

## **Software Engineering & Project Management Lab Experiment No: - 04**

**Aim:** To understand Continuous Integration, install and configure Jenkins with Maven/Ant/Gradle to setup a build Job

### **Theory:**

Continuous Integration (CI) is a DevOps practice where code changes are automatically built, tested, and integrated into a shared repository multiple times a day. It helps in early detection of errors, reduces integration problems, and improves software quality.

### **Jenkins: An Overview**

Jenkins is an open-source CI/CD automation tool used for building, testing, and deploying applications. It allows developers to automate software development workflows and ensures a seamless integration process. Jenkins supports various build tools like Maven, Ant, and Gradle to compile and package applications.

### **Installing and Configuring Jenkins**

#### **1. Download and Install Jenkins**

- o Install Java (JDK) as a prerequisite.
- o Download Jenkins from the official website and install it on the server.
- o Start Jenkins and configure initial setup using an administrator password.

#### **2. Installing Build Tools**

- o Install Maven, Ant, or Gradle depending on project requirements.
- o Configure Jenkins to recognize the installed build tool.

#### **3. Creating a Build Job in Jenkins**

- o Navigate to Jenkins Dashboard → New Item → Freestyle Project/Pipeline.
- o Configure the Git repository URL to fetch the source code.
- o Select the Build Tool (Maven/Ant/Gradle) and define the build command.
- o Set up triggers (e.g., Git webhooks) for automatic build execution.
- o Save and trigger the build job to verify the setup.

To install Jenkins following software packages are required:

- 1) GIT ([git-scm.com](https://git-scm.com))
- 2) Notepad++ (<https://notepad-plus-plus.org/downloads/>)

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3) Latest Java development kit (JDK)

4) Jenkins

5) Apache Maven (Optional)

Step 1:- Install GIT

Step 2 -: Install Notepad++

Step 3 -: Install Java

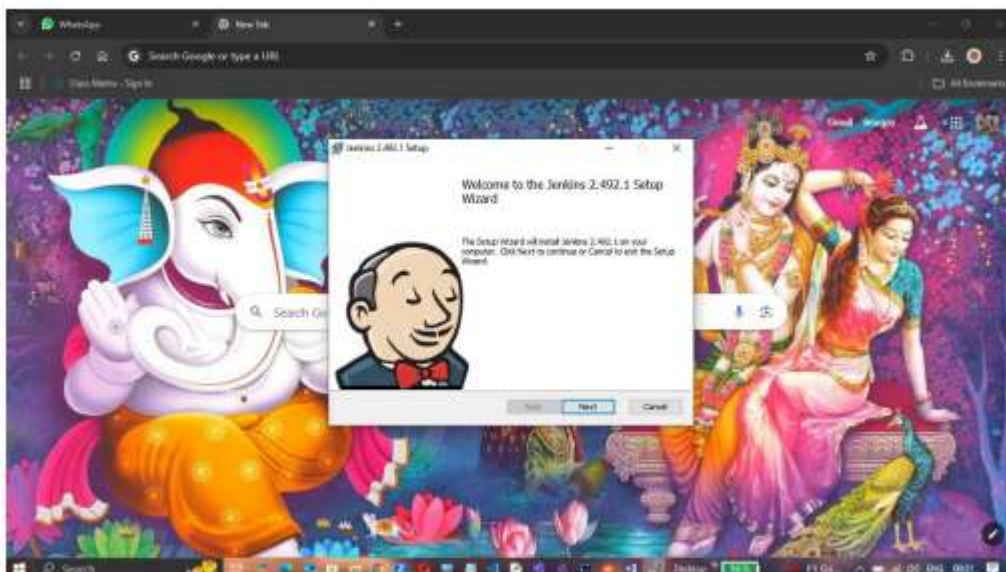
Step 4 -: Install Jenkins

Step 5 -: Install Maven

Jenkins is an open source automation tool written in Java with plugins built for Continuous Integration purpose. Jenkins is used to build and test your software projects continuously making it easier for developers to integrate changes to the project, and making it easier for users to obtain a fresh build. It also allows you to continuously deliver your software by integrating with a large number of testing and deployment technologies.

Step 1:- Open <https://www.jenkins.io/doc/book/installing/windows/> and install Jenkins.

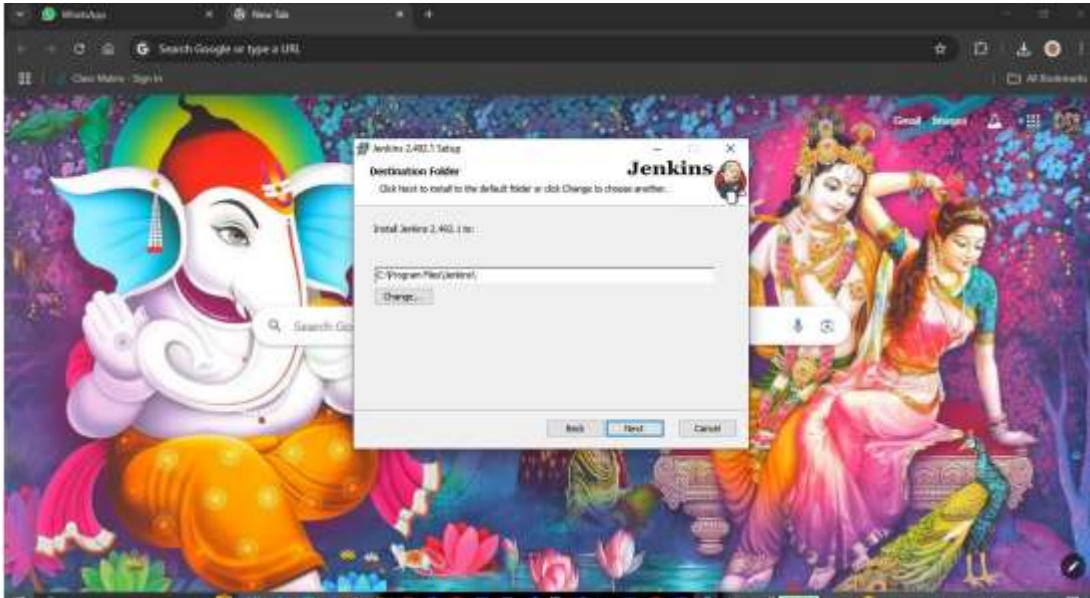
Open the installed .exe setup



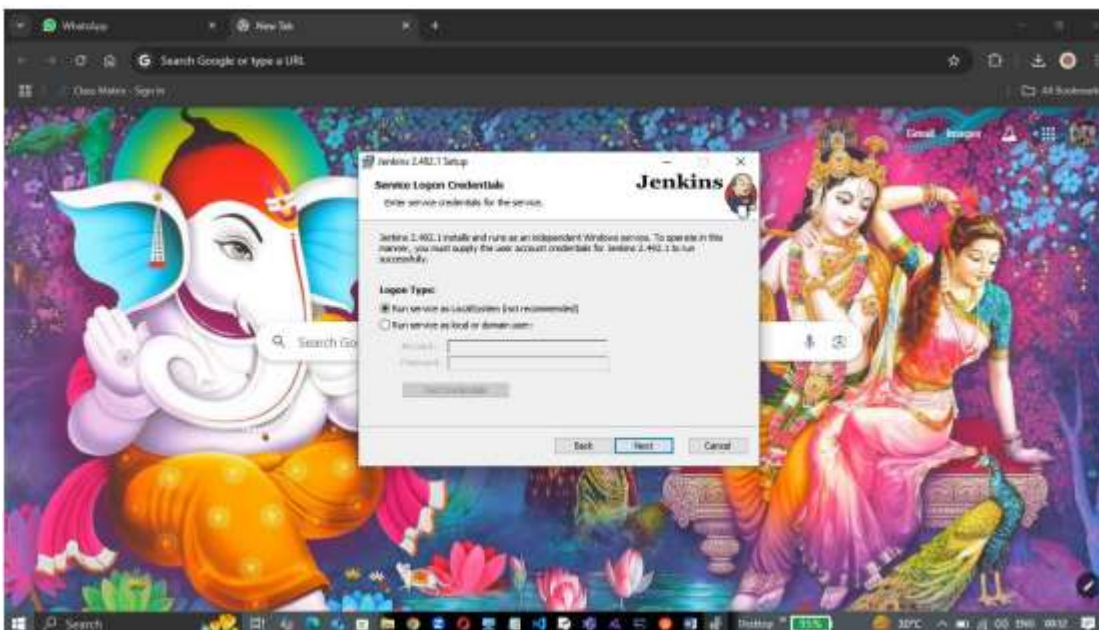
Step 2: Locate the folder where you want to install Jenkins in the location path

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Step 3: Select service as Local System and proceed to Next.

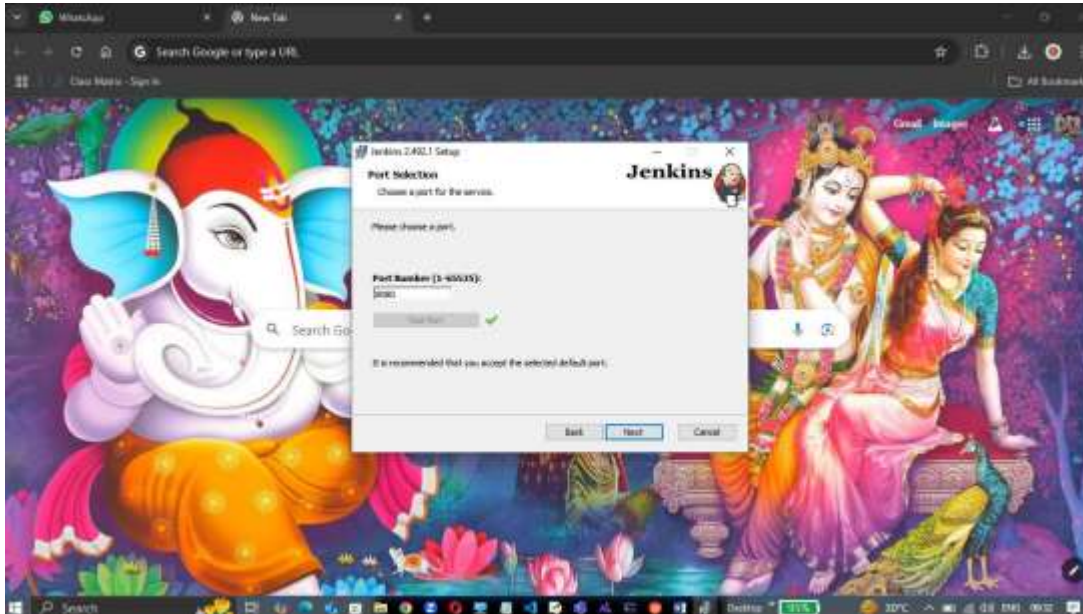




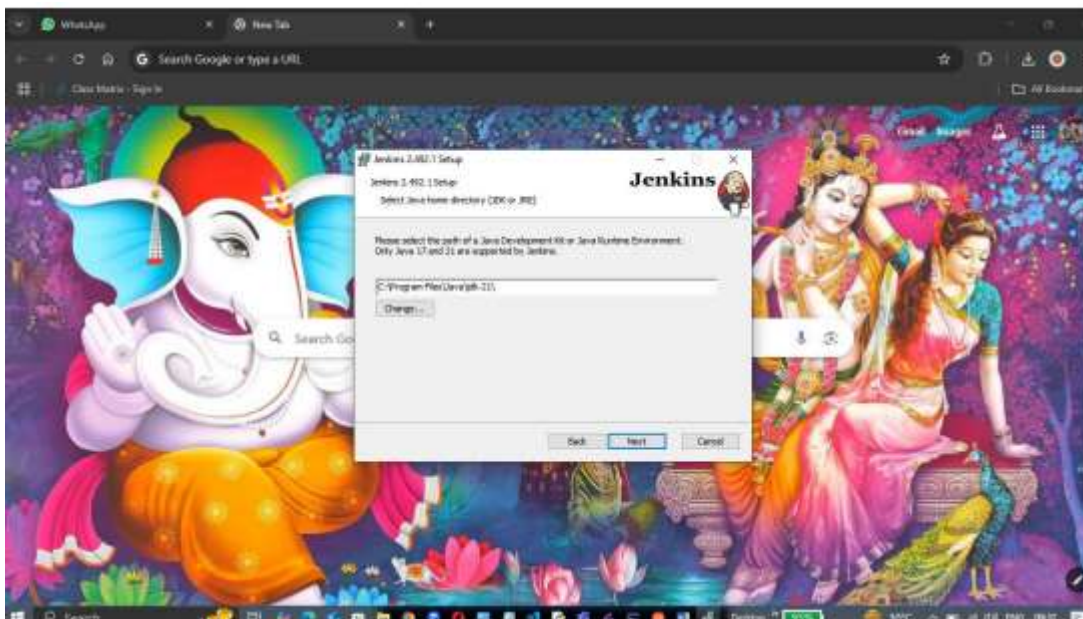
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Step 4: Select the port 8080 and click Test Port button. The green tick will appear after which you can proceed to Next.



Step 5: Locate the folder where you have installed JDK in the location path:



Step 6: Once Installation is done, you can test the Jenkins on <http://localhost:8080> on the browser. First time, when you open Jenkins portal it will ask to put admin default password which is stored in `/var/lib/jenkins/secrets/initialAdminPassword` file.

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Step 7: On entering the password, you can continue to choose “Install Suggested Plugins”



Once plugins are installed, click on next and specify the admin details along with the new password for Jenkins admin and click on finish to complete the installation. After filling the details, click on Save & Continue, you will be redirected to the dashboard.

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### Getting Started

# Getting Started

✓ Folders	✓ OWASP Markup Formatter	✓ Build Timeout	✓ Credentials Binding
✓ Timestampers	Workspace Cleanup	Ant	Gradle
Pipeline	GitHub Branch Source	Pipeline: GitHub Groovy Libraries	Pipeline: Stage View
Git	SSH Build Agents	Matrix Authorization Strategy	RAM Authentication
LDAP	Email Extension	Mailer	

\*\*\* required dependency

\*\*\* Bouncycastle API

\*\*\* Instance Identity

\*\*\* JavaBeans Activation Framework (JAF) API

\*\*\* Jettison API

\*\*\* Credentials

\*\*\* Plain Credentials

\*\*\* Gson API

\*\*\* Trilead API

\*\*\* SSH Credentials

\*\*\* Credentials Binding

\*\*\* SCM API

\*\*\* Pipeline: API

\*\*\* commons-lang3 v3.x Jenkins API

\*\*\* Timestampers

\*\*\* Caffeine API

\*\*\* Script Security

\*\*\* JAXB

\*\*\* SnakeYAML API

\*\*\* Jackson 2 API

\*\*\* commons-text API

\*\*\* Pipeline: Supporting APIs

\*\*\* Plugin Utilities API

\*\*\* Font Awesome API

\*\*\* Bootstrap 3 API

\*\*\* JQuery3 API

Dashboard

New Item

People

Build History

Manage Jenkins

My Views

Build Queue

The build is in the queue

Build Executor Status

1 job

2 job

### Welcome to Jenkins!

This page is where your Jenkins jobs will be displayed. To get started, you can set up distributed builds or start building a software project.

Start building your software project

Create a job

Set up a distributed build

Set up an agent

Configure a cloud

Learn more about distributed builds

REST API Jenkins 2.425.1

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Getting Started

### Create First Admin User

Username

adi

Password

\*\*\*\*\*

Confirm password

\*\*\*\*\*

Full name

Aditya Parulekar

E-mail address

adit189parul@gmail.com

Jenkins 2.426.3

[Skip and continue as admin](#)

[Save and Continue](#)

Dashboard

Enter an item name:

example 1

[+ Required item](#)



#### Freestyle project

This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.



#### Pipeline

Orchestrate long-running activities that run upon 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

Create a container that stores related 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.



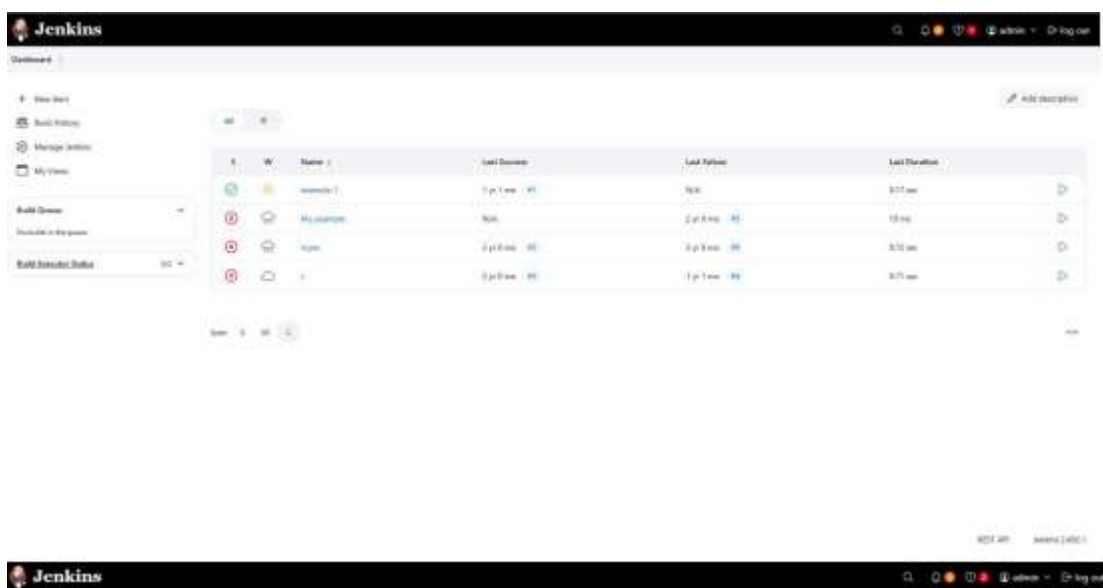
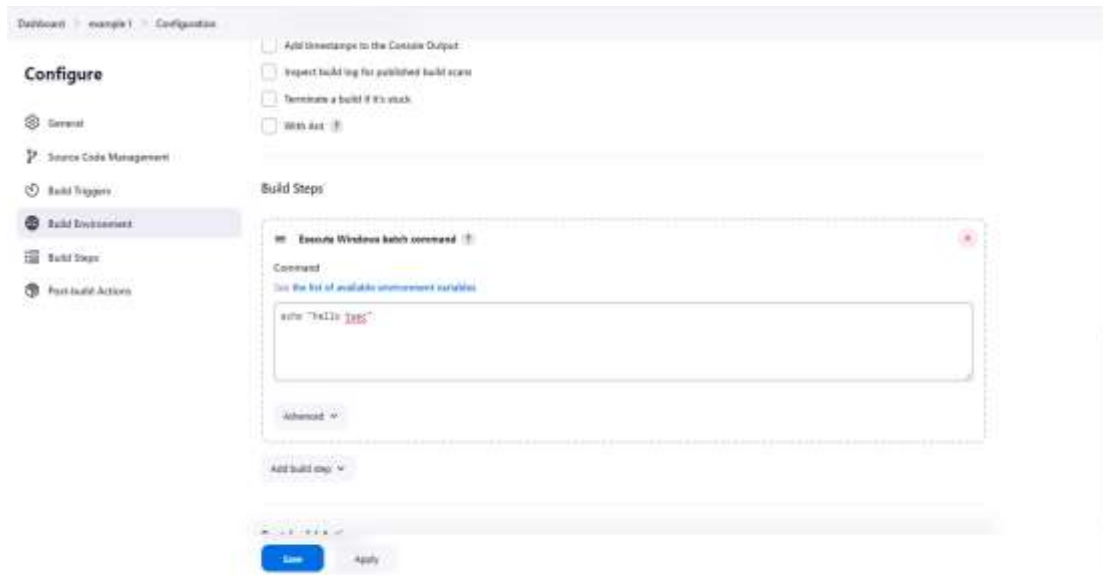
#### Organization Folder

Creates a set of multibranch project subfolders by scanning for repositories.

[OK](#)

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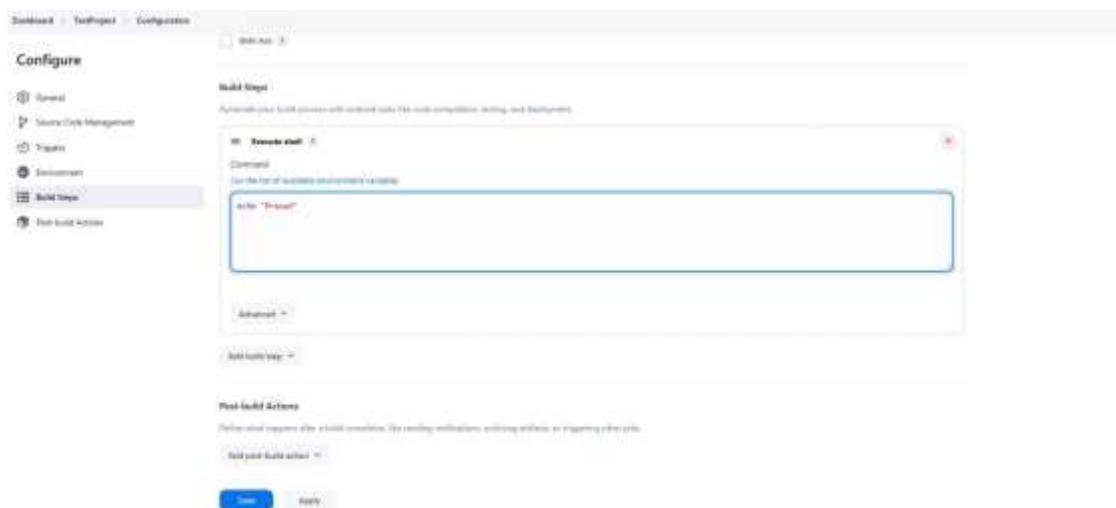
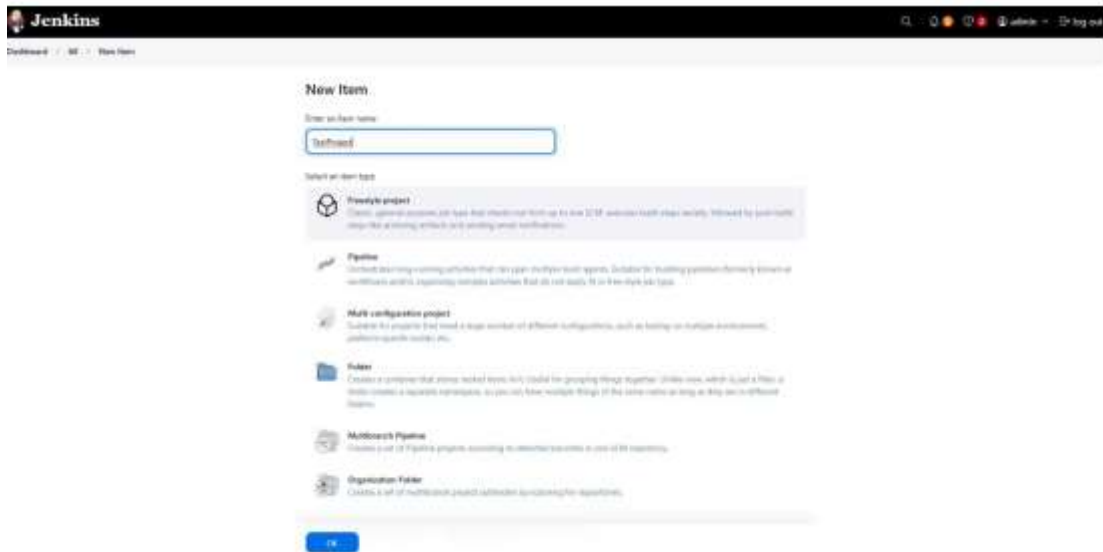
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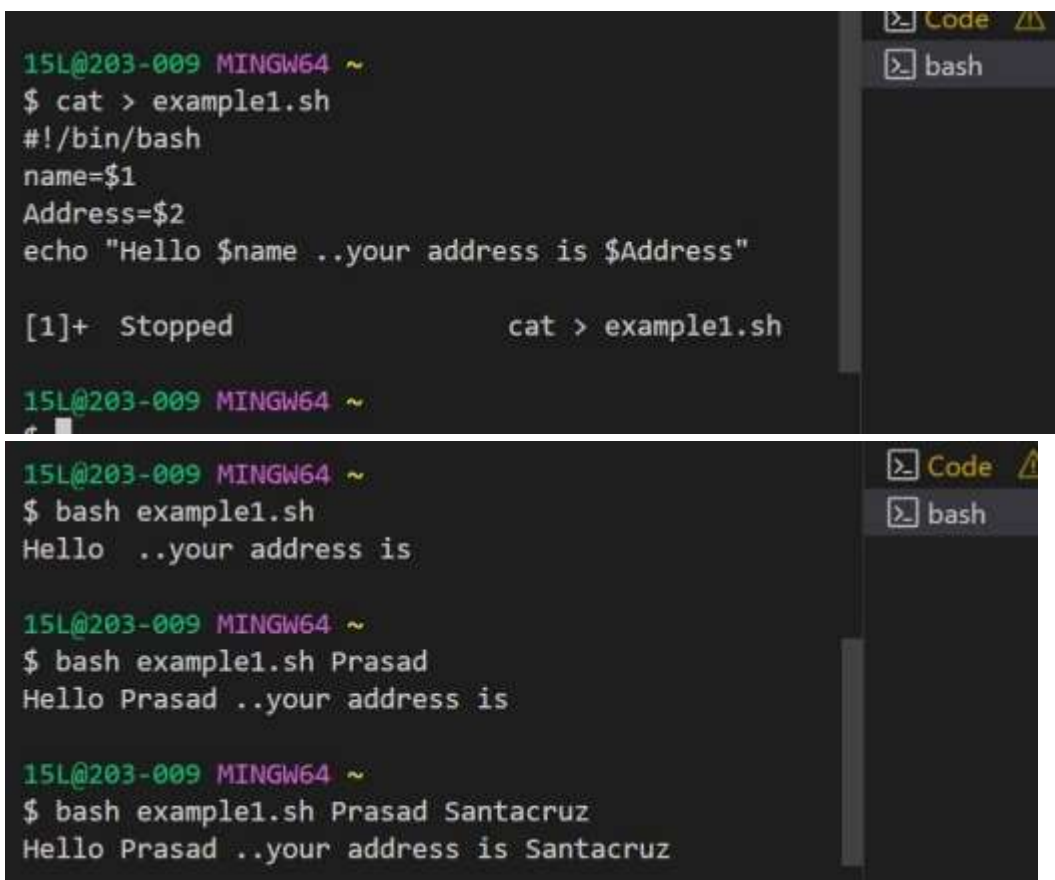
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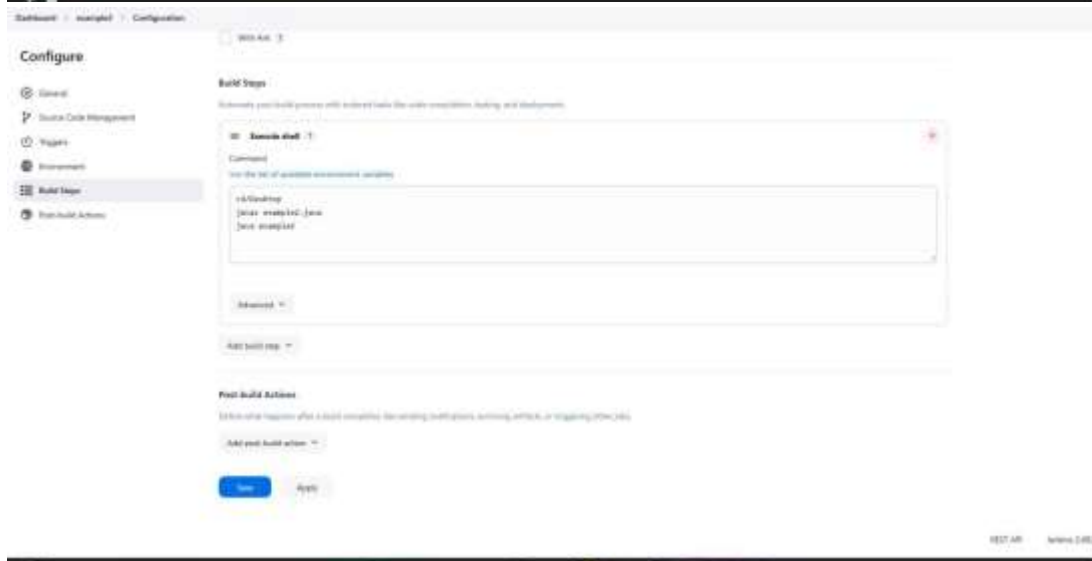
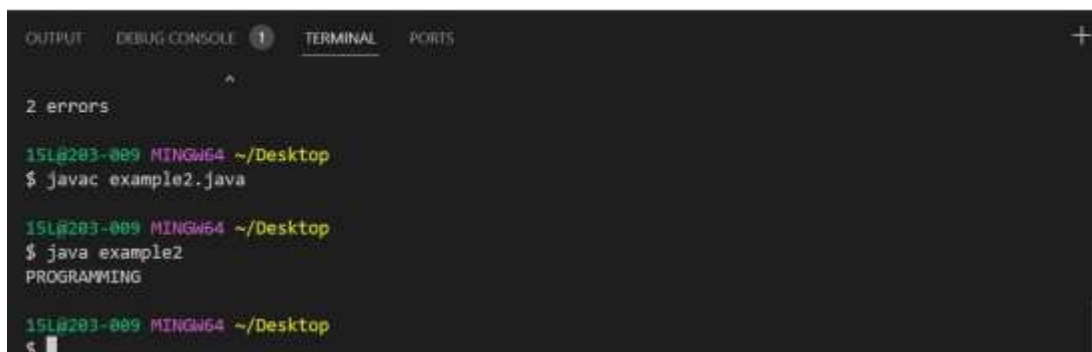
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### Conclusion:

Thus, we have successfully installed and configured Jenkins with Maven/Ant/Gradle to setup a build Job and learnt about the implementation of Jenkins in open source continuous integration.