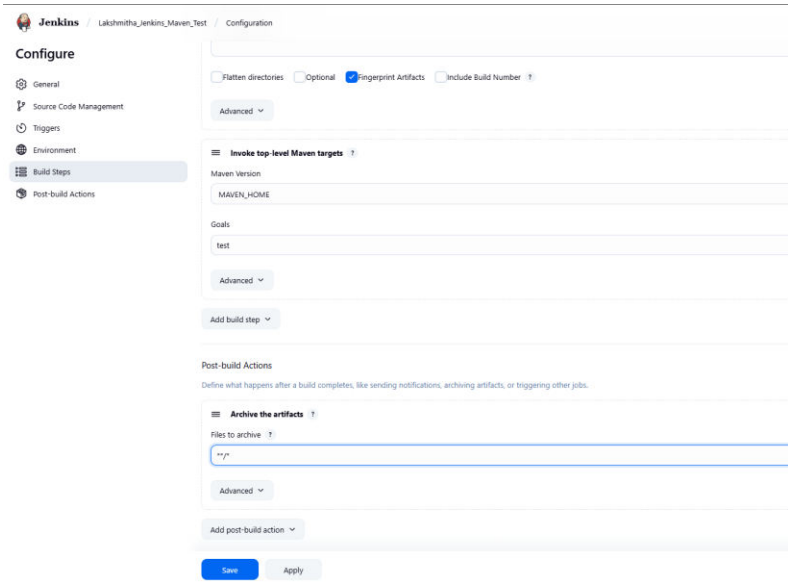
└── Goals: test

└── Post-build Actions:

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

└── Files to archive: **/*

└── Apply and Save



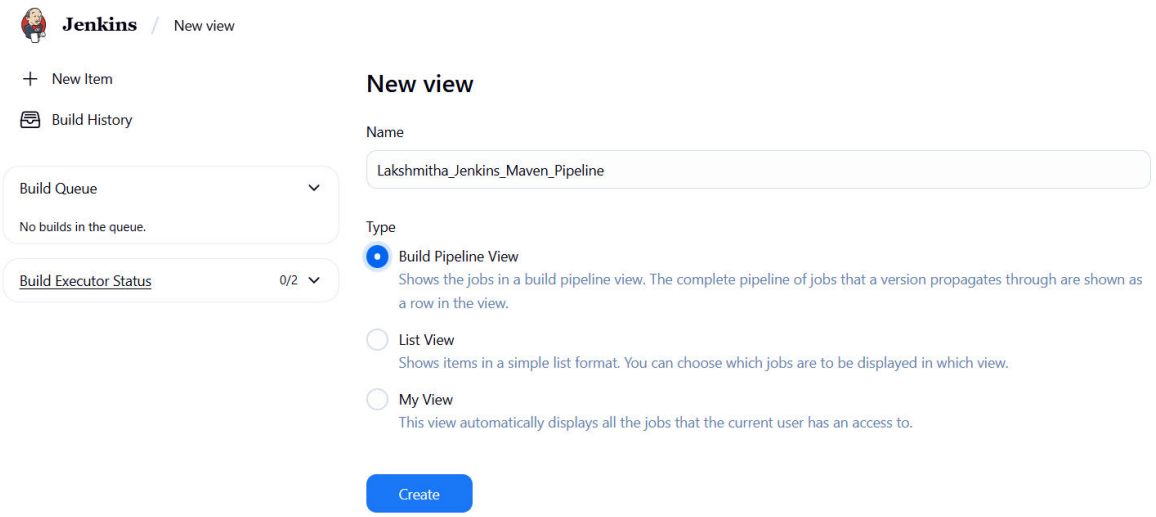
└── **Step 4**: Create Pipeline View for Maven Java project

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

├── Enter name: MavenJava_Pipeline

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

├--- **create**

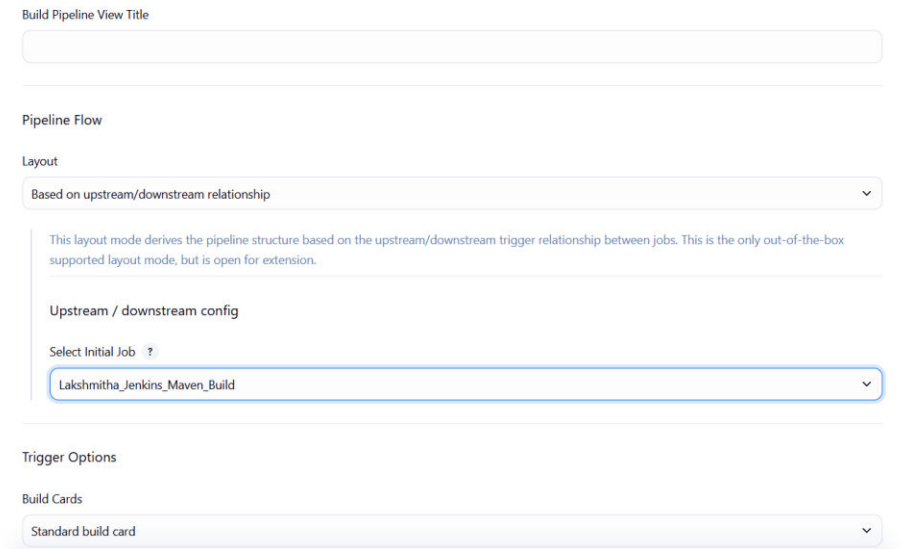


└── **Pipeline Flow**:

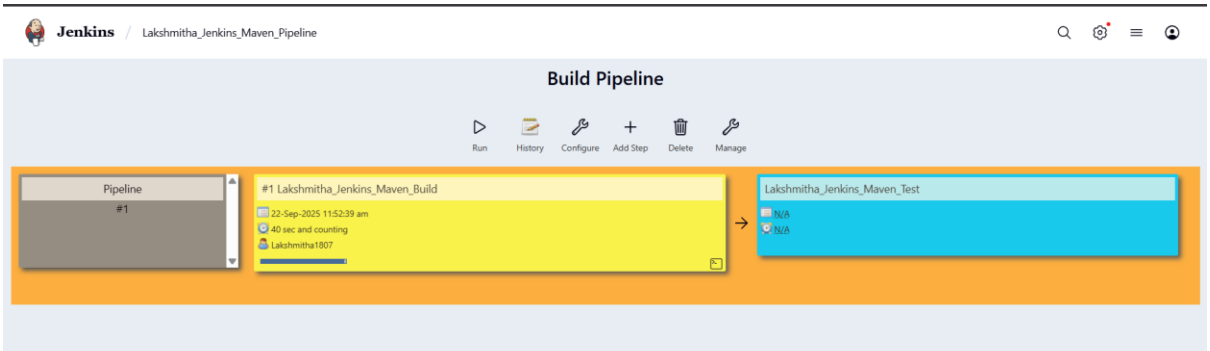
├── **Layout**: Based on upstream/downstream relationship

├── Initial job: MavenJava_Build

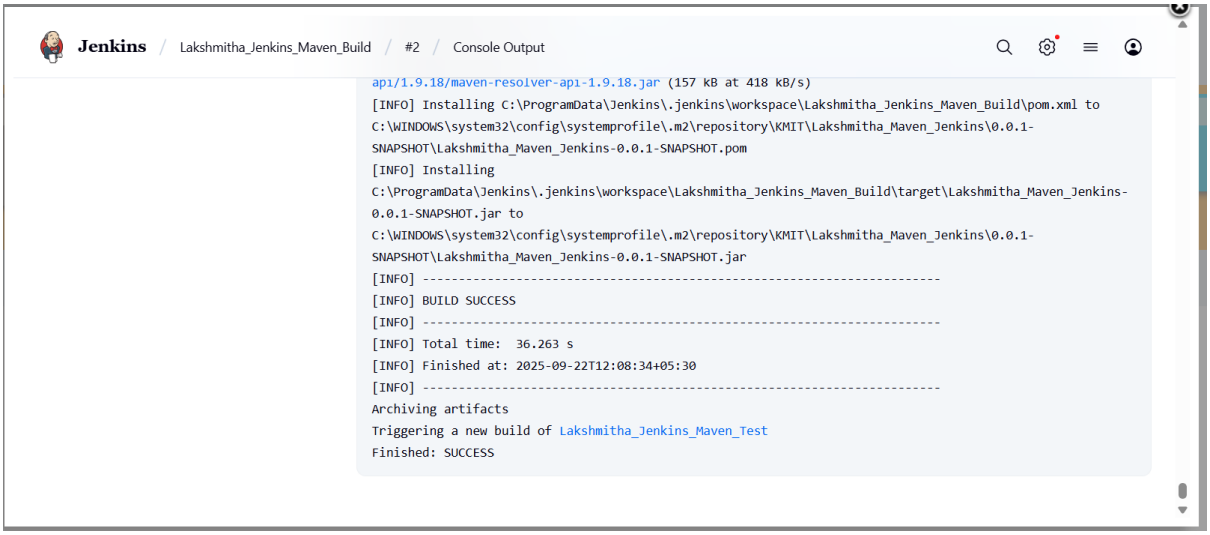
└── Apply and Save OK



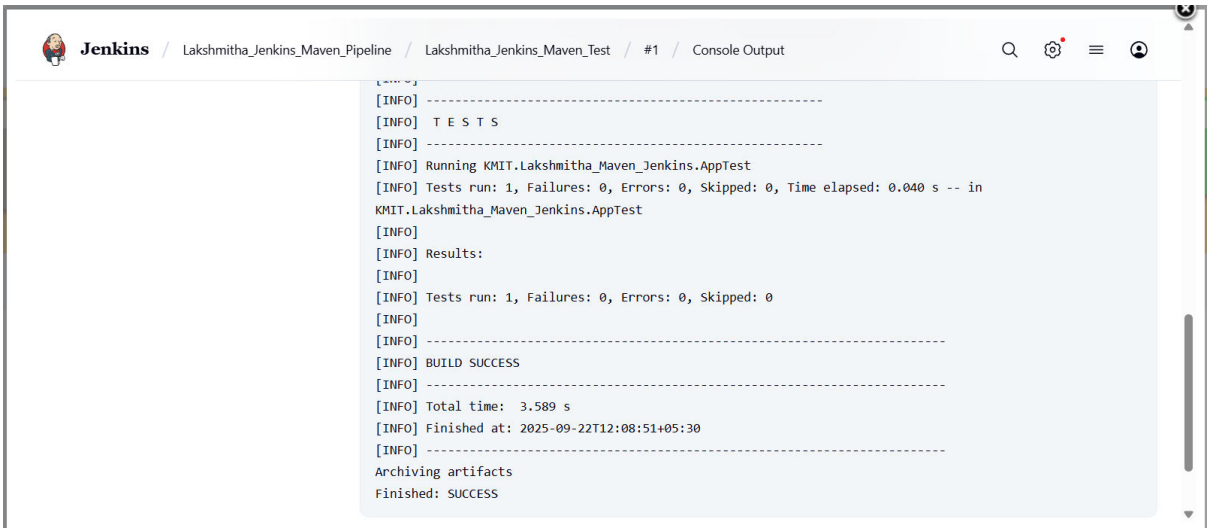
└── **Step 5**: Run the Pipeline and Check Output



├── 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

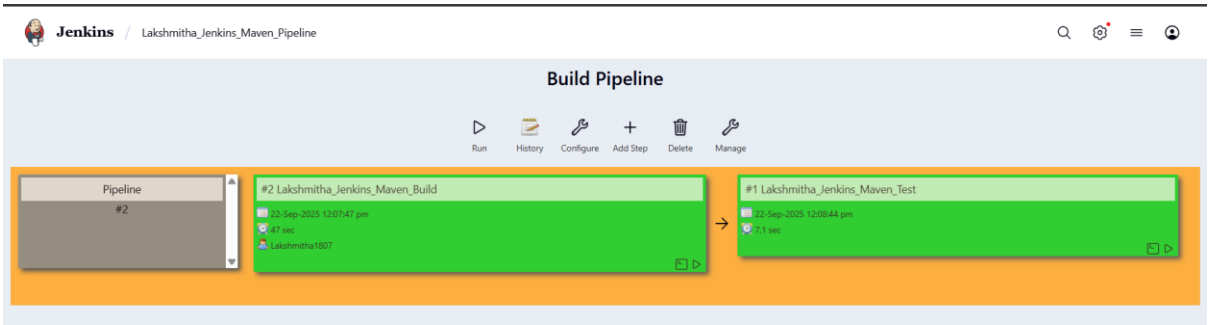


Note :

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

   “MavenJava_Test”

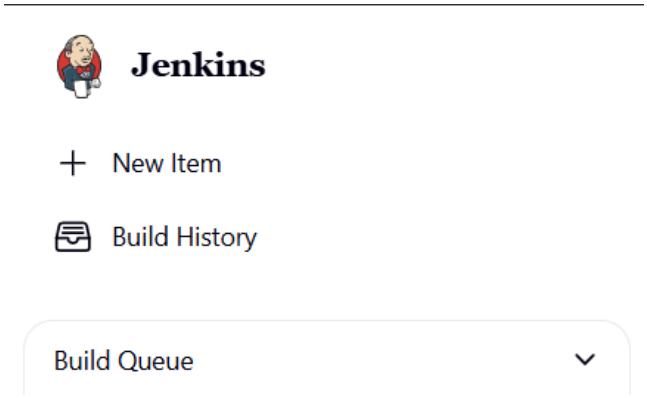
2. The pipeline is successful if it is in green color as shown ->check the console of the test project
3. The test project is successful and all the artifacts are archived successfully



II. Maven Web Automation Steps:

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

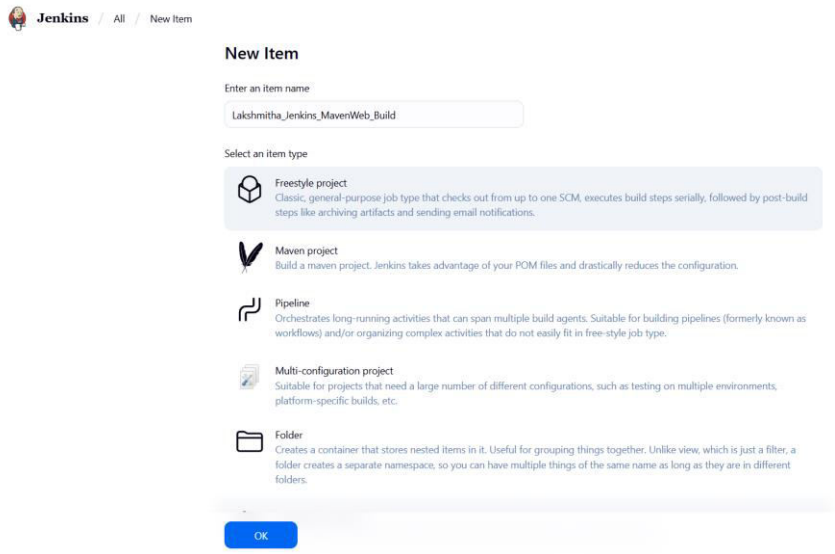
├── Click on "New Item" (left side menu)



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

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

├── Click "OK"



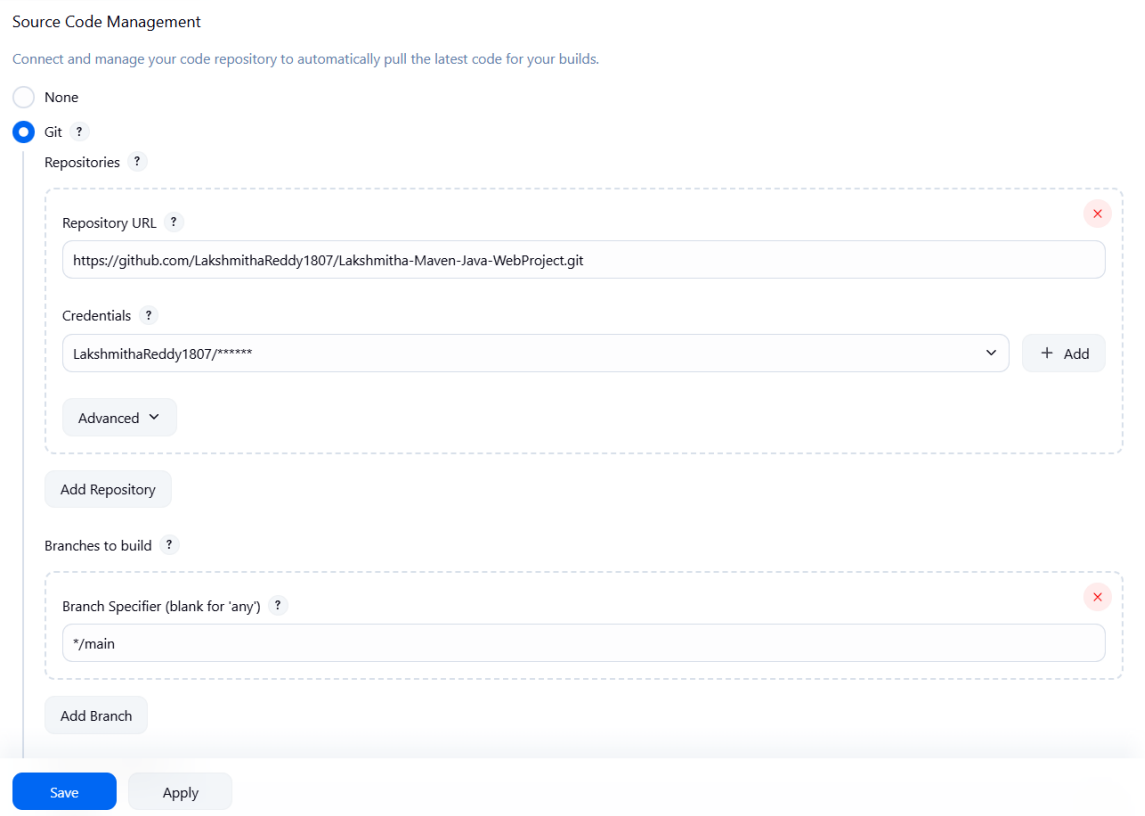
└── **Configure the project**:

  ├── **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"

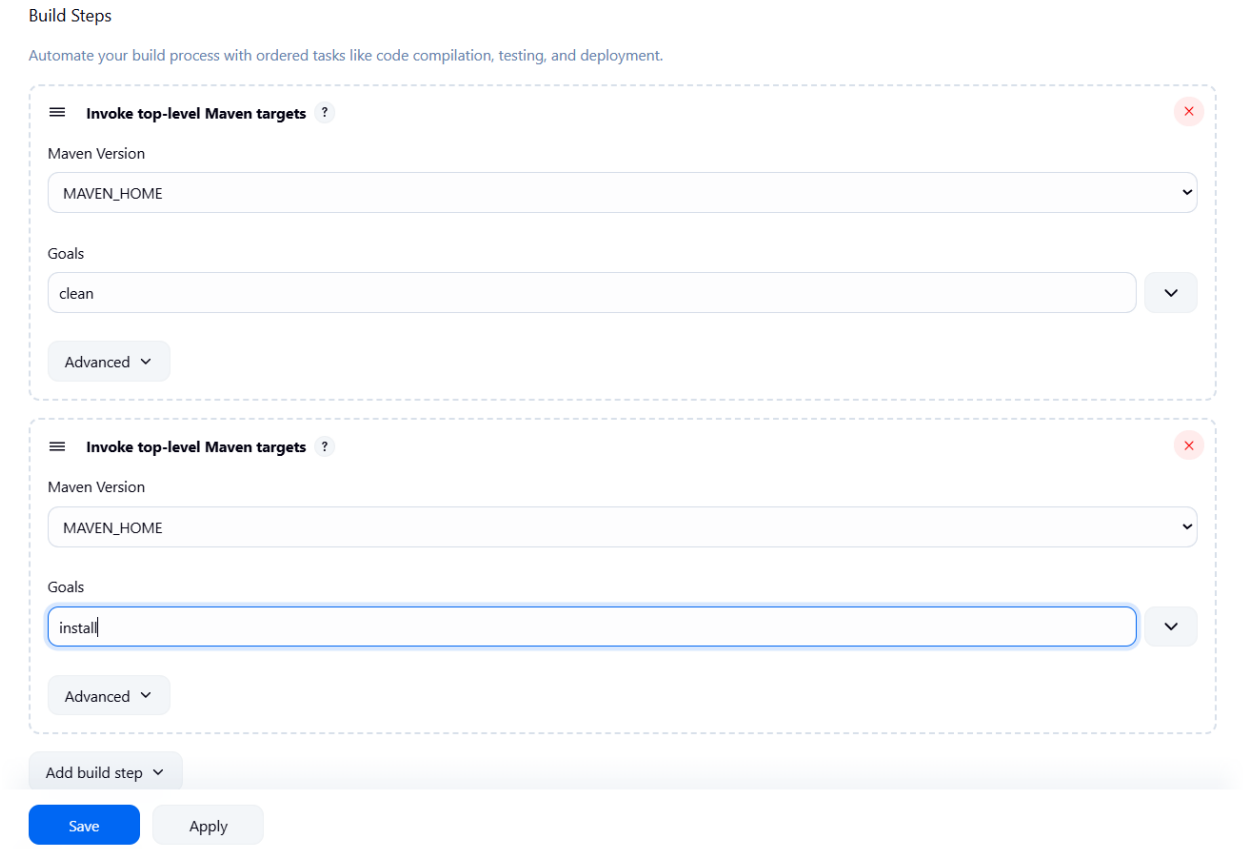
└── Maven version: MAVEN_HOME

└── Goals: clean

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

└── Maven version: MAVEN_HOME

└── Goals: install



└── **Post-build Actions**:

├── **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

Post-build Actions

Define what happens after a build completes, like sending notifications, archiving artifacts, or triggering other jobs.

Archive the artifacts ?

Files to archive ?

**/*

Advanced

Build other projects ?

Projects to build

Lakshmitha_Jenkins_MavenWeb_Test

No such project 'Lakshmitha_Jenkins_MavenWeb_Test'. Did you mean 'Lakshmitha_Jenkins_Maven_Test'?

- (•) Trigger only if build is stable
- ( ) Trigger even if the build is unstable
- ( ) Trigger even if the build fails

Add post-build action

Save Apply

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

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

├── Click "OK"

New Item

Enter an item name

Lakshmitha_Jenkins_MavenWeb_Test

Select an item type

Freestyle project
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.

Maven project
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

Pipeline
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

Multi-configuration project
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

Folder
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

Multibranch Pipeline
Creates a set of Pipeline projects according to detected branches in one SCM repository.

Organization Folder

OK

└── **Configure the project:**

├── **Description:** "Test demo"

├── **Build Environment**:

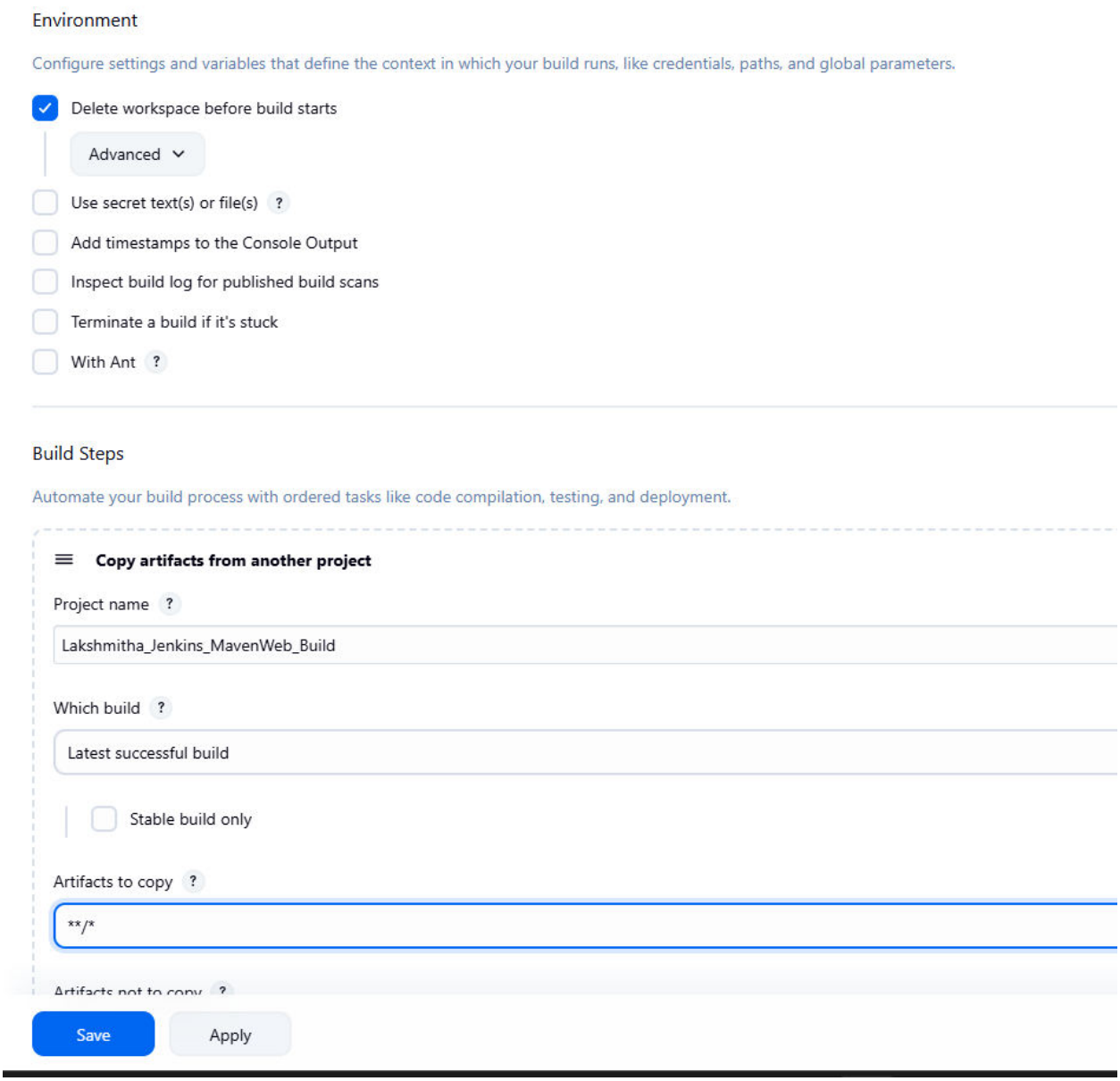
└── Check: "Delete the workspace before build starts"

├── **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"

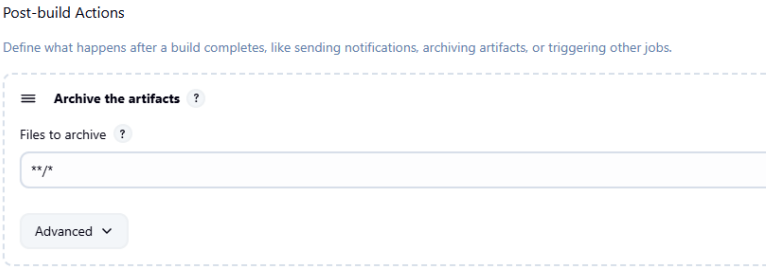
└── Maven version: MAVEN_HOME

└── Goals: test

└── **Post-build Actions**:

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

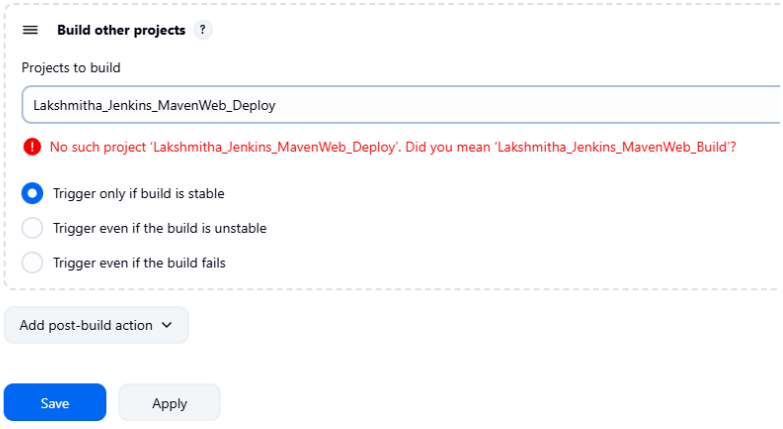
└── Files to archive: **/*



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

└── Projects to build: MavenWeb_Deploy

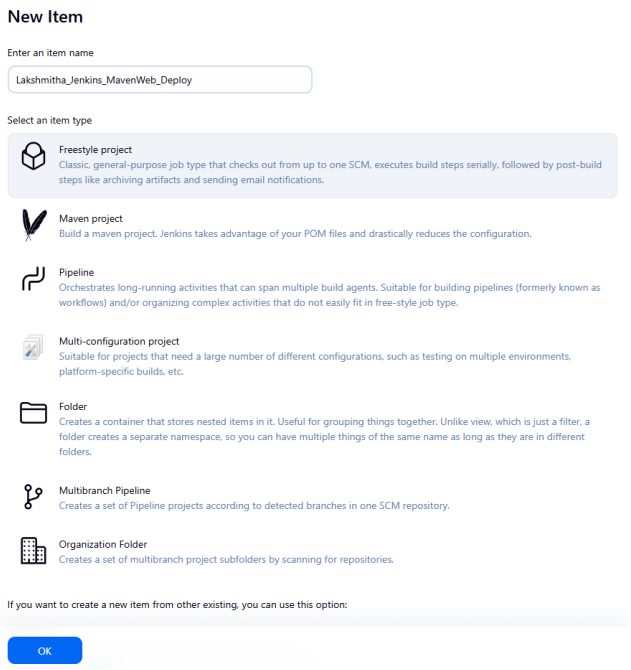
└── Apply and Save



└── **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**:

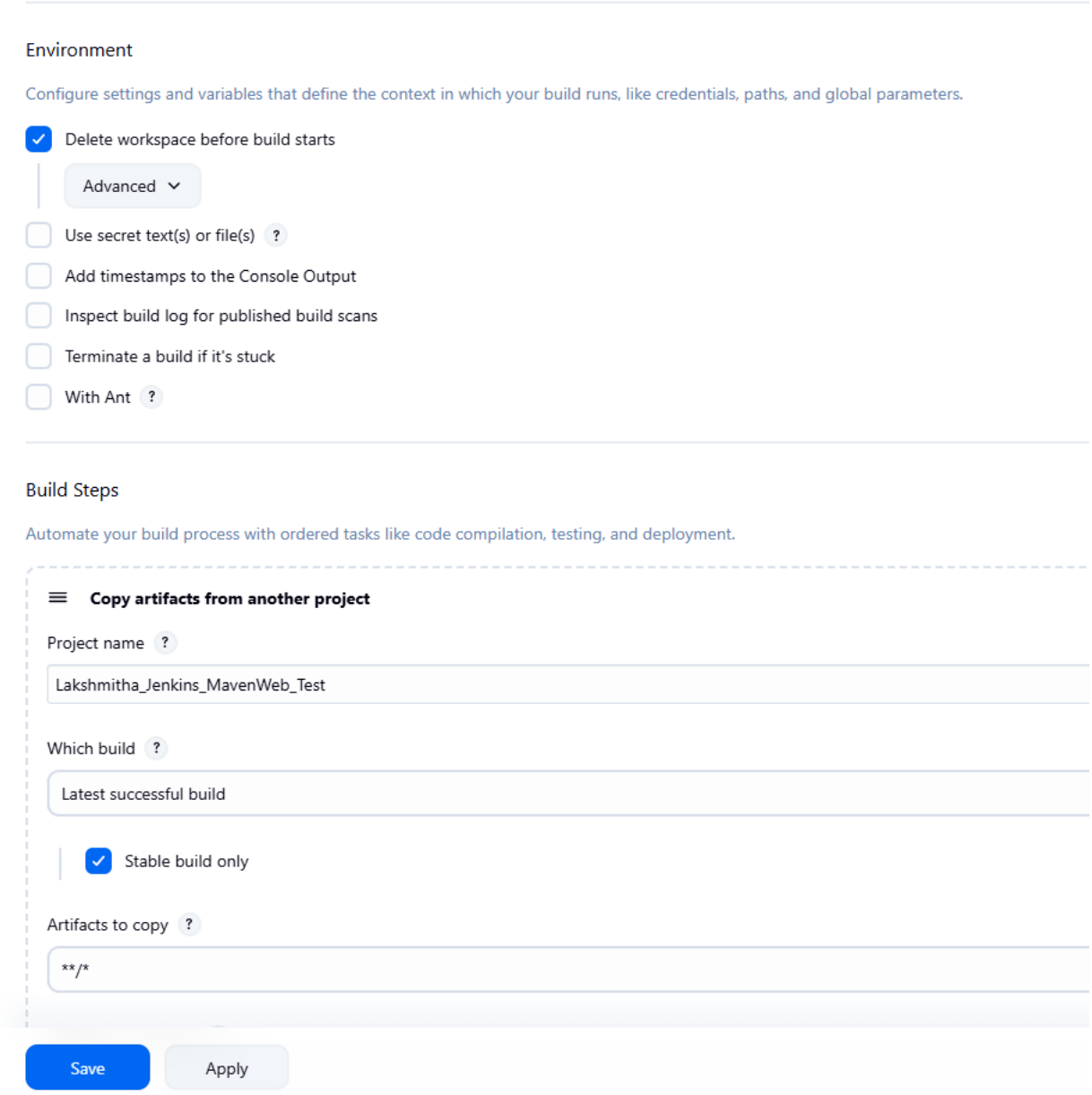
└── Check: "Delete the workspace before build starts"

├── **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

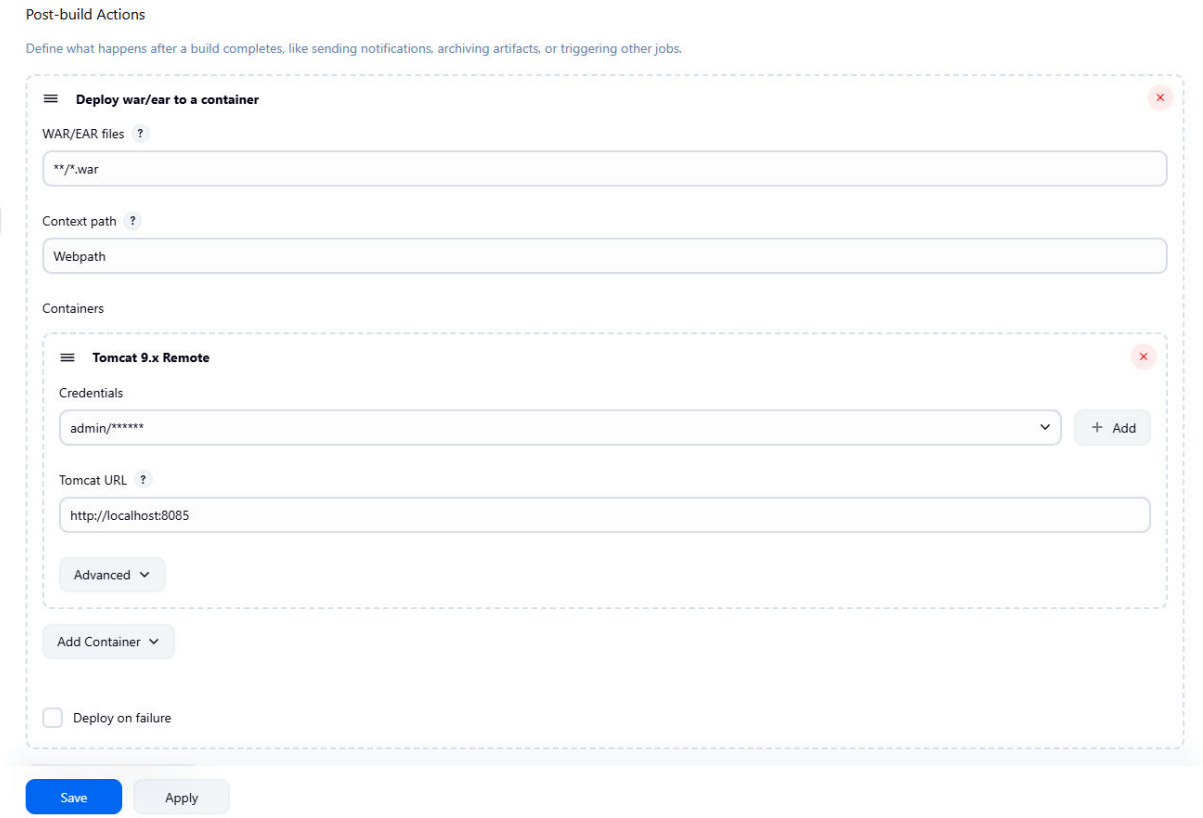
    └── Context path: Webpath

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

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

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

  └── Apply and Save

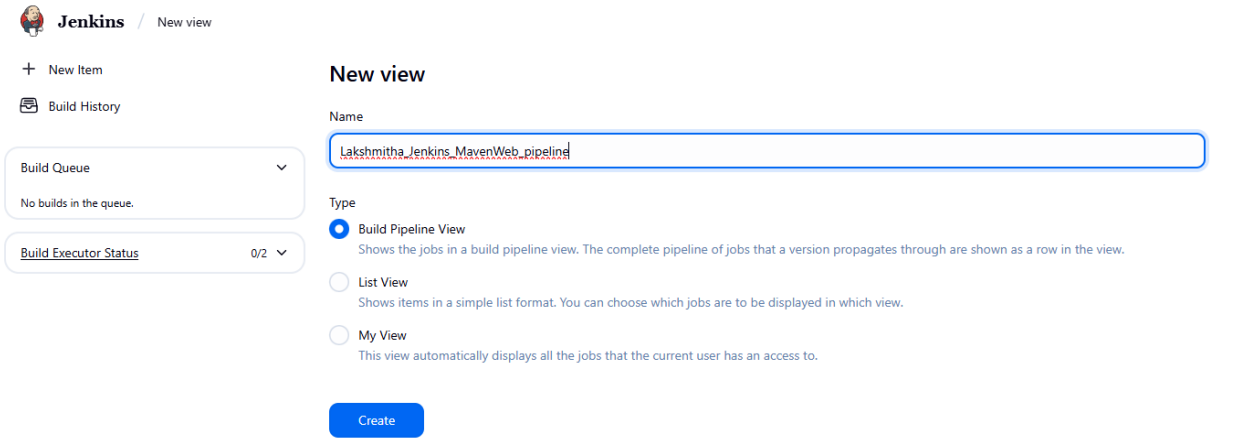


└── **Step 5**: Create Pipeline View for MavenWeb

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

├── Enter name: MavenWeb_Pipeline

├── **Select "Build pipeline view"**

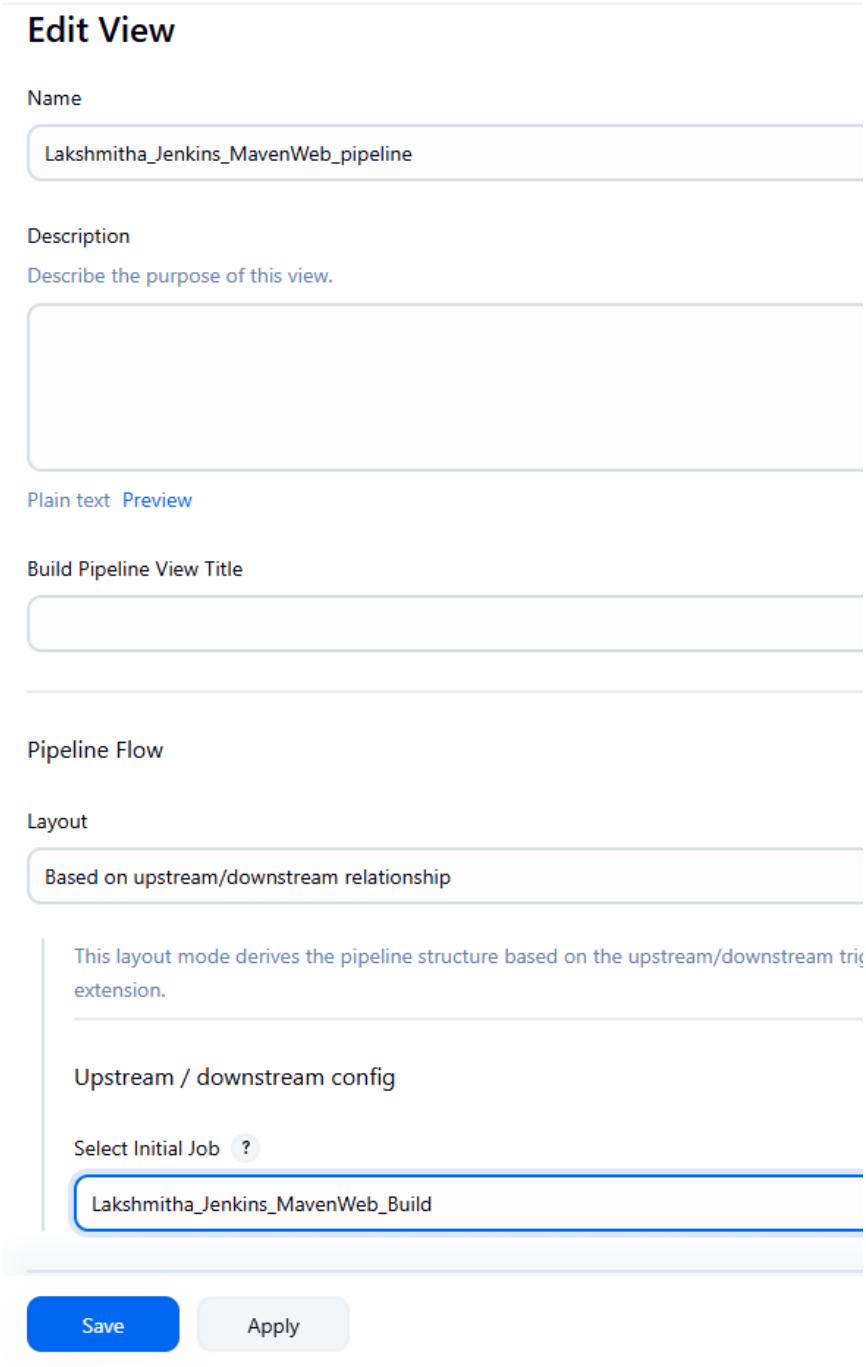


└── **Pipeline Flow**:

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

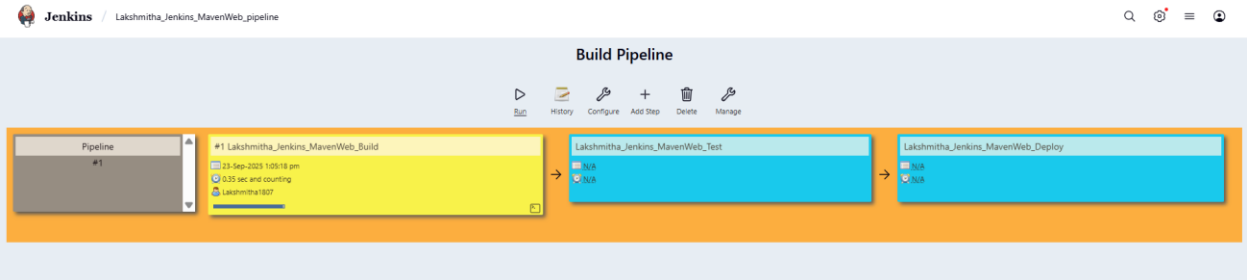
  ├── Initial job: MavenWeb_Build

  └── Apply and Save



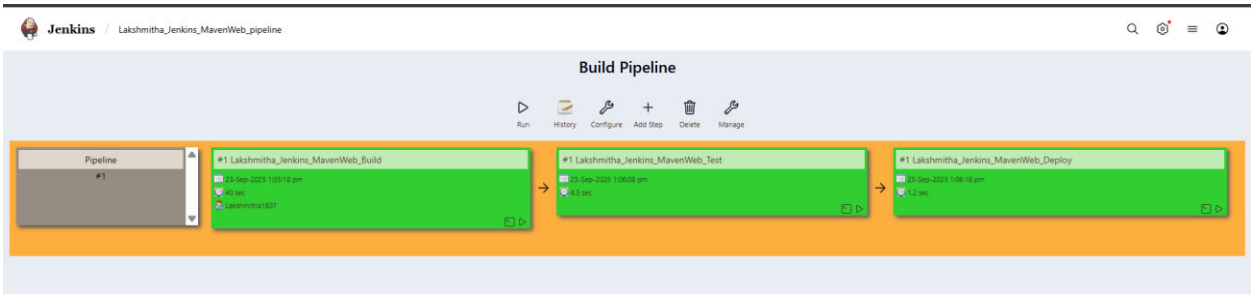
└── **Step 6**: Run the Pipeline and Check Output

├── 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



o

├── 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?

Jenkins is primarily used for **Continuous Integration (CI) and Continuous Delivery/Deployment (CD)** to automate building, testing, and deploying applications.

2. What is feature of Jenkins?

Extensibility through plugins (over 1,800 available).
Pipeline as code (using Jenkinsfile).
Distributed builds across multiple nodes.
Integration with version control systems.

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

8080

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

Git, Github,BitBucket,SVN

5. What is the purpose of Jenkins plugins?

Plugins extend Jenkins' core functionality by adding **new integrations, build steps, UI enhancements, SCM support, and pipeline features**.

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

FreeStyle Job

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

Using the **Credentials Plugin**, which stores secrets securely and injects them into builds.

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

A **modern, user-friendly UI** for Jenkins pipelines with visualization of stages and steps.

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

A **modern, user-friendly UI** for Jenkins pipelines with visualization of stages and steps.

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

Jenkins Master-Agent architecture (agents handle distributed builds).

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.

    Maven Integration Plugin – Automates building, testing, and packaging microservices using Maven.
    Build Pipeline Plugin – Visualizes and manages multi-stage CI/CD workflows.
    Pipeline Utility Steps Plugin – Provides extra steps for handling files, JSON, and YAML in pipelines.
    Copy Artifacts Plugin – Shares build outputs between dependent Jenkins jobs.
    Deploy to Container Plugin – Automates deployment of applications to servers like Tomcat/JBoss.
    Git SCM / Blue Ocean Plugin – Integrates Git repos and offers a modern UI for pipeline visualization.

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?

Go to **Manage Jenkins → Manage Plugins**.
Search in the **Available** tab.
Select plugin → click **Install without restart** (or with restart if required).
Considerations:
Ensure plugin version is **compatible with Jenkins version**.

Check for **dependency requirements**.
Avoid outdated or unmaintained plugins.

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?

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?

- Go to **Manage Jenkins → Global Tool Configuration**.
- Add Git installation path.
- In your pipeline/job, configure Git repository URL and credentials.
- Test connection to ensure Jenkins can access the repo.

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?

Dependency conflicts – One plugin may require a different version of another.
Version incompatibility – Plugins may not support the installed Jenkins core.
Security vulnerabilities – Outdated plugins may have security issues.
Troubleshooting:
Check **Jenkins logs** for errors.
Review plugin documentation & compatibility matrix.
Upgrade/downgrade plugin versions carefully.
Use **Jenkins Plugin Manager → Updates** to patch issues.
If broken, uninstall plugin or roll back using a backup.

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