**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** ○ Install Java (JDK) as a prerequisite. ○ Download Jenkins from the official website and install it on the server.
   - ○ Start Jenkins and configure initial setup using an administrator password.
2. **Installing Build Tools** ○ Install **Maven**, **Ant**, or **Gradle** depending on project requirements.
   - ○ Configure Jenkins to recognize the installed build tool.
3. **Creating a Build Job in Jenkins** ○ Navigate to **Jenkins Dashboard → New Item → Freestyle Project/Pipeline**.
   - ○ Configure the **Git repository URL** to fetch the source code.
   - ○ Select the **Build Tool (Maven/Ant/Gradle)** and define the build command.
   - ○ Set up triggers (e.g., Git webhooks) for automatic build execution.
   - ○ Save and trigger the build job to verify the setup.

To install Jenkins following software packages are required:

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

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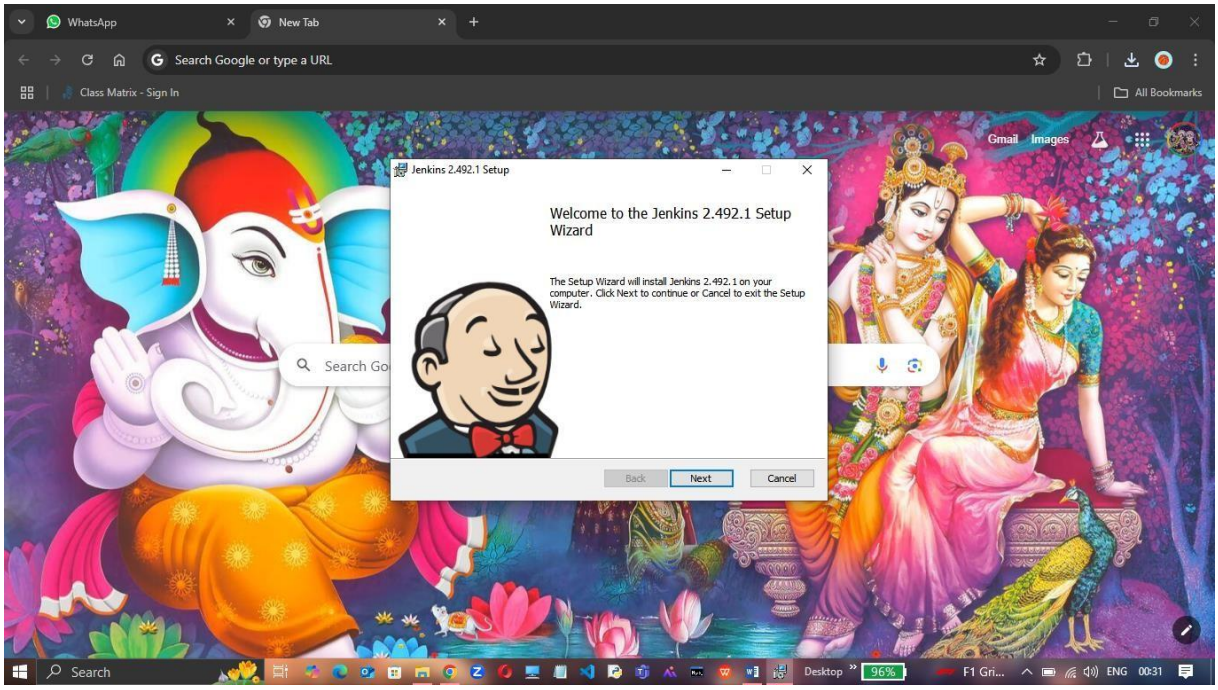
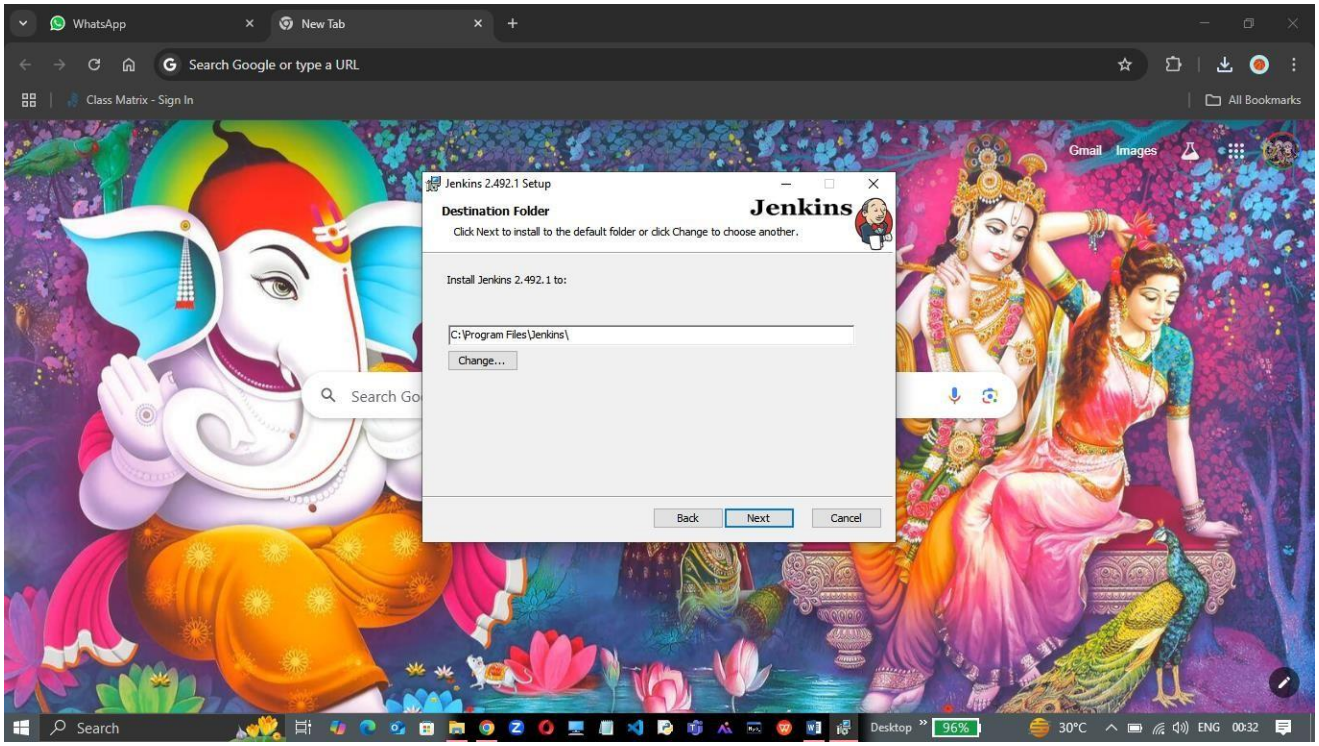



**Step 2**: Locate the folder where you want to install Jenkins in the location path:



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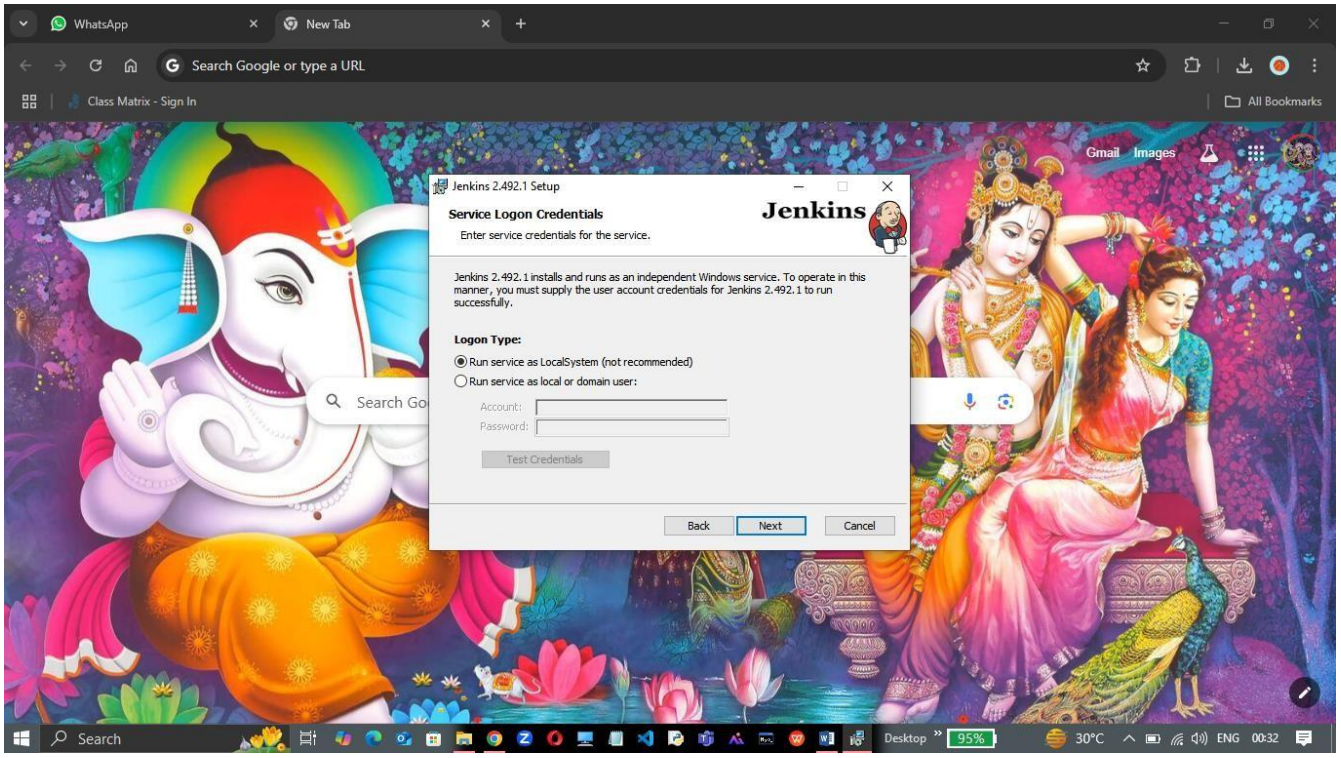
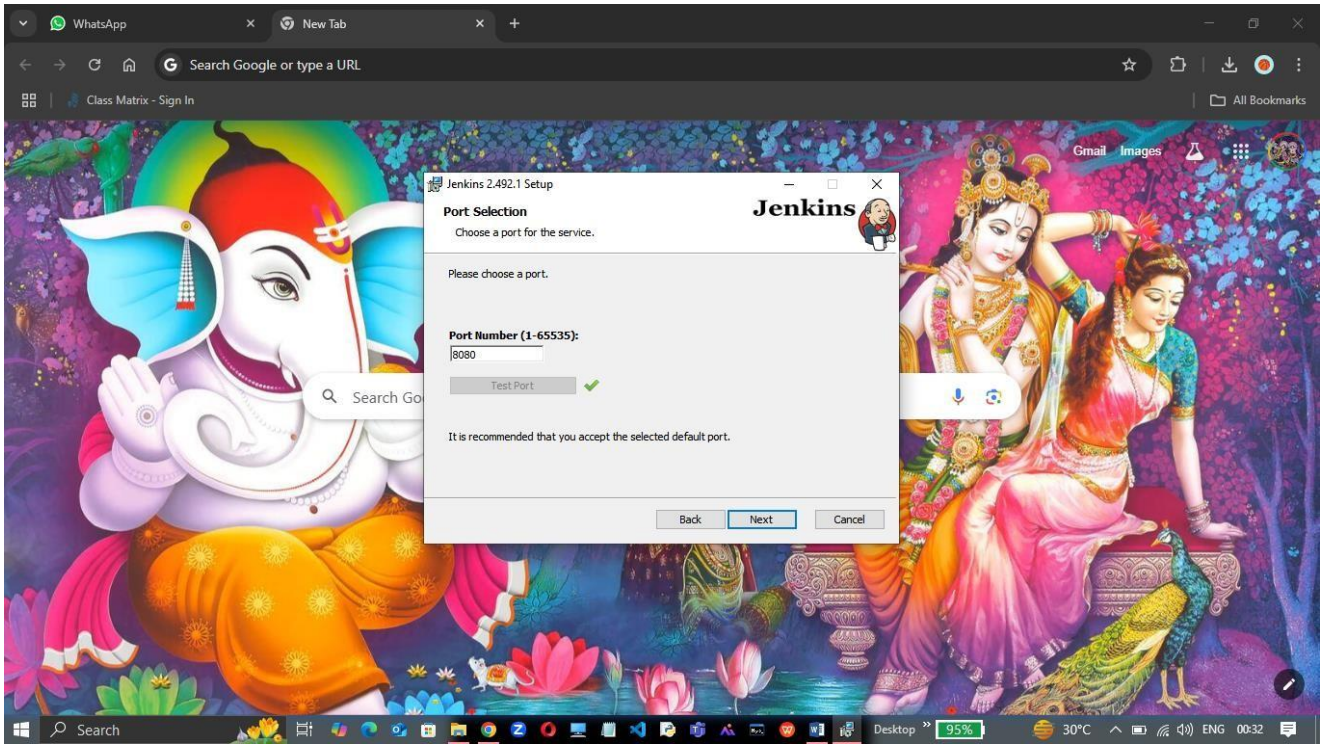
**Step 3**: Select service as Local System and proceed to Next.




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



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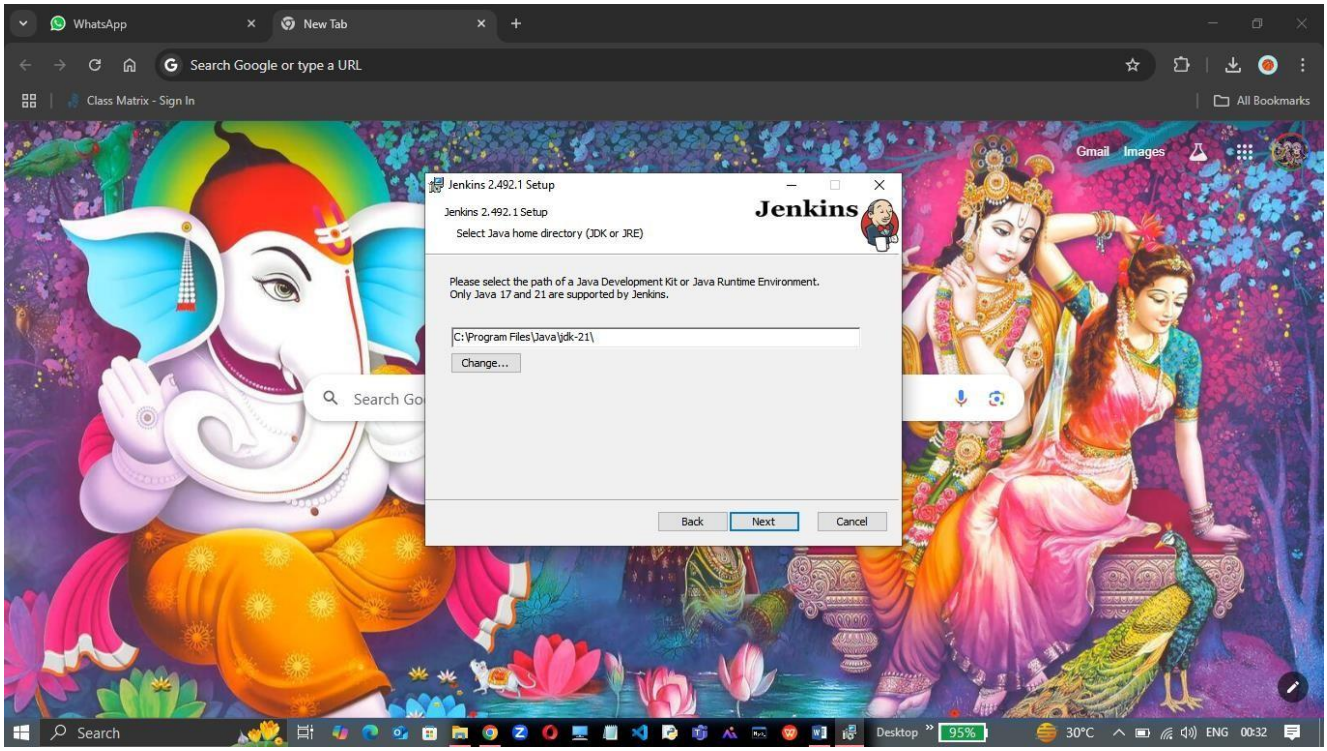
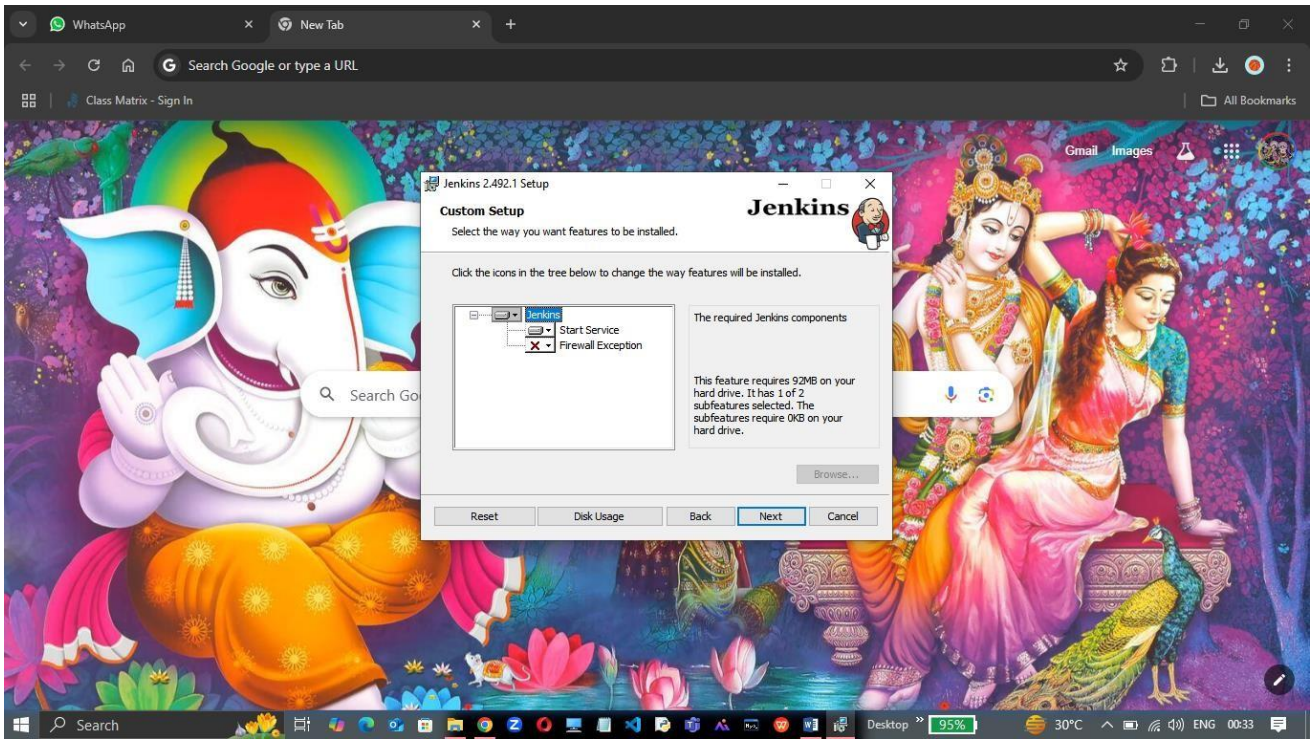
**Step 5**: Locate the folder where you have installed JDK in the location path:




**Proceed to Next**



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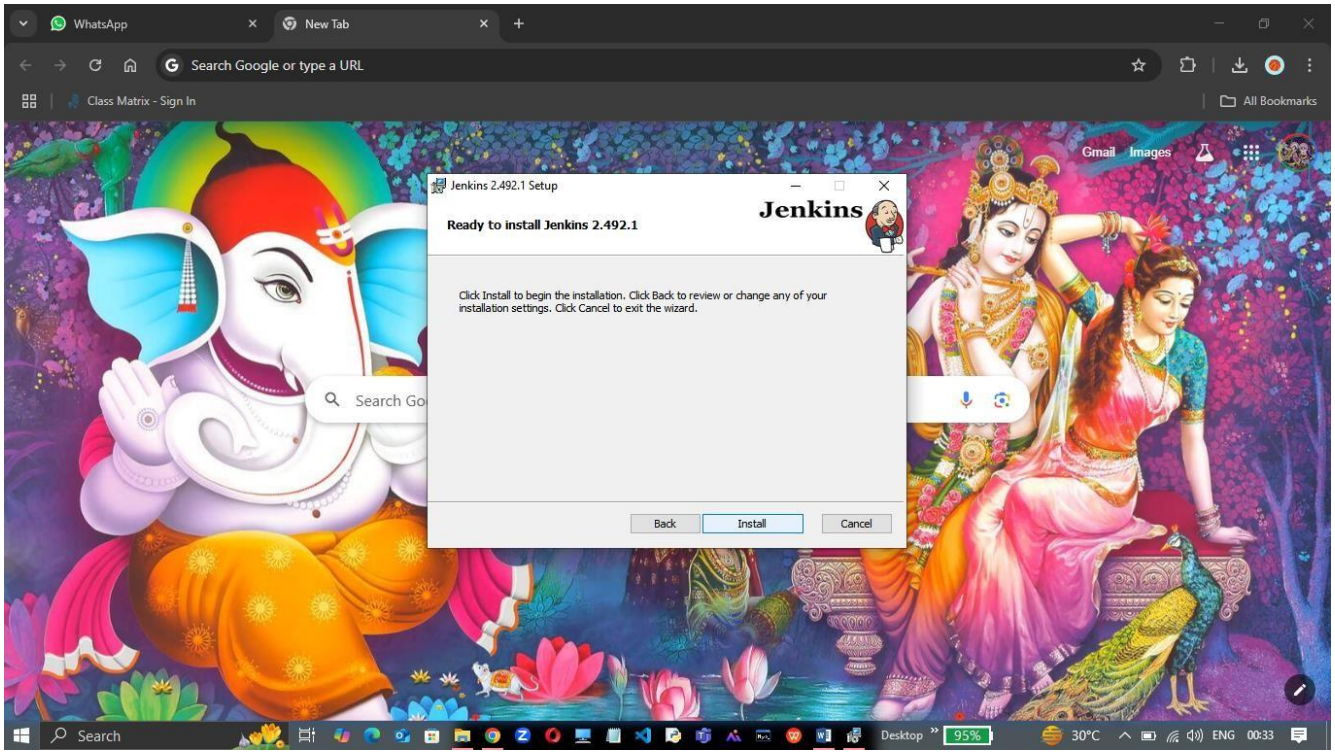
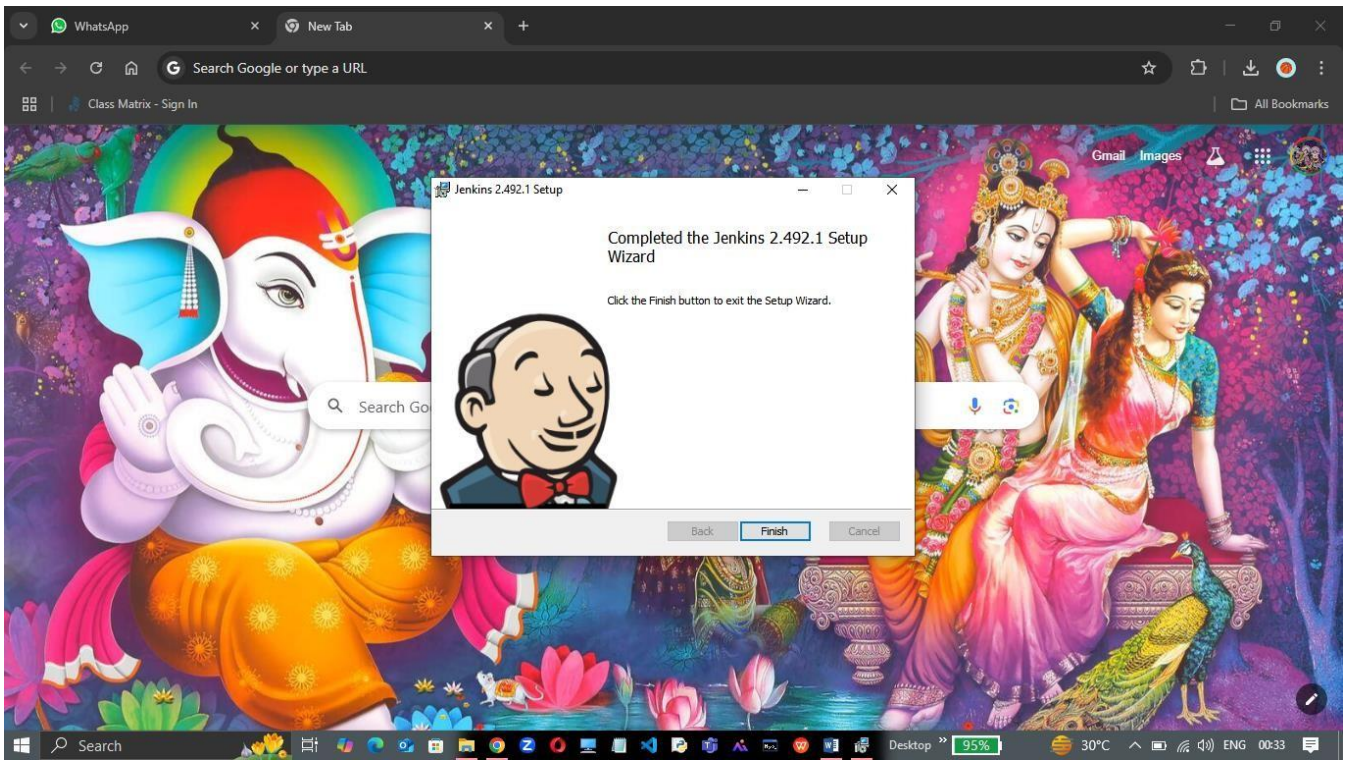
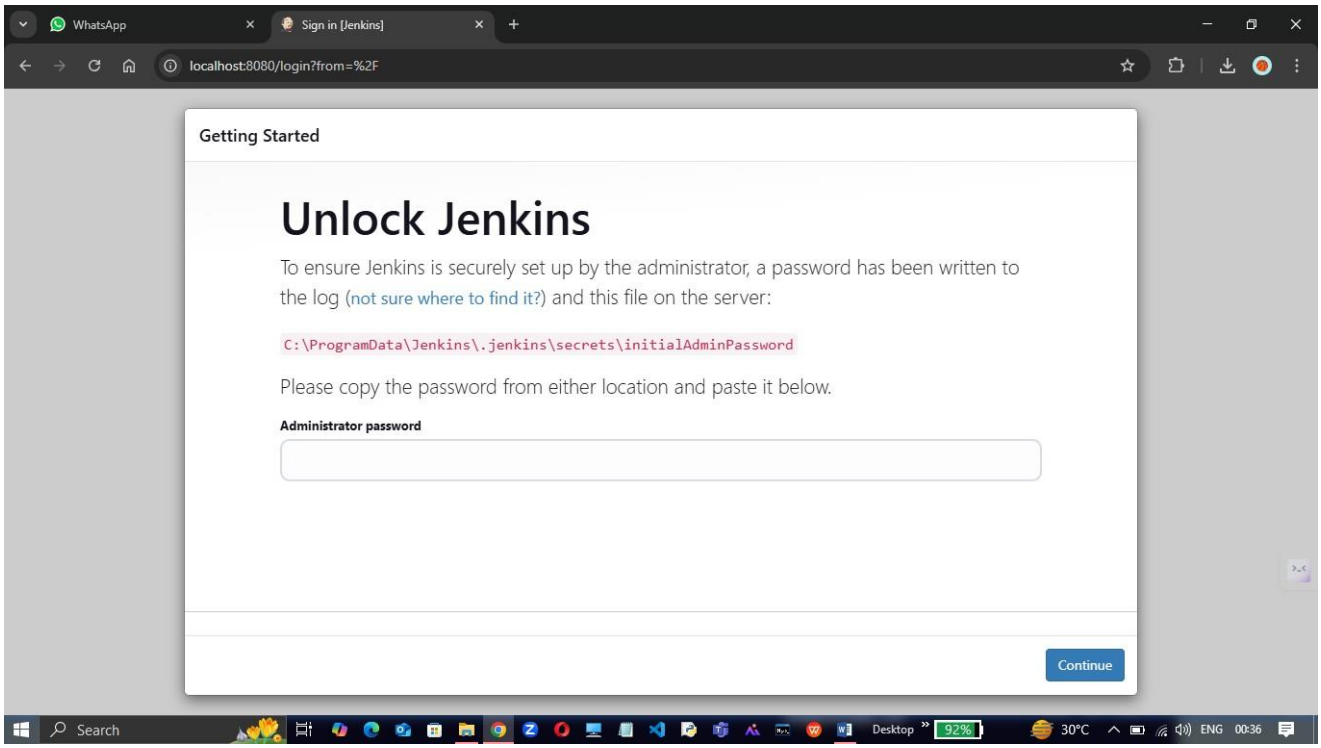



**On clicking 'Install', installation is finished.**

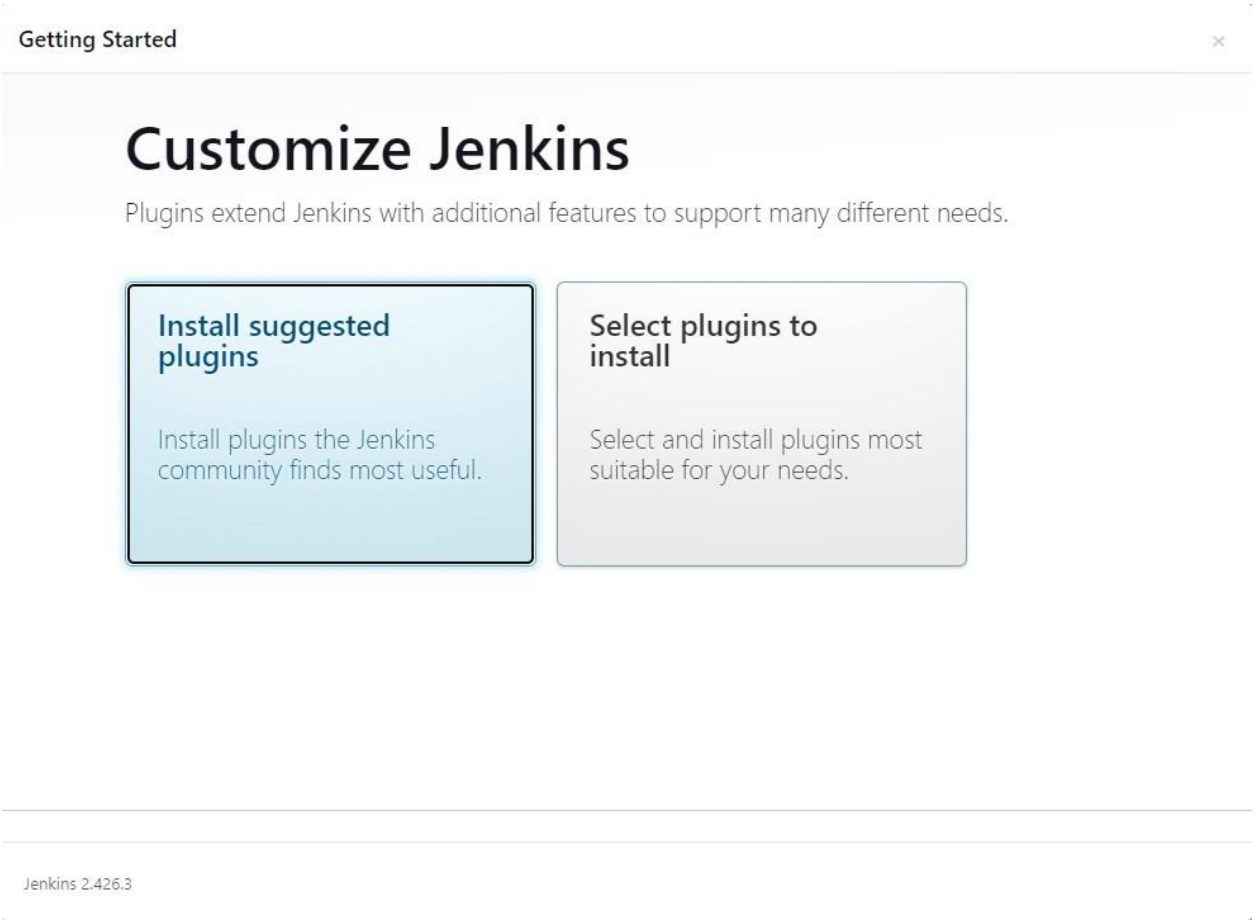


**Step 6**: Once Installation is done, you can test the Jenkins on http://localhost:8080 on the browser.

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.




**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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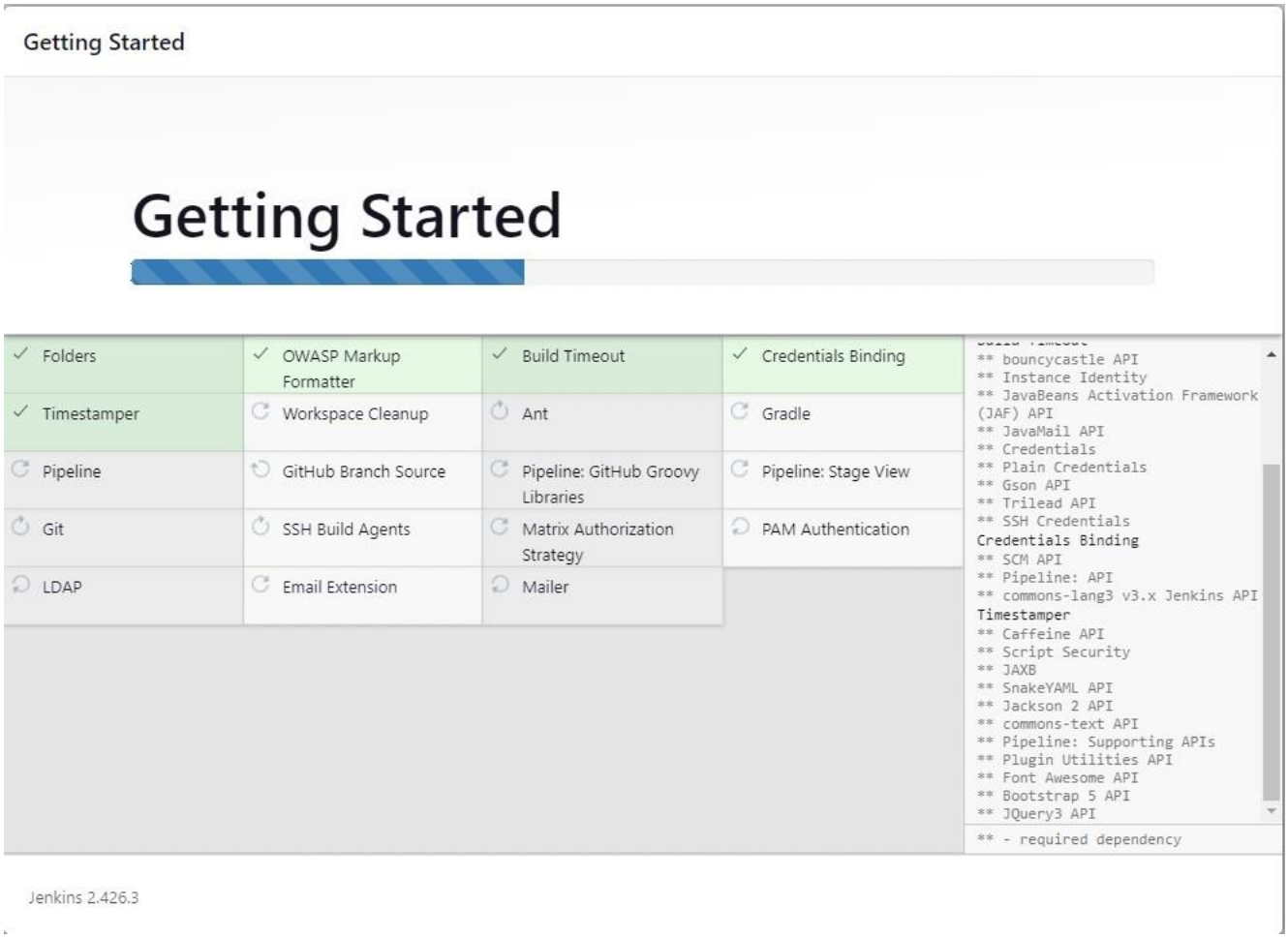


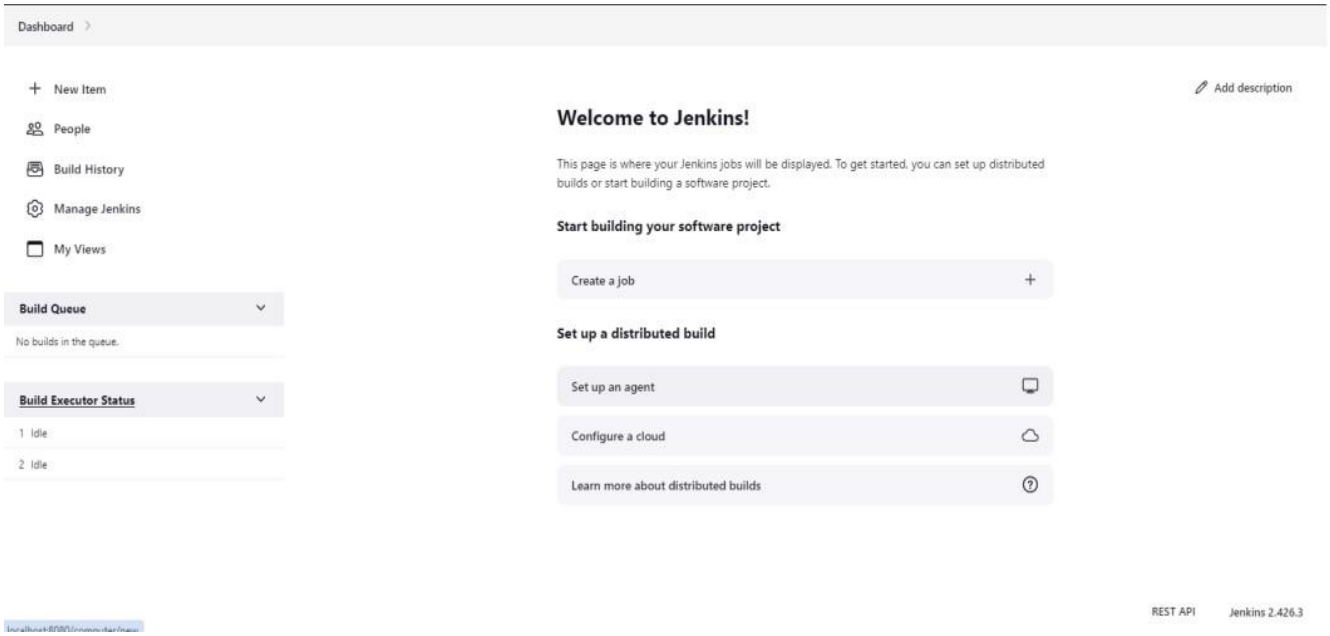

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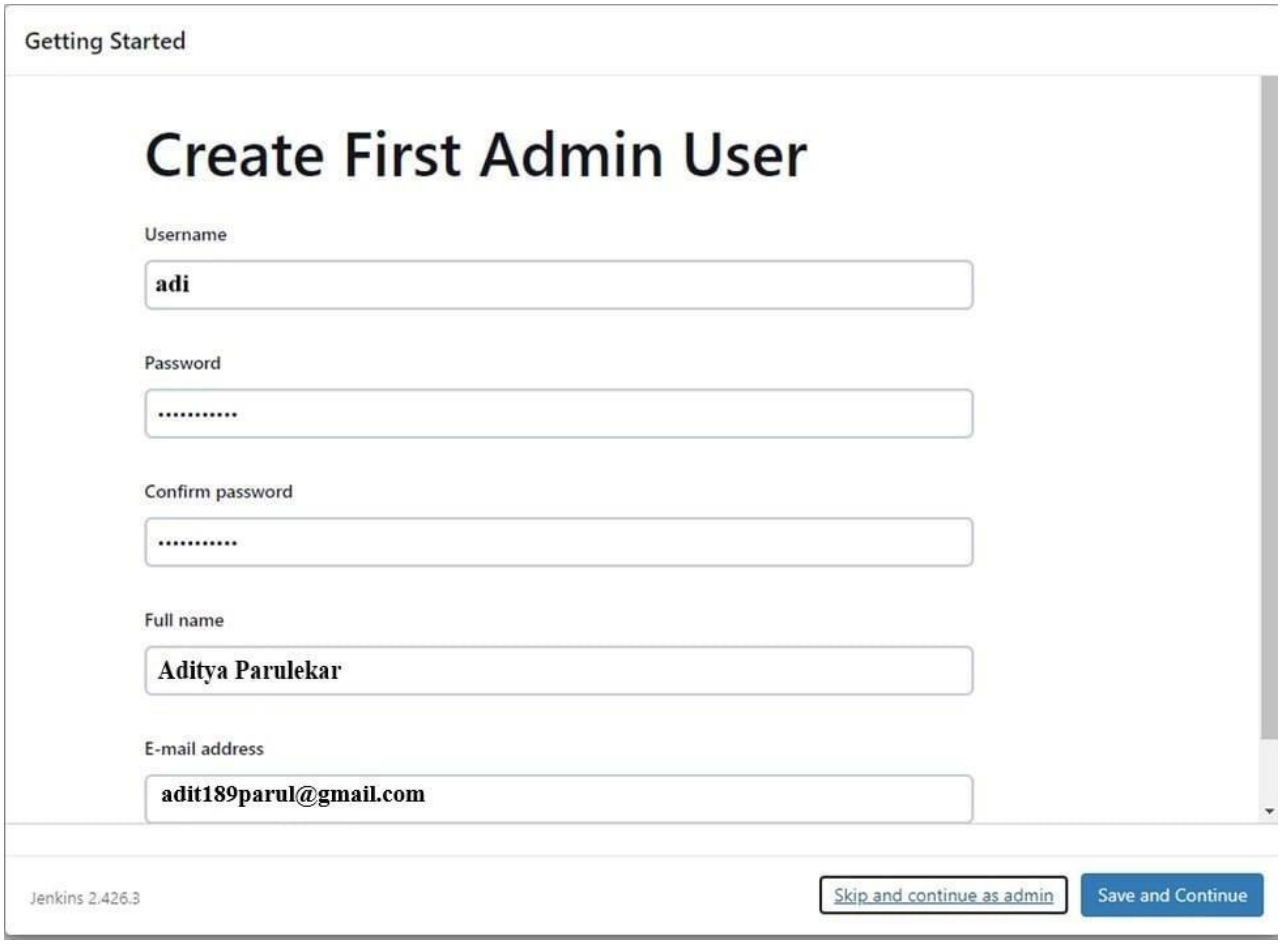


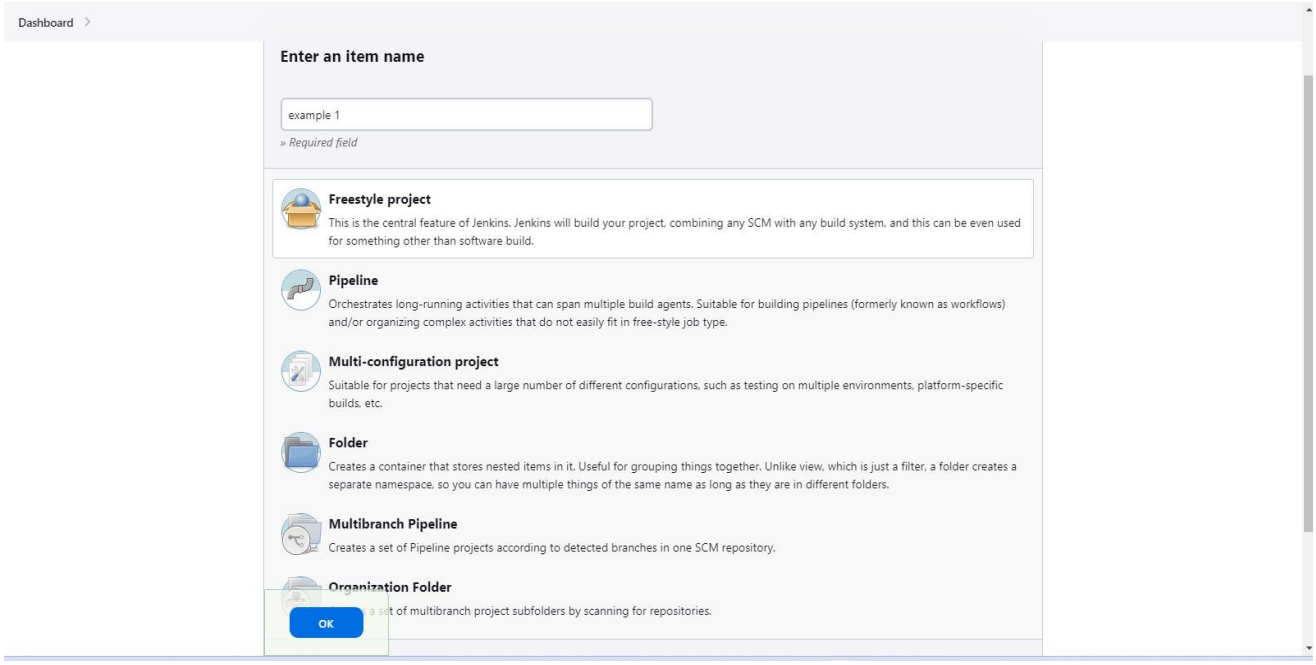

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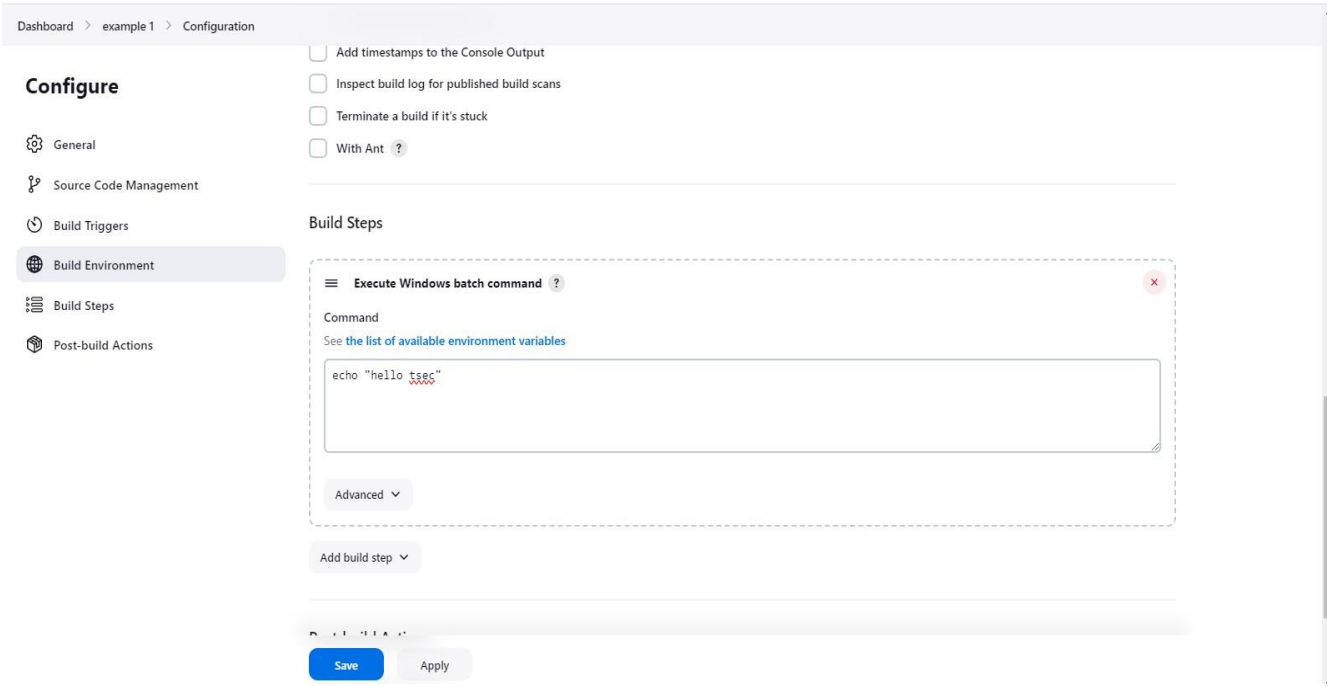


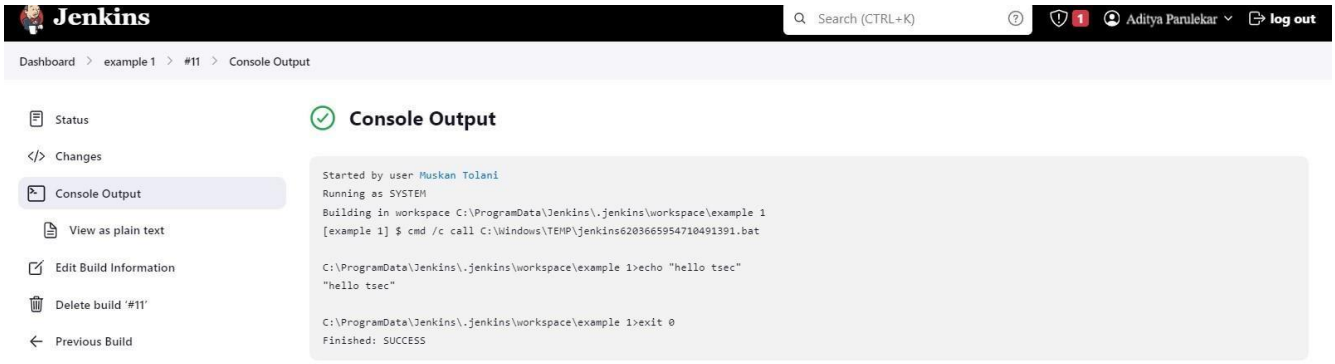

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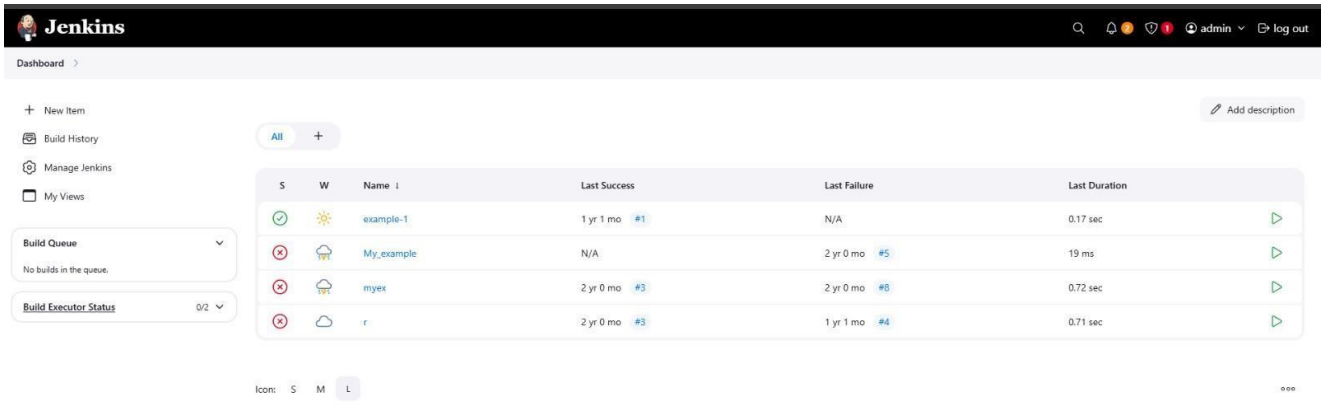


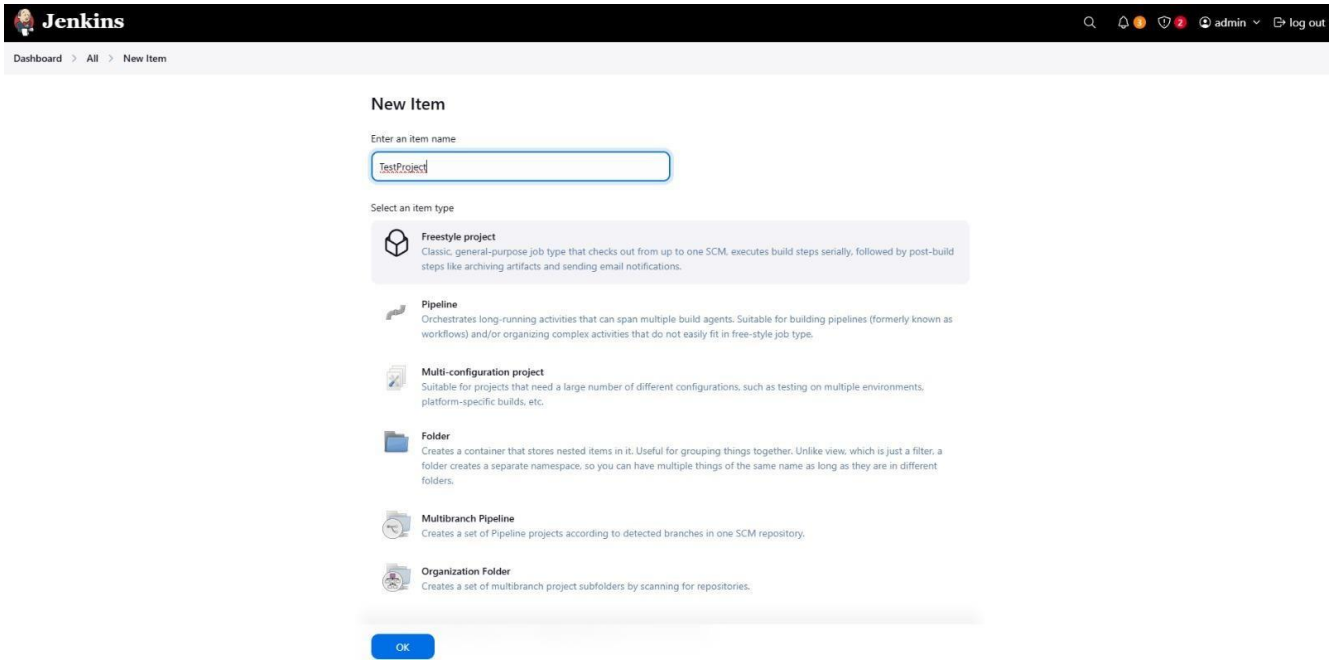

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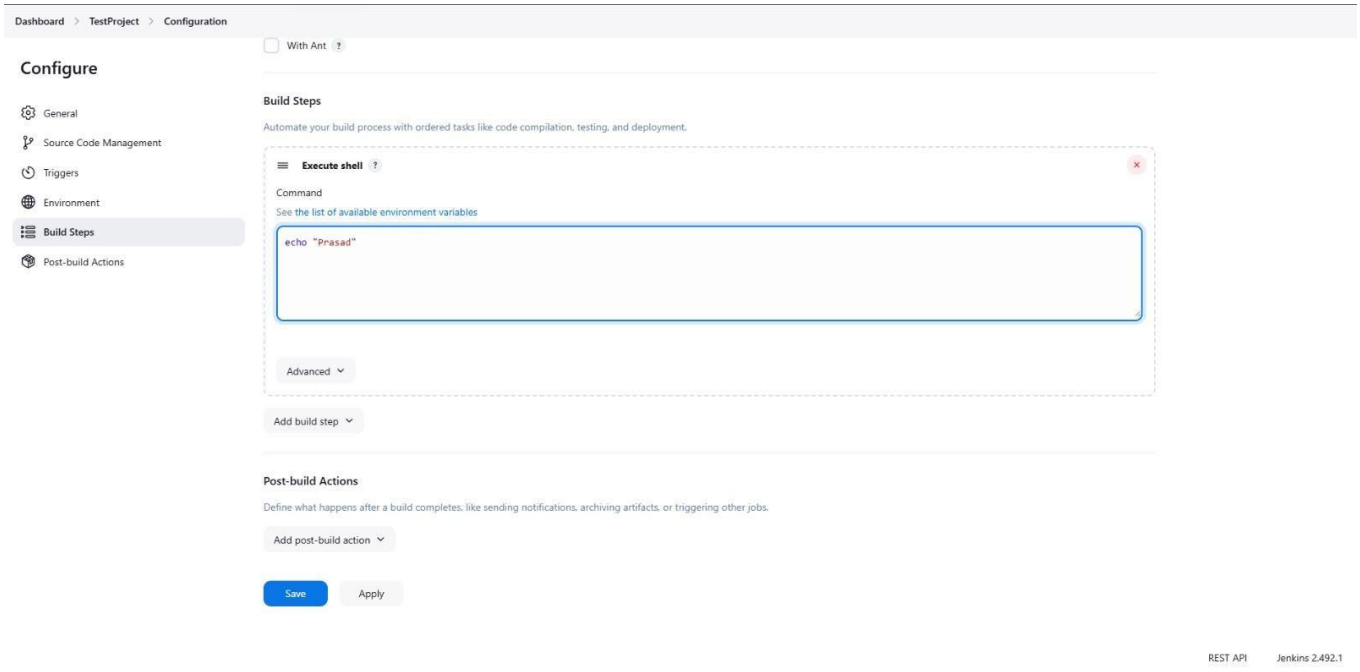


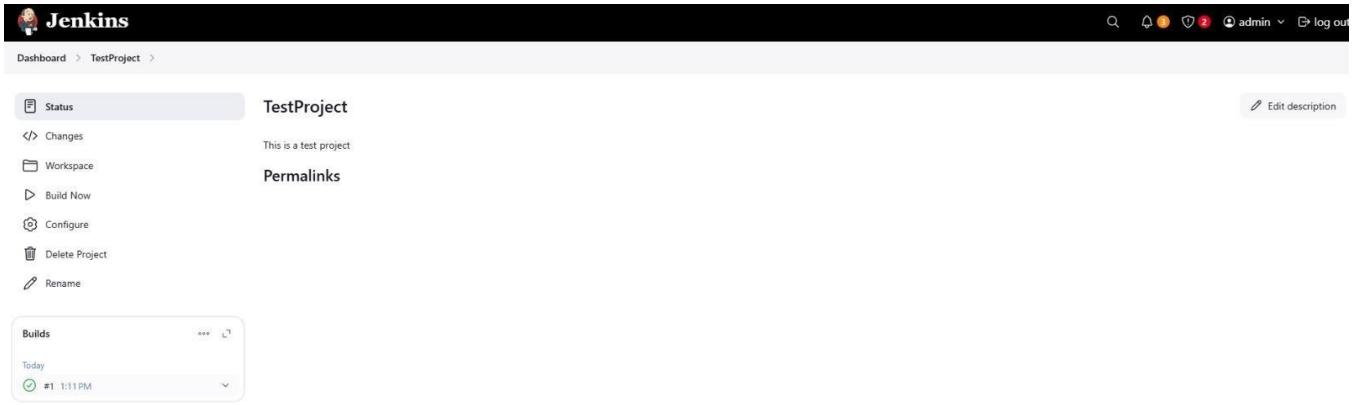

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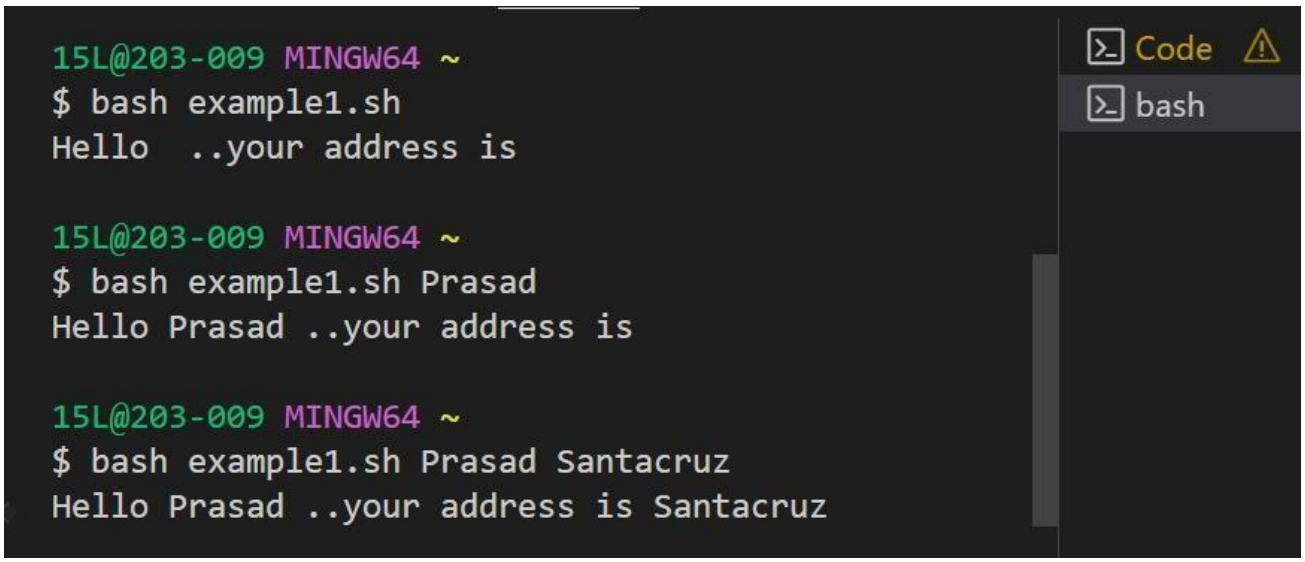

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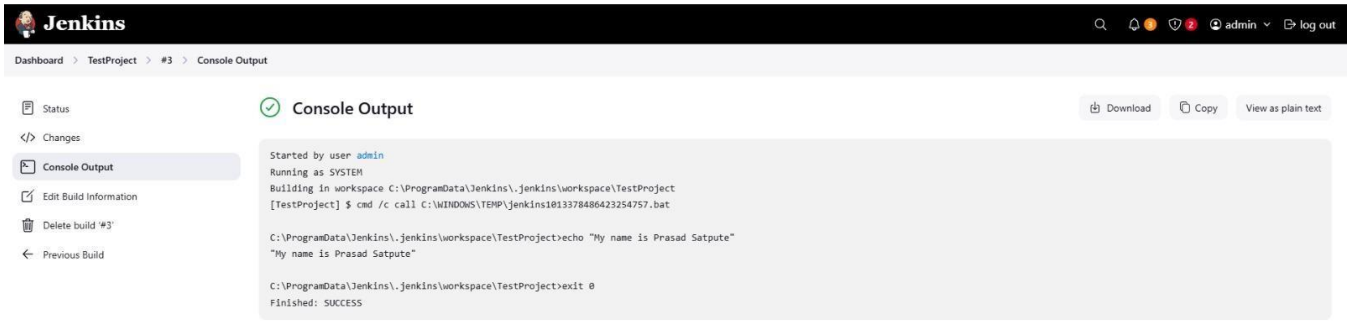


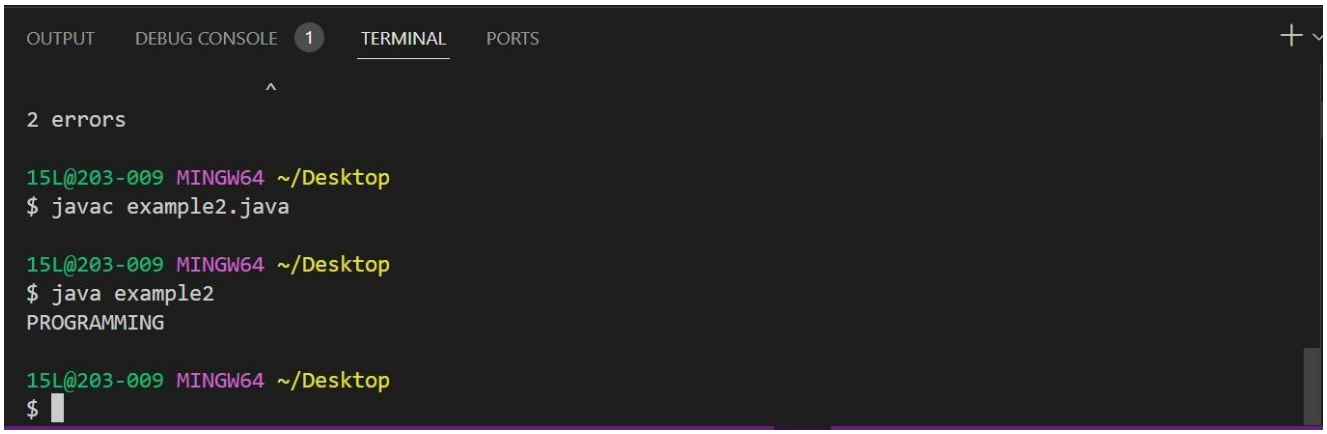


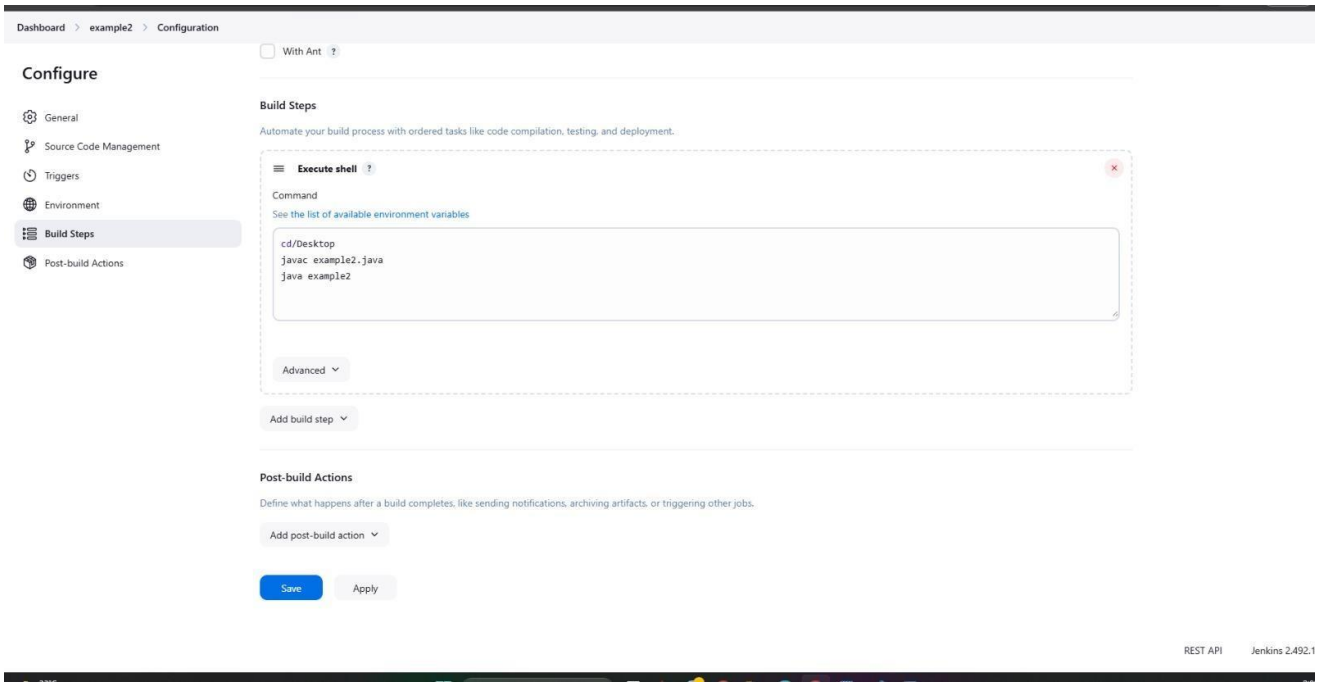

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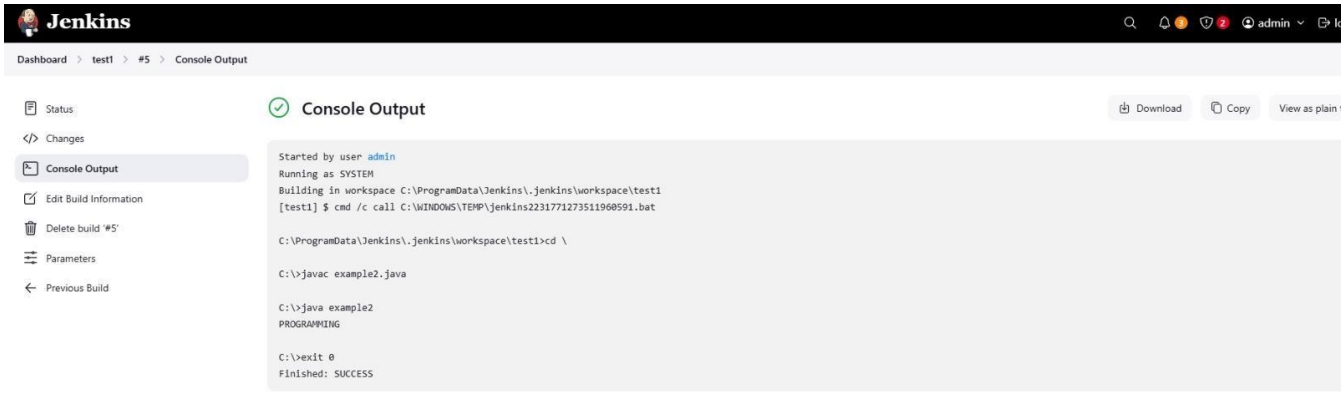



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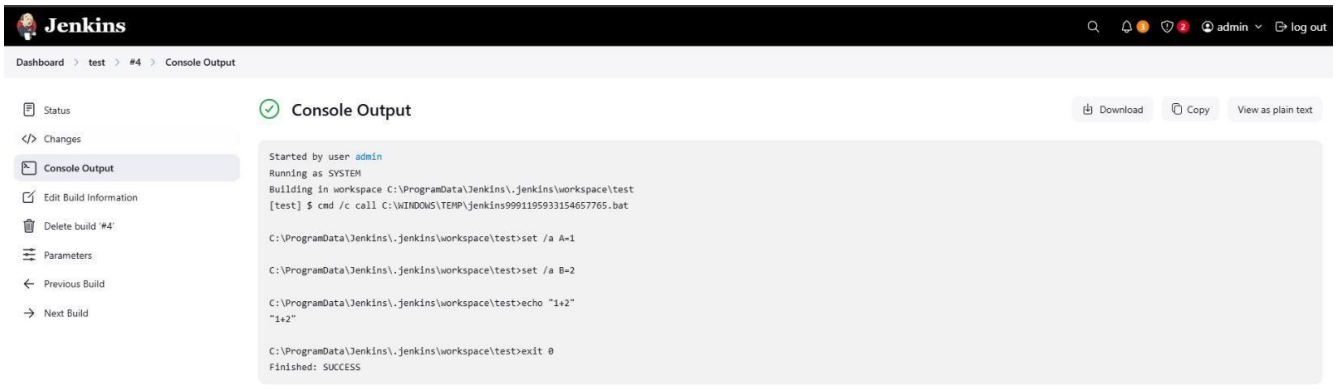


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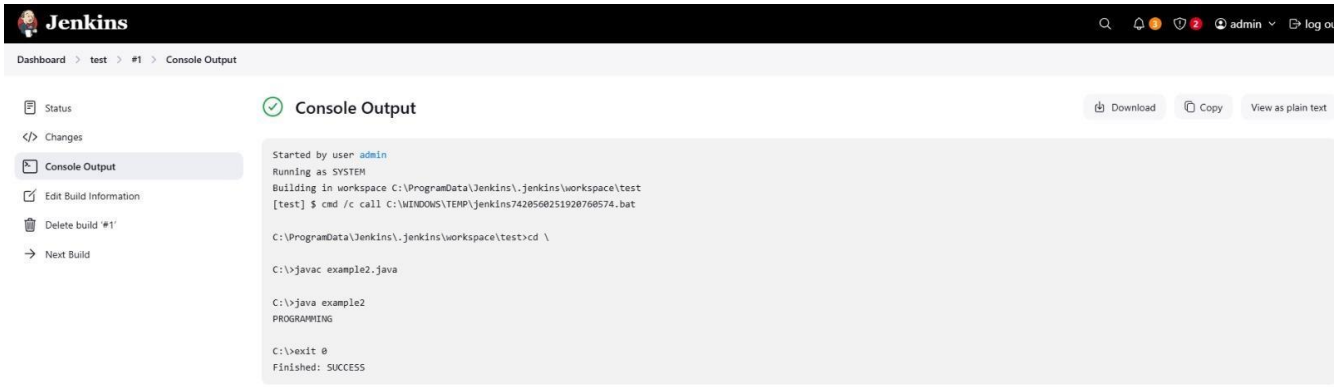


**<u>Conclusion</u>: Thus, we have successfully installed and configured Jenkins with Maven/Ant/Gradle to setup a build Job and learnt about the implementation of Jenkins in open source continuous integration.**