St. Francis Institute of Technology, Mumbai-400 103
Department Of Information Technology

A.Y. 2023-2024
Class: TE-ITA/B, Semester: V

Subject: **DevOps Lab**

Experiment – 4: To understand Continuous Integration, install and configure Jenkins with Maven/Ant/Gradle to setup a build Job.

1. **Aim:** To understand Continuous Integration, install and configure Jenkins with Maven
2. **Objectives:** Aim of this experiment is that, the students will be able
   - To Integrate and deploy tools like Jenkins and Maven, which is used to build applications in DevOps environment
3. **Outcomes:** After study of this experiment, the students will be able
   - To understand the importance of Jenkins to Build and deploy Software Applications on server environment.
   - Learn about Jenkins (With Architecture)
   - To have introduction to Maven / Gradle / Ant
4. **Prerequisite:** Knowledge of software engineering concept of integration
5. **Requirements:** Jenkins, JDK, python, ANT, Personal Computer, Windows operating system, browser, Internet Connection, Microsoft Word.
6. **Pre-Experiment Exercise:**
   Brief Theory: Refer shared material
7. **Laboratory Exercise**
   A. **Procedure:**
      a. **Answer the following:**
         - **What is Jenkins?**
           Jenkins is a self-contained, open source automation server which can be used to automate all sorts of tasks related to building, testing, and delivering or deploying software.

           Jenkins can be installed through native system packages, Docker, or even run standalone by any machine with a Java Runtime Environment (JRE) installed

         - **Why use Jenkins?**
           Jenkins is a highly extensible product whose functionality can be extended through the installation of plugins.
           There are a vast array of plugins available to Jenkins. However, the documentation covered in the Guided Tour, Tutorials, Solution pages and User Handbook of this documentation are based on a Jenkins installation with the Blue Ocean plugins installed, as well as the "suggested plugins", which are specified when running through the Post-installation setup wizard.

      b. **Execute following (Refer the shared material) and attach screenshots:**
         - Install Jenkins
         - Configure Jenkins with Maven and ANT
         - Build 4 basic projects in Jenkins
8. **Post-Experiments Exercise**
   A. **Extended Theory:**

Nil

B. Questions:

- What are the system requirements to install Jenkins?
- Give some important plugins in Jenkins.
- What is Maven and ANT?

C. Conclusion:

- Write what was performed in the experiment.
- Write the significance of the topic studied in the experiment.

D. References:

https://jenkins.io/doc/
https://www.cloudbees.com/jenkins/what-is-jenkins
https://vmokshagroup.com/blog/what-is-jenkins/

https://www.infoworld.com/article/3239666/what-is-jenkins-the-ci-server-explained.html
https://www.edureka.co/blog/interview-questions/jenkins-interview-questions/

St. Francis Institute of Technology, Mumbai-400 103
Department Of Information Technology

A.Y. 2023-2024
Class: TE-ITA/B, Semester: V

Subject: **DevOps Lab**

Experiment – 4: To understand Continuous Integration, install and configure Jenkins with Maven/Ant/Gradle to setup a build Job

List of screenshots to be included in this experiment

7b. Execute following (Refer the shared material) and attach screenshots:

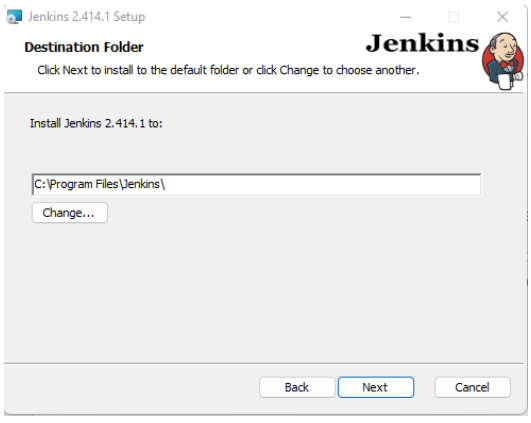
• Install Jenkins

1.

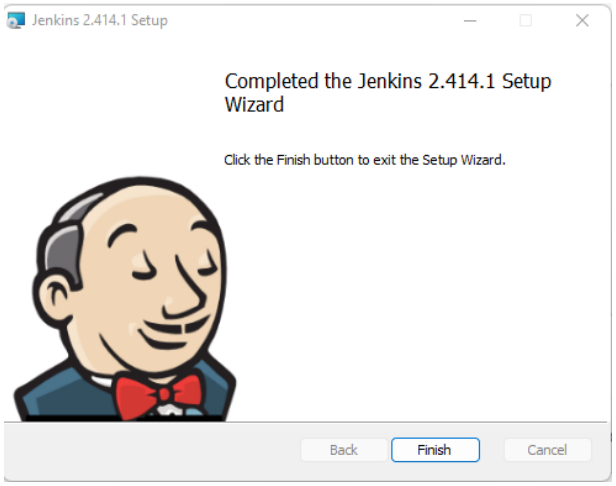
2.

3.

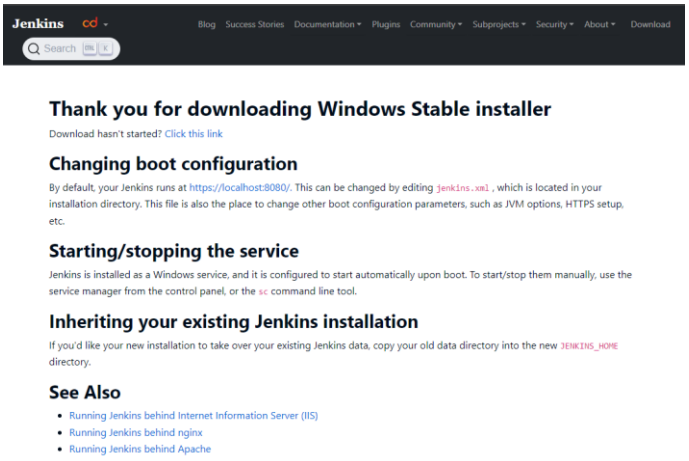
4.



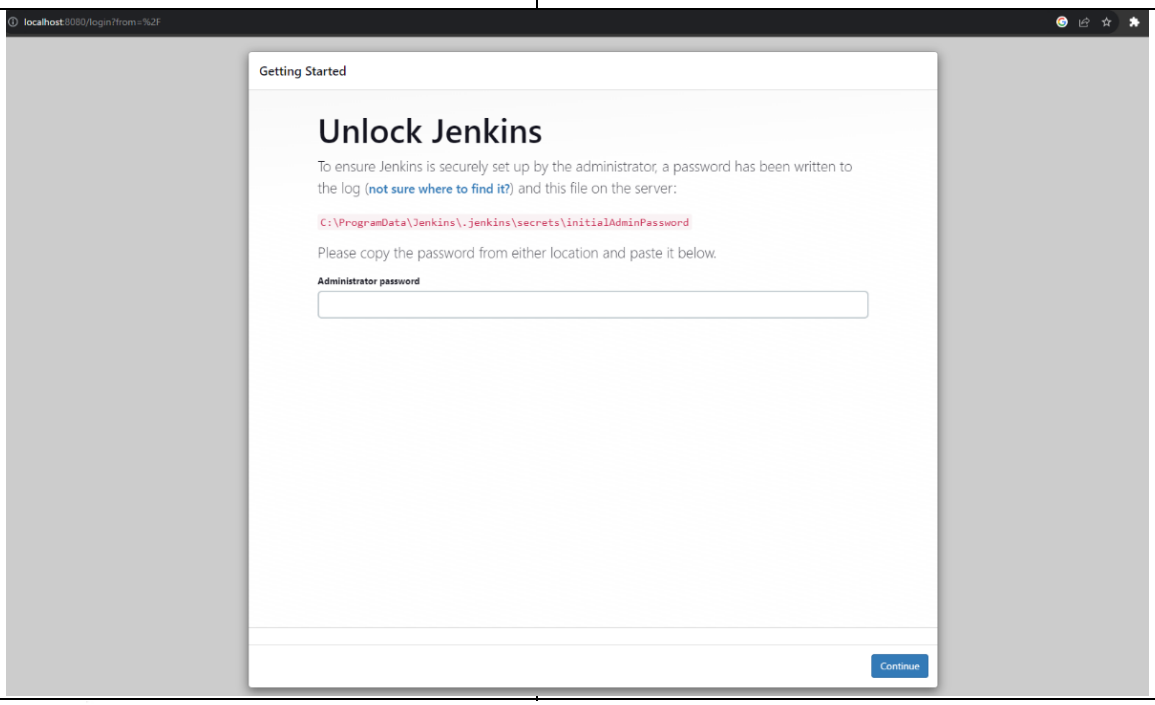
5.


Jenkins 2.414.1 Setup
Completed the Jenkins 2.414.1 Setup Wizard
Click the Finish button to exit the Setup Wizard.
Back
Finish
Cancel

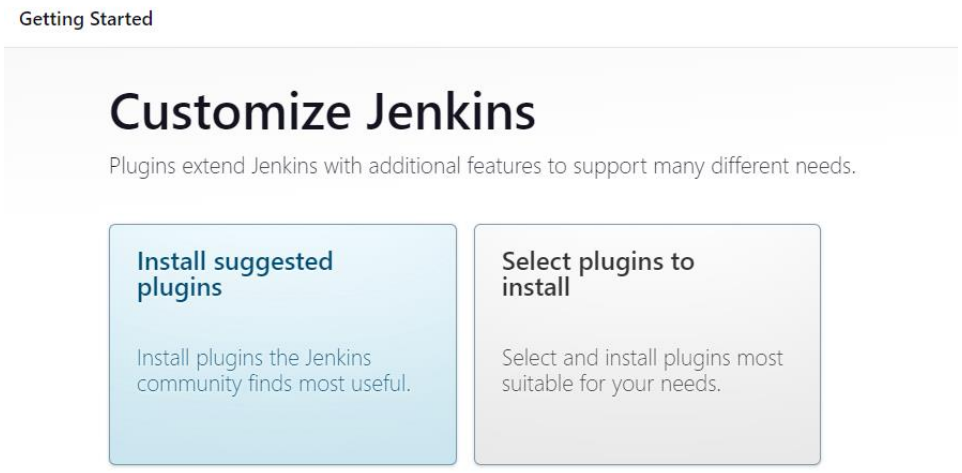
6.


Jenkins
Blog
Success Stories
Documentation
Plugins
Community
Subprojects
Security
About
Download
Search
Thank you for downloading Windows Stable installer
Download hasn't started? Click this link
Changing boot configuration
By default, your Jenkins runs at https://localhost:8080/. This can be changed by editing jenkins.xml, which is located in your installation directory. This file is also the place to change other boot configuration parameters, such as JVM options, HTTPS setup, etc.
Starting/stopping the service
Jenkins is installed as a Windows service, and it is configured to start automatically upon boot. To start/stop them manually, use the service manager from the control panel, or the sc command line tool.
Inheriting your existing Jenkins installation
If you'd like your new installation to take over your existing Jenkins data, copy your old data directory into the new JENKINS_HOME directory.
See Also
Running Jenkins behind Internet Information Server (IIS)
Running Jenkins behind nginx
Running Jenkins behind Apache

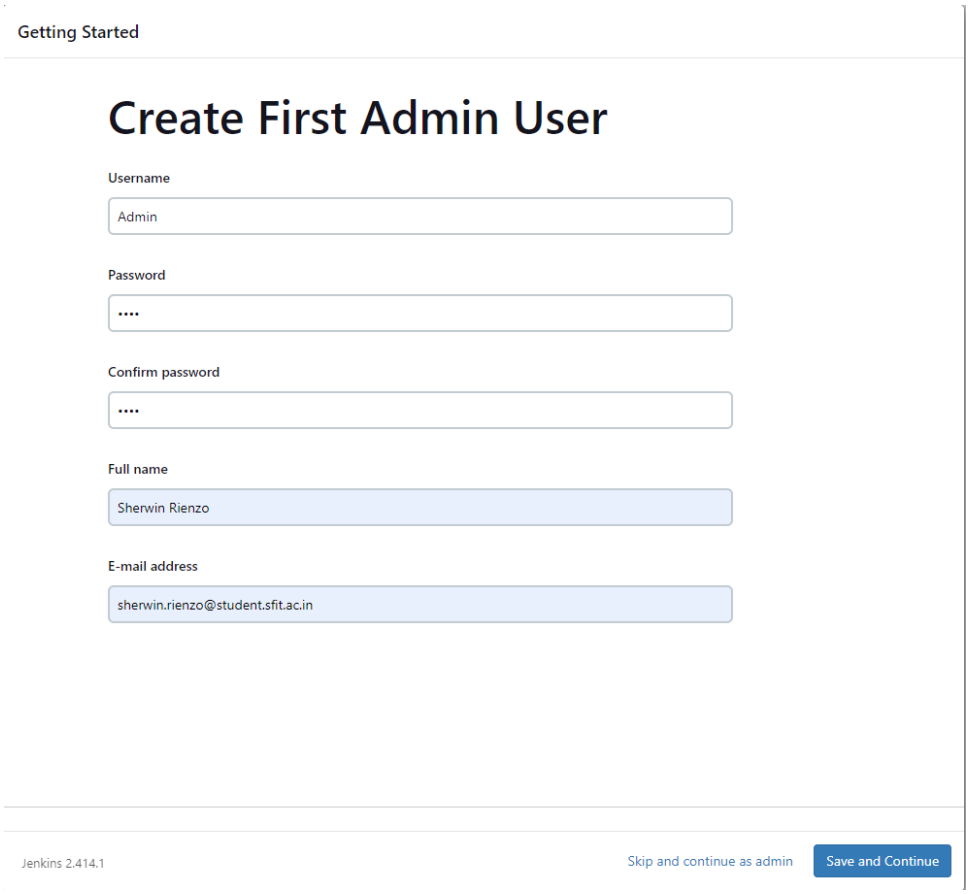
7.


localhost:8080/login?from=%2F
Getting Started
Unlock Jenkins
To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:
C:\ProgramData\Jenkins\.jenkins\secrets\initialAdminPassword
Please copy the password from either location and paste it below.
Administrator password
Continue

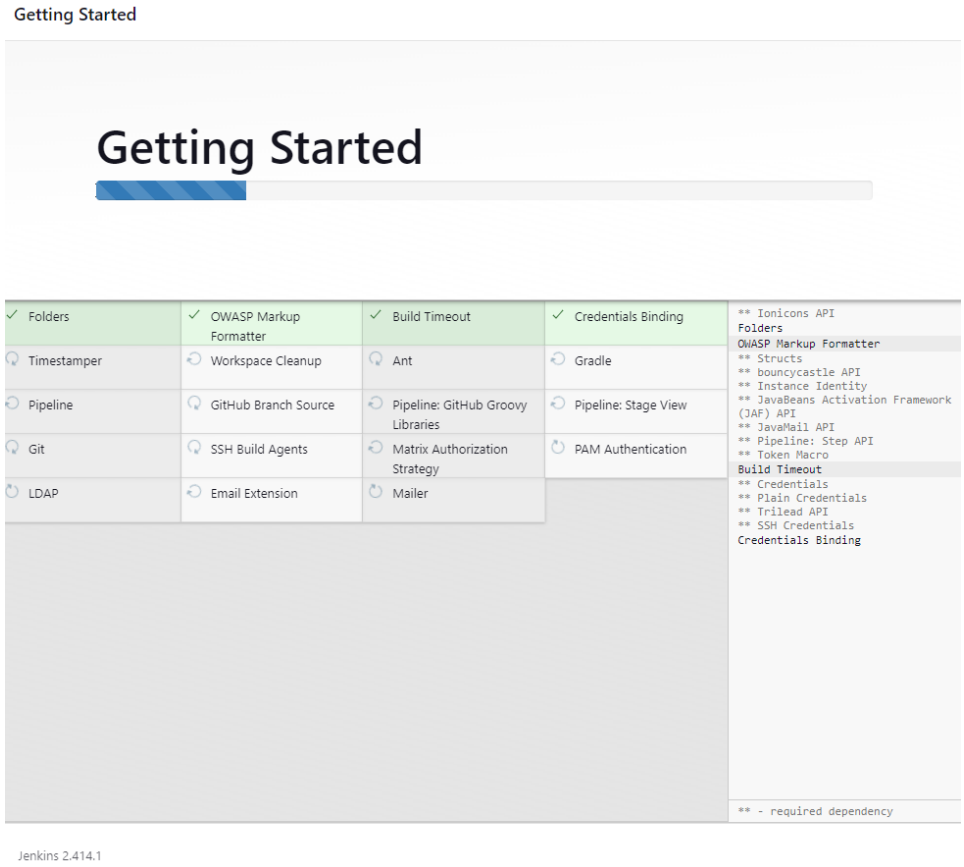
8.


Getting Started
Customize Jenkins
Plugins extend Jenkins with additional features to support many different needs.
Install suggested plugins
Install plugins the Jenkins community finds most useful.
Select plugins to install
Select and install plugins most suitable for your needs.

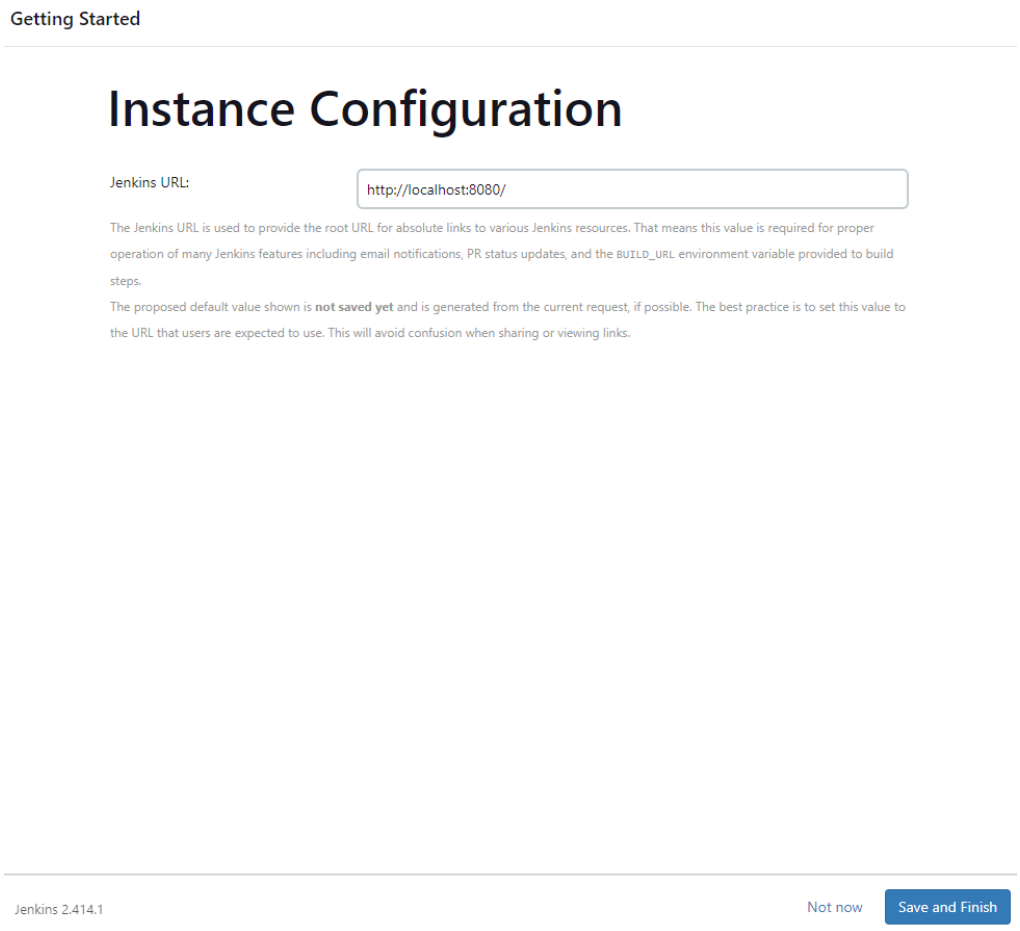
9.


Getting Started
Create First Admin User
Username
Admin
Password
Confirm password
Full name
Sherwin Rienzo
E-mail address
sherwin.rienzo@student.sfit.ac.in
Jenkins 2.414.1
Skip and continue as admin
Save and Continue

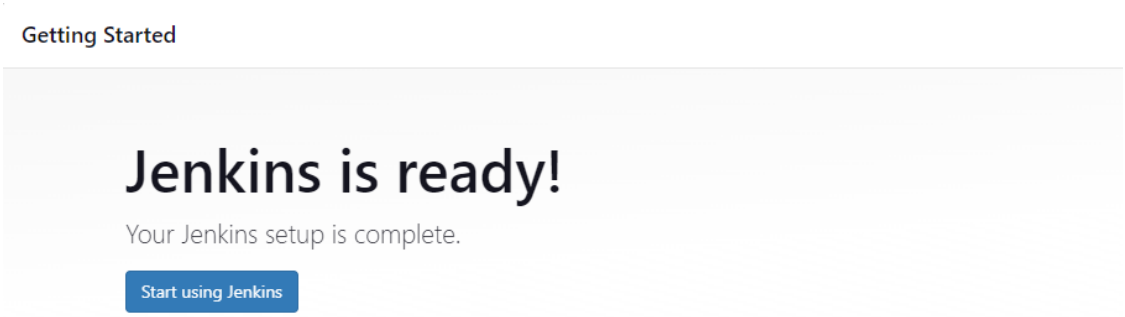
10.


Getting Started
Getting Started
Folders
OWASP Markup Formatter
Build Timeout
Credentials Binding
Timestamper
Workspace Cleanup
Ant
Gradle
Pipeline
GitHub Branch Source
Pipeline: GitHub Groovy Libraries
Pipeline: Stage View
Git
SSH Build Agents
Matrix Authorization Strategy
PAM Authentication
LDAP
Email Extension
Mailer
** Ionicons API
Folders
OWASP Markup Formatter
** Structs
** bouncycastle API
** Instance Identity
** JavaBeans Activation Framework (JAF) API
** JavaMail API
** Pipeline: Step API
** Token Macro
Build Timeout
** Credentials
** Plain Credentials
** Trilead API
** SSH Credentials
Credentials Binding
** - required dependency
Jenkins 2.414.1

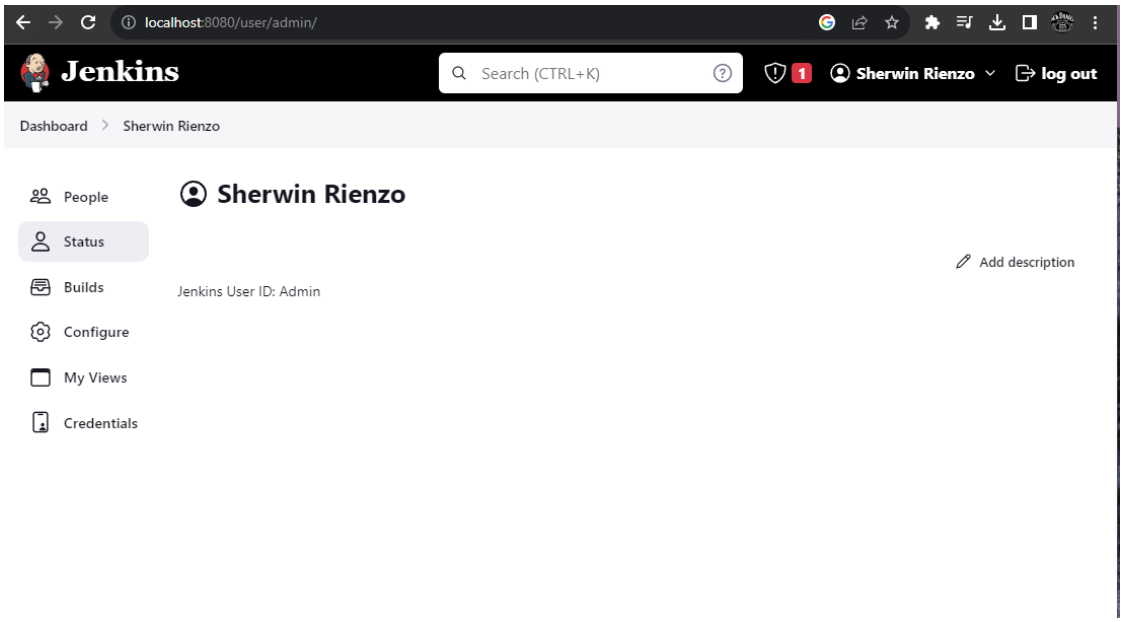
11.


Getting Started
Instance Configuration
Jenkins URL:
http://localhost:8080/
The Jenkins URL is used to provide the root URL for absolute links to various Jenkins resources. That means this value is required for proper operation of many Jenkins features including email notifications, PR status updates, and the BUILD_URL environment variable provided to build steps.
The proposed default value shown is not saved yet and is generated from the current request, if possible. The best practice is to set this value to the URL that users are expected to use. This will avoid confusion when sharing or viewing links.
Jenkins 2.414.1
Not now
Save and Finish

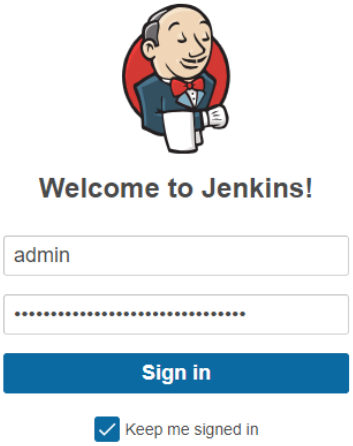
12.

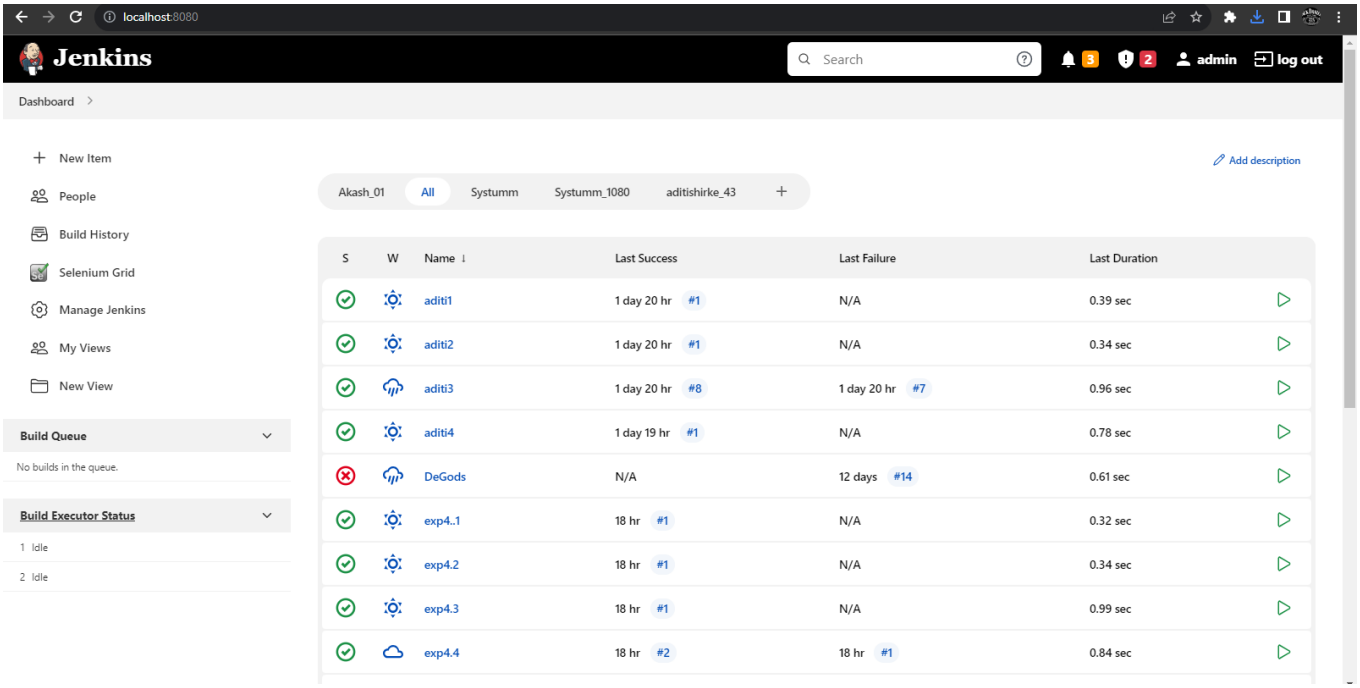

Getting Started
Jenkins is ready!
Your Jenkins setup is complete.
Start using Jenkins

13.



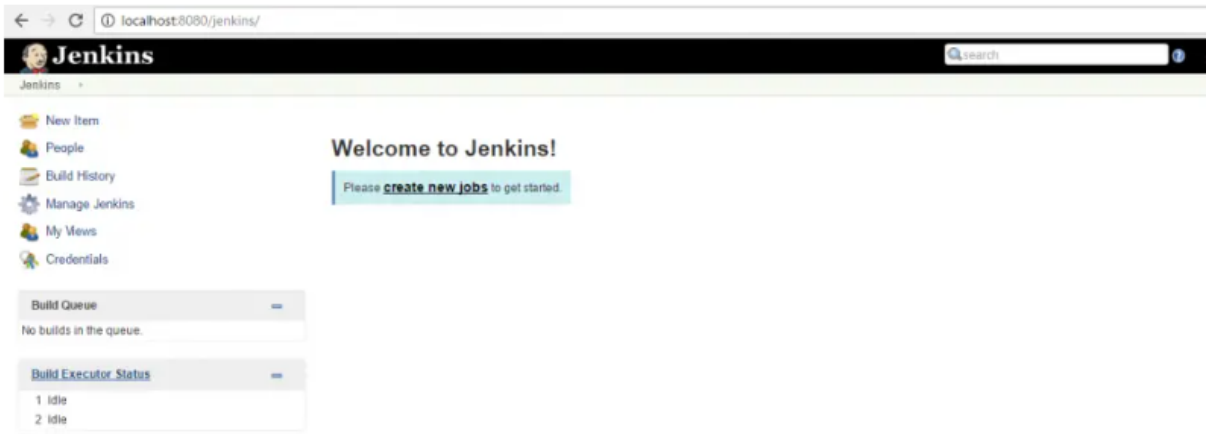
• Configure Jenkins with Maven/Ant/Gradle – Global tool configuration, manage plugins





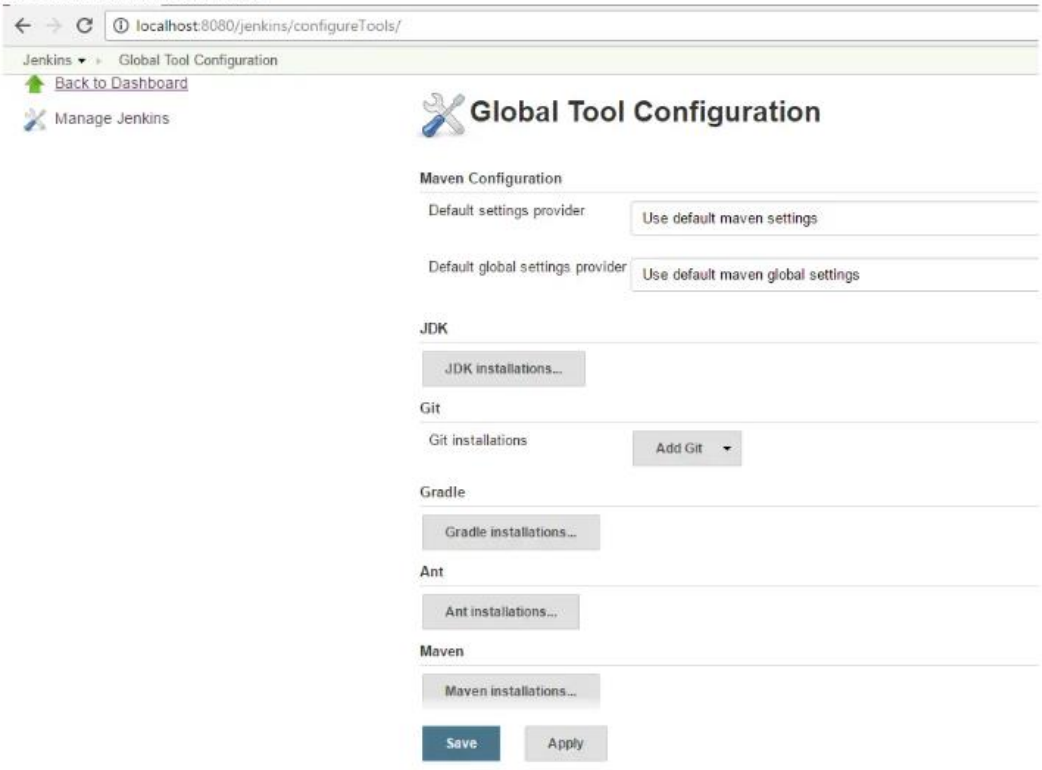
Jenkins Configuration Setup

Login on Jenkins as **"admin"** user and you will get the following home page



Click on "**Manage Jenkins => Global Tools Configurations**" where we will configure java, ant, maven and gradle with Jenkins

By Default, Jenkins has following



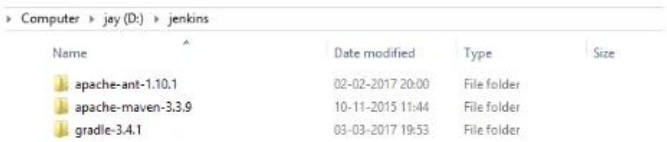
Configure Java:

Configure Java:

- Click on JDK Installation
- By Default, **"Install Automatically"** is checked and you can install from java.sun.com. but we will avoid downloading as most of the systems are Java enabled.

- Uncheck **"Install automatically" and** provide the JDK Name and JDK Path in JAVA_HOME as shown in below

Download the ANT, Maven and Gradle bin folders to local folder like shown below

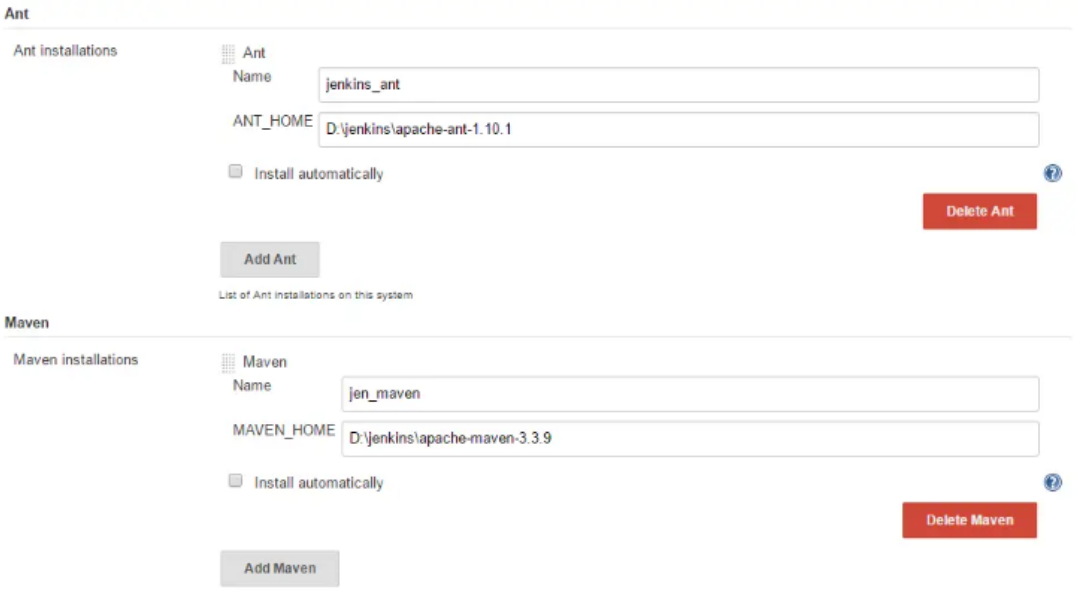


Configure Gradle

- click on Gradle Installation
- Uncheck **"Install Automatically"** and provide the GRADLE_HOME to to Gradle folder as shown in below

. Configure Maven and Ant

- click on Maven and ANT Installation
- Uncheck **"Install Automatically"** and set the MVN_HOME and ANT_HOME like shown below:

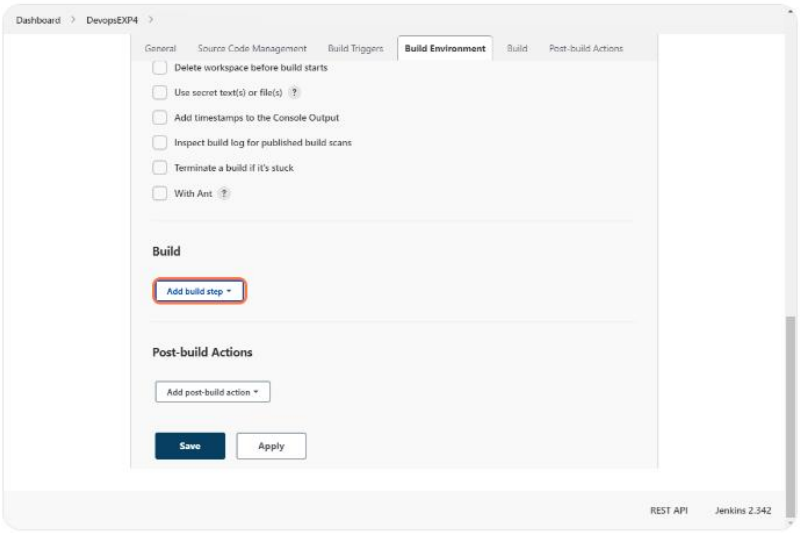


Click on Apply and Save. Now Jenkins is configured with Java, Gradle,ANT and Maven

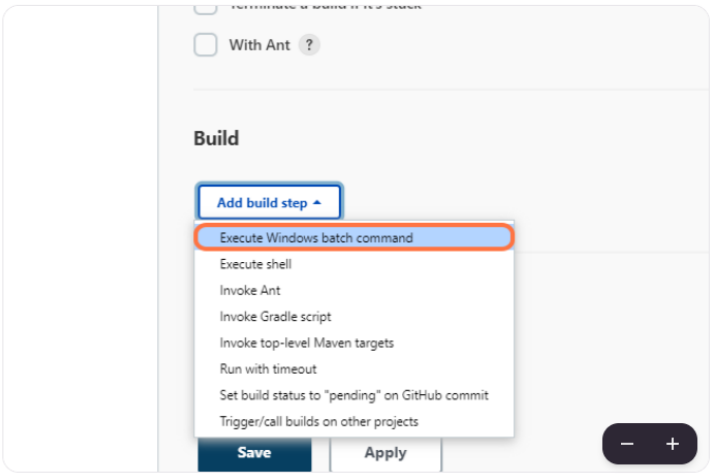
• Build jobs in Jenkins

1. Freestyle project (Simple Windows batch command) – echo

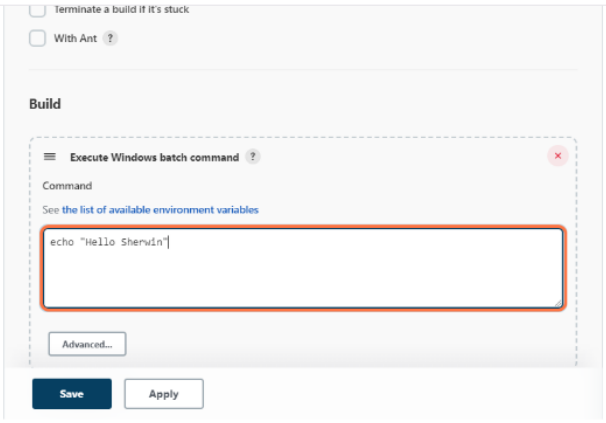
1 Click on Add build step



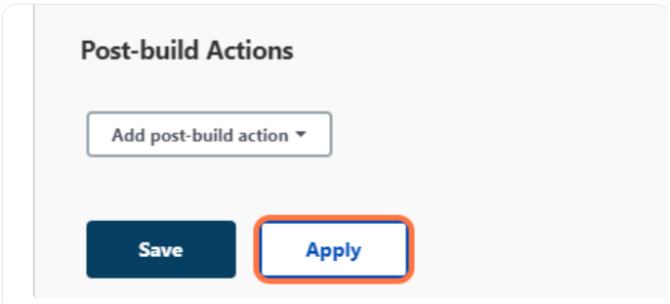
2 Click on Execute Windows batch command



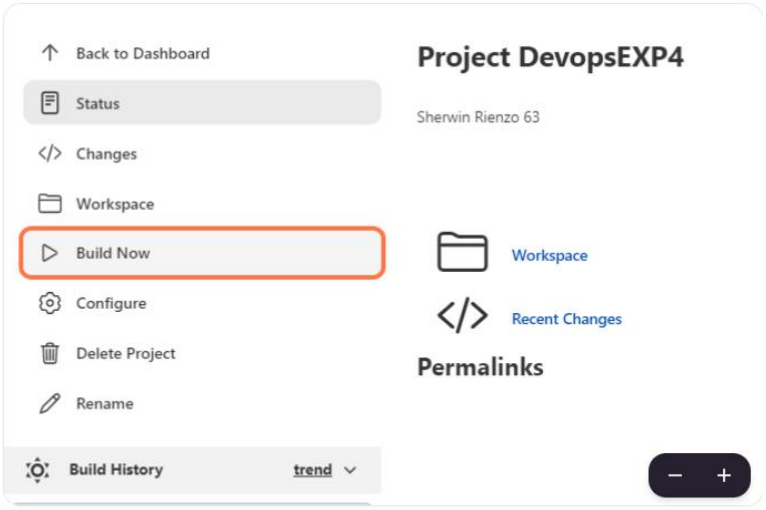
3 Click on command



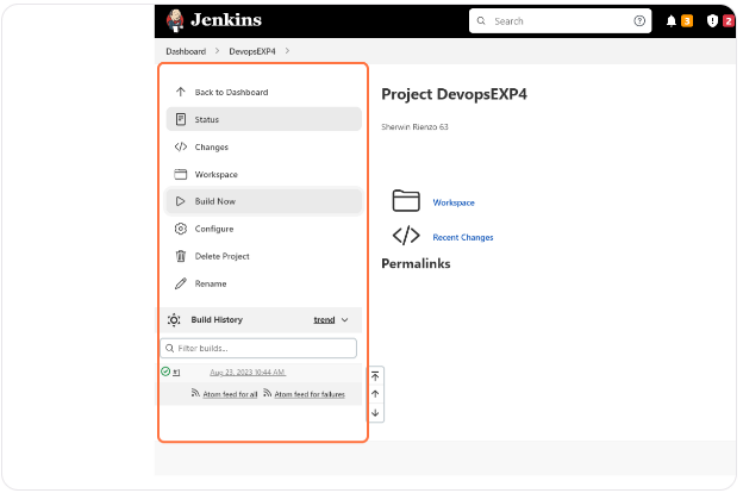
4 Click on Apply



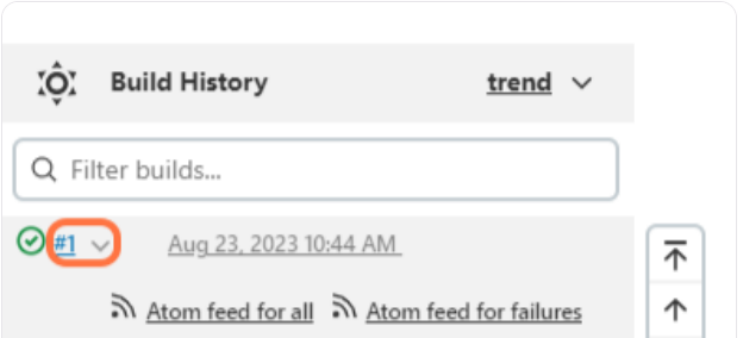
5 Click on Build Now



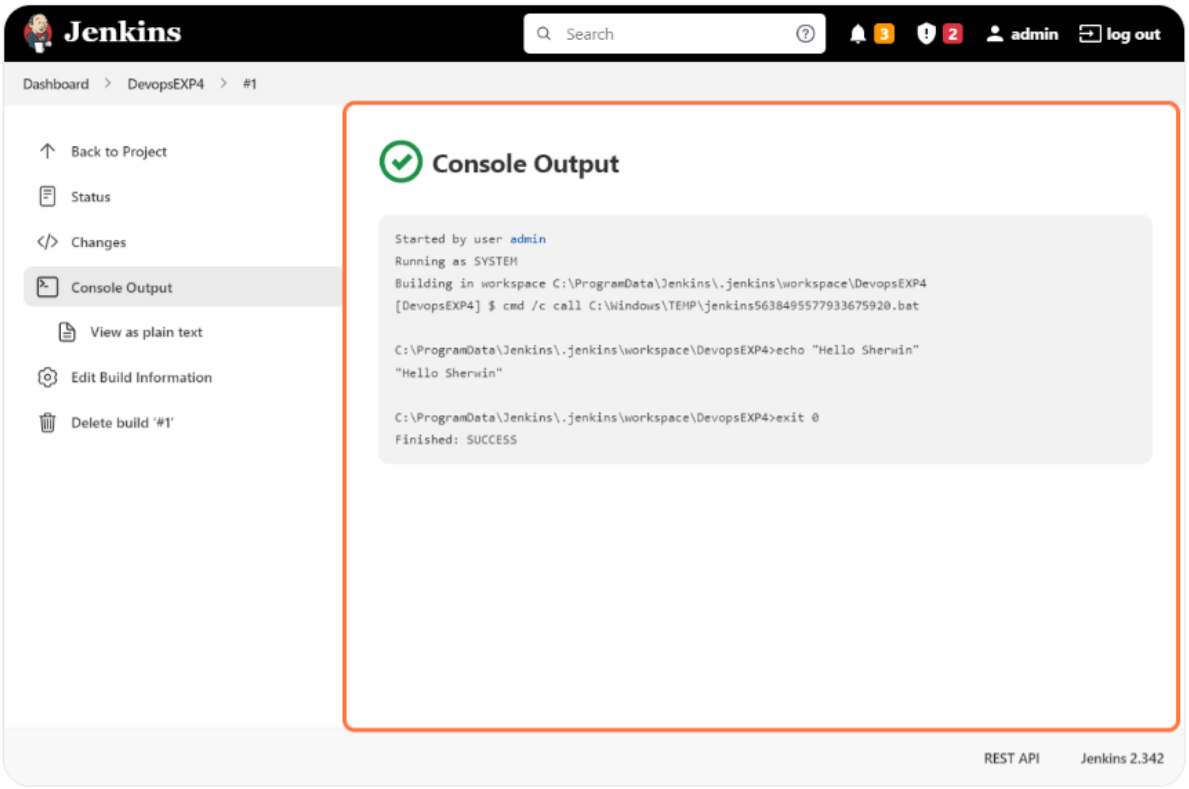
6 Click on Back to Dashboard...



7 Click on #1

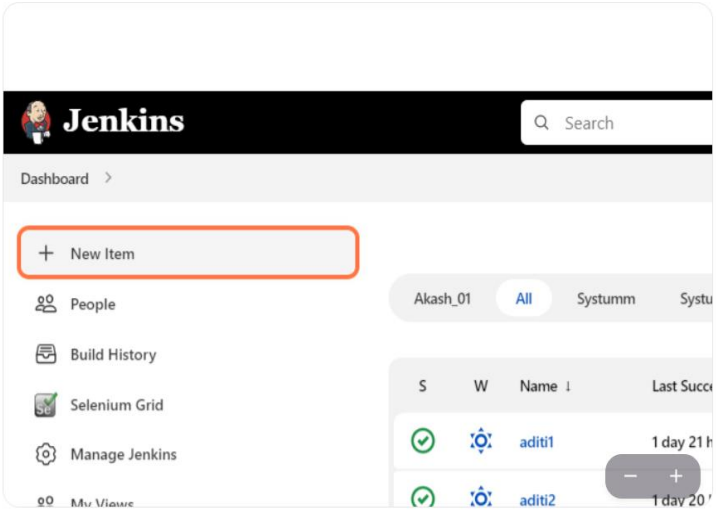


8 Click on Console Output...

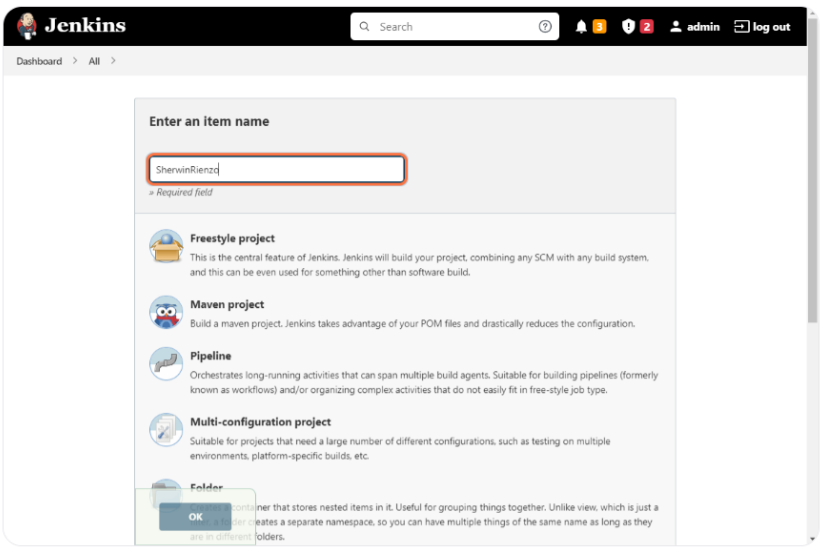


2. Freestyle parameterized project (Windows batch command) string, Boolean and choice parameters with echo

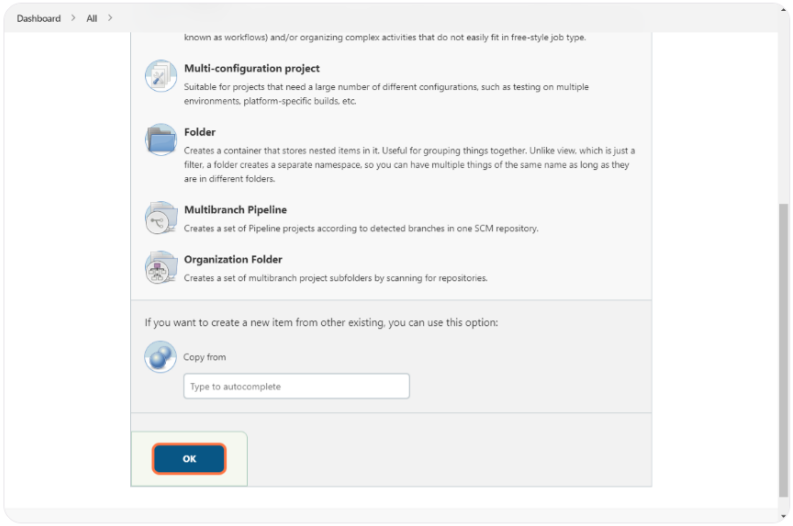
9 Click on New Item



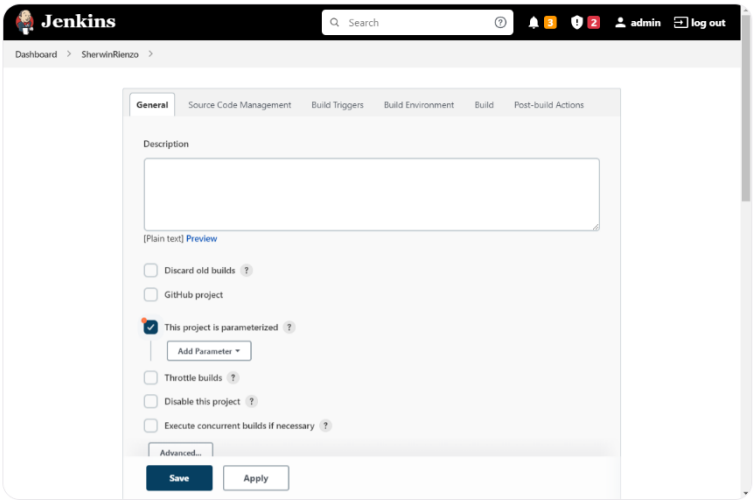
10 Type "SherwinRienzo"



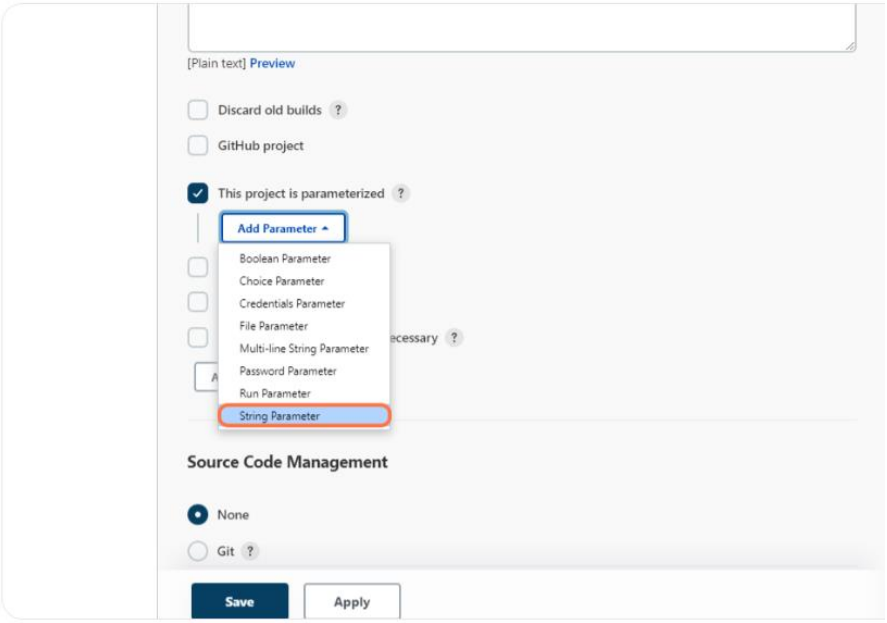
12 Click on OK

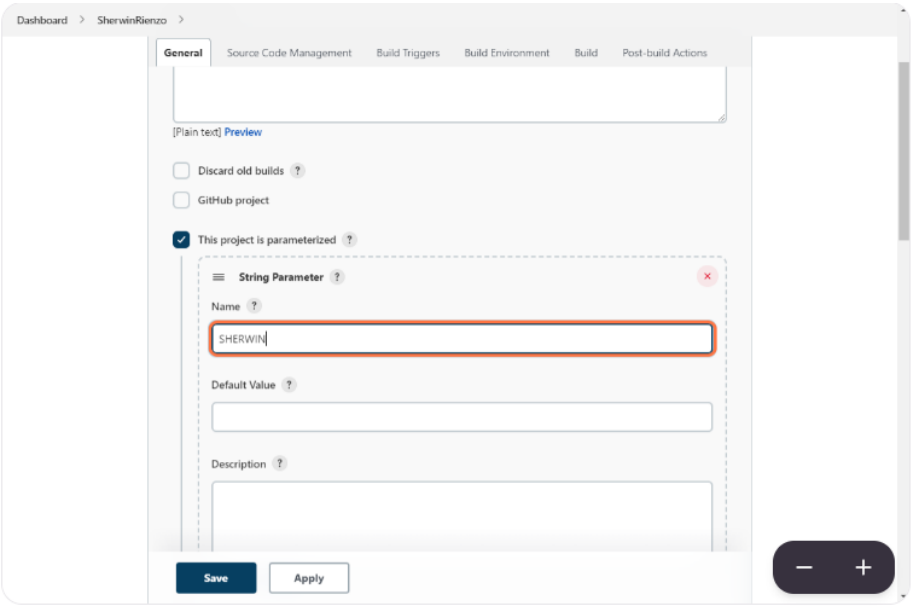


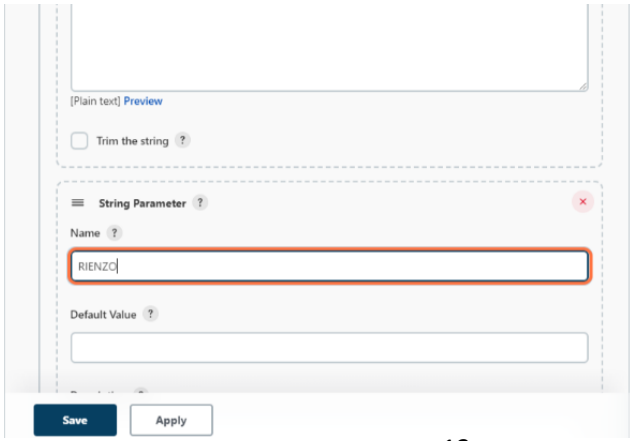
13 Check specified



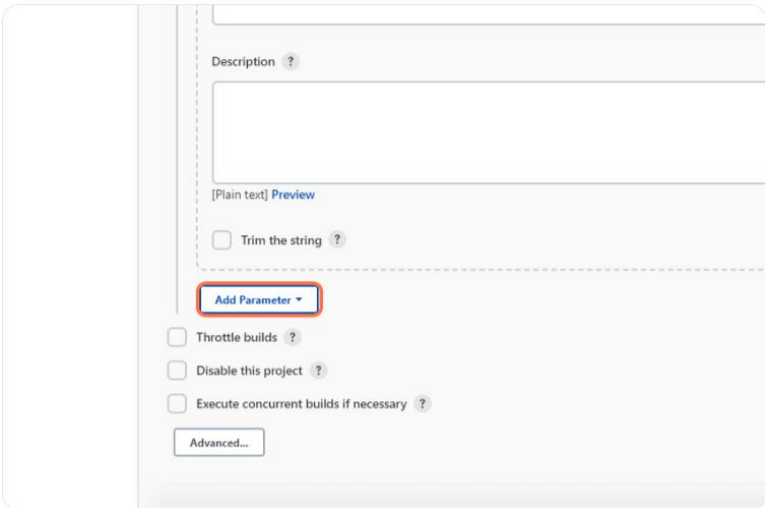
15 Click on String Parameter one for NAME and another string parameter for SURNAME



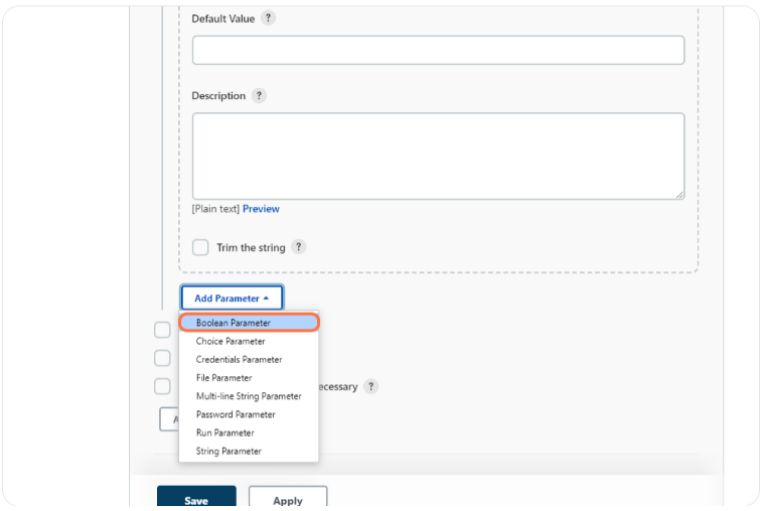




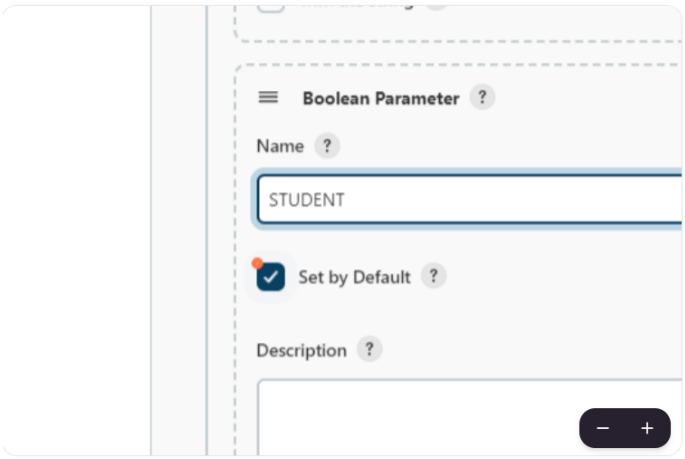
20 Click on Add Parameter



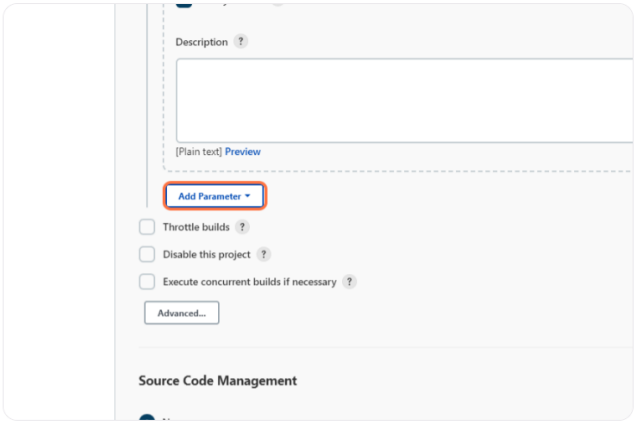
21 Click on Boolean Parameter



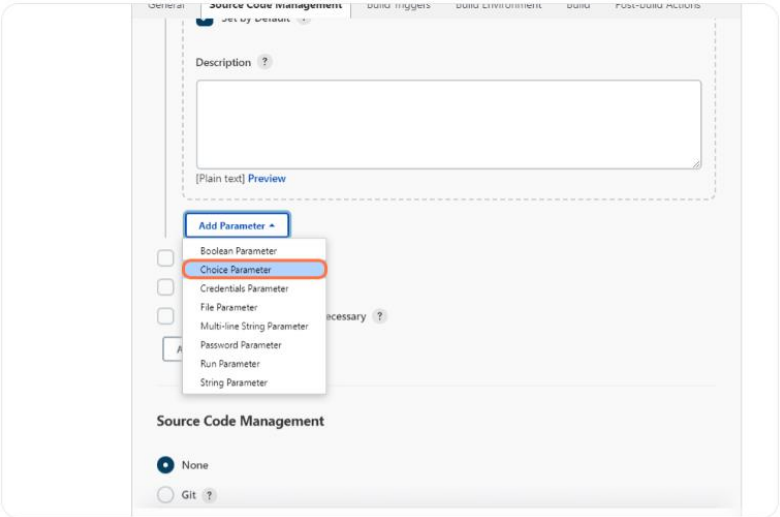
23 Check parameter.defaultValue



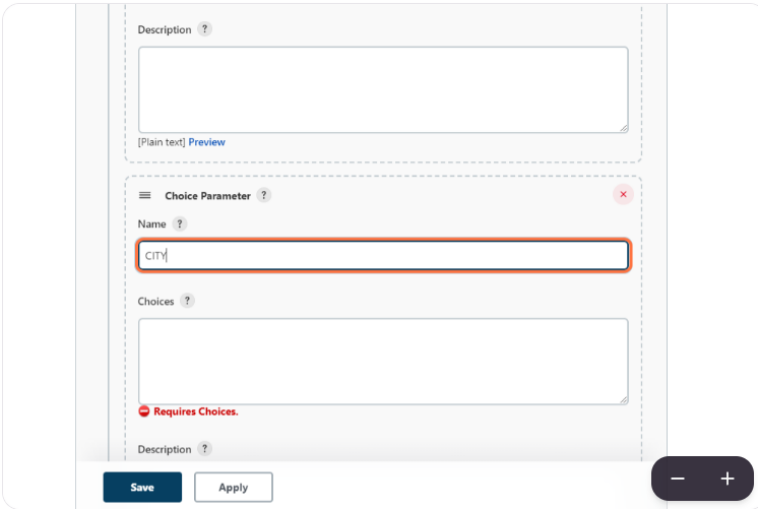
24 Click on Add Parameter



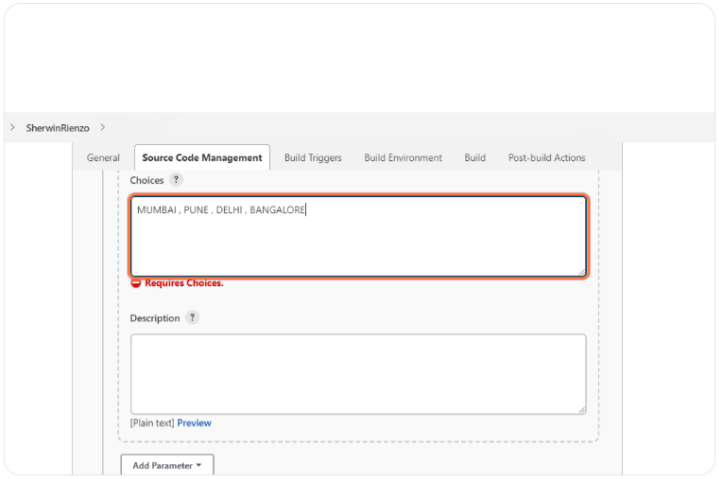
25 Click on Choice Parameter



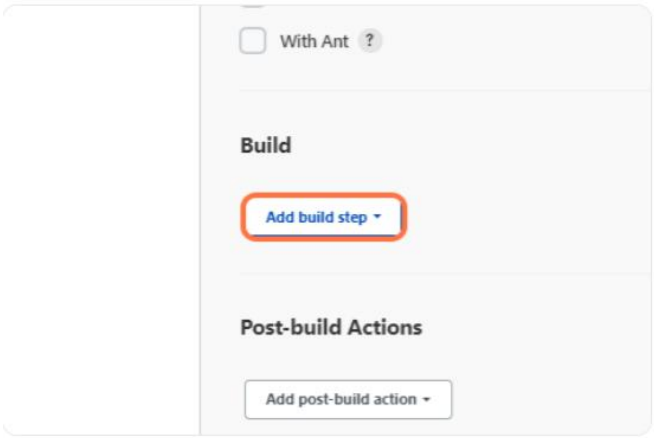
26 Type "CITY"



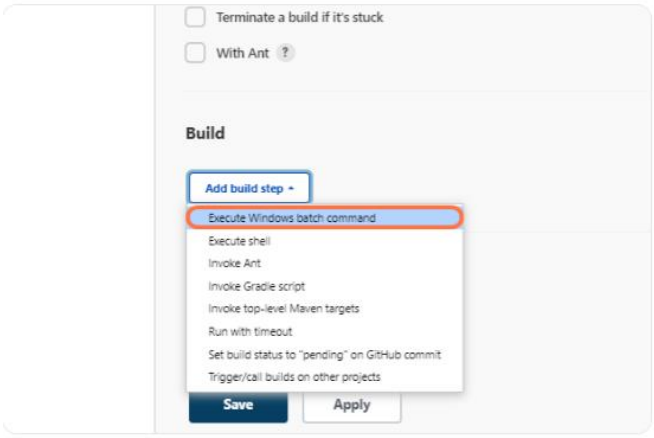
28 Type "MUMBAI , PUNE , DELHI , BANGALORE"



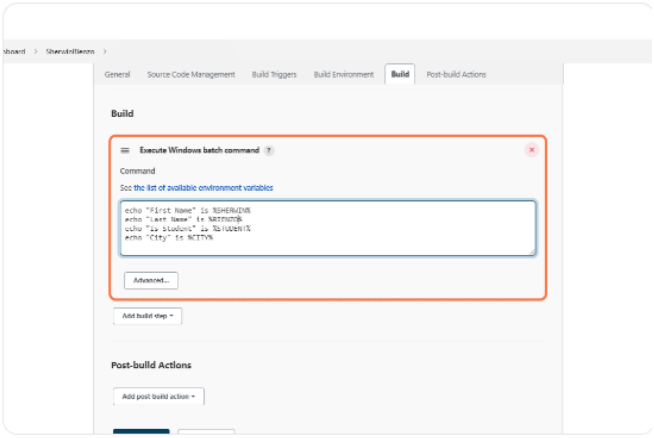
29 Click on Add build step



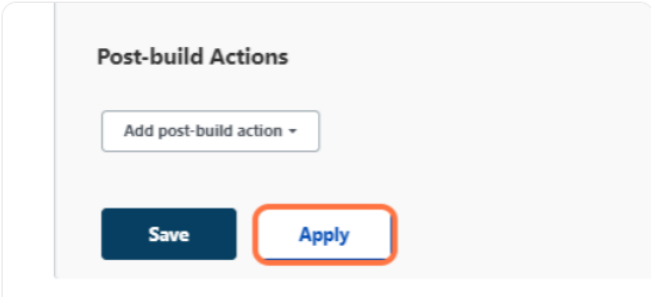
30 Click on Execute Windows batch command



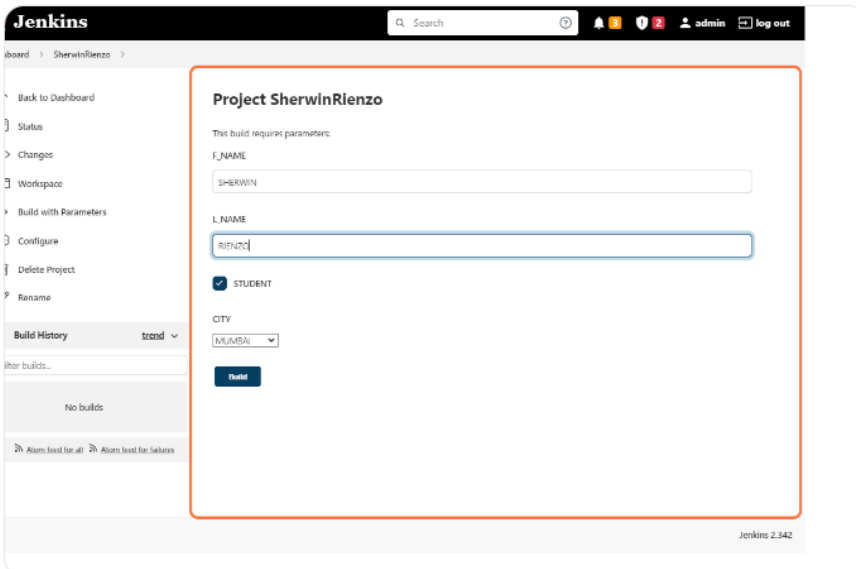
32 Click on Execute Windows batch command...



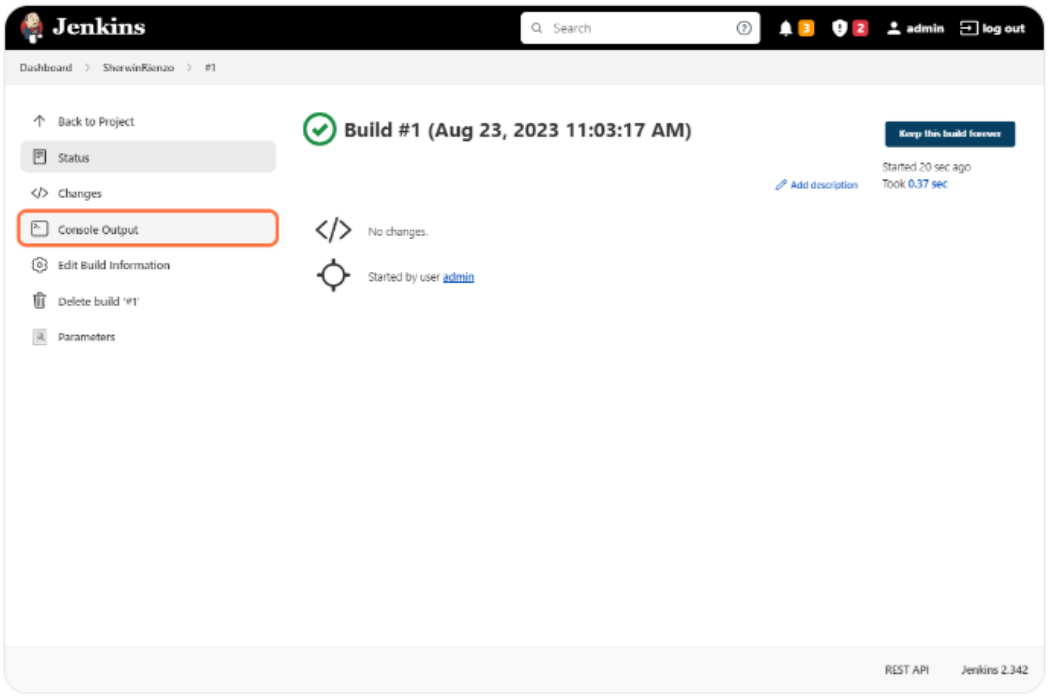
33 Click on Apply



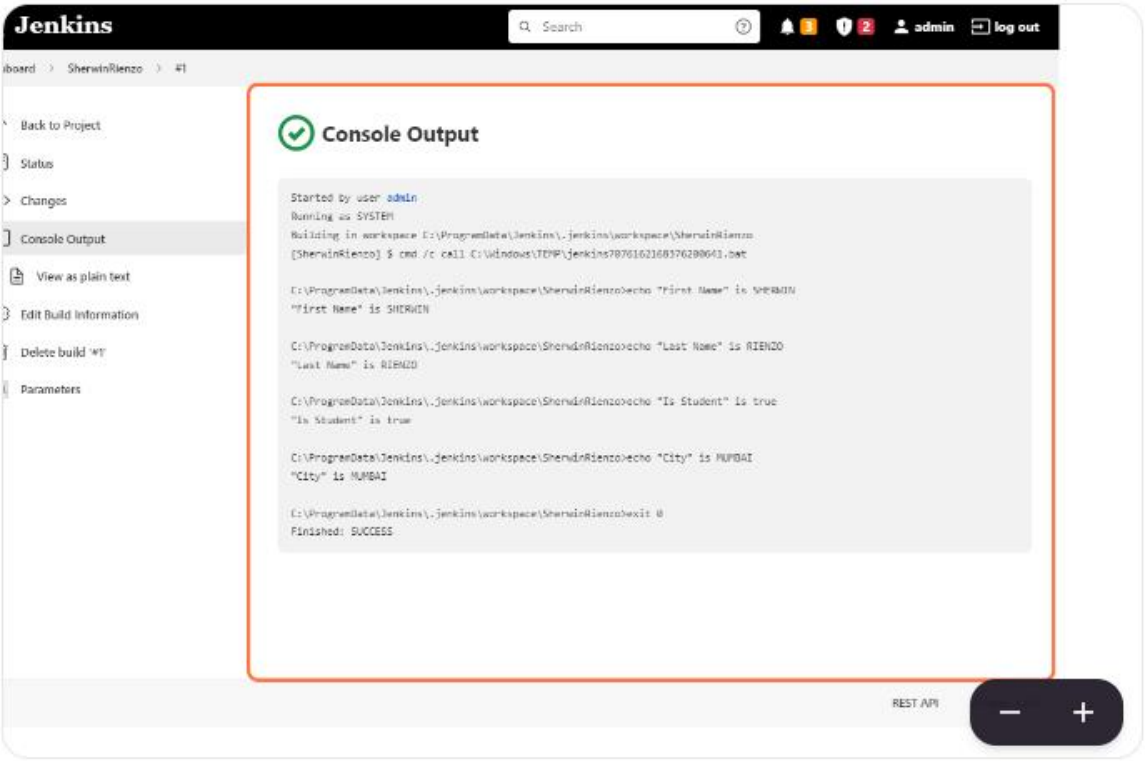
36 Click on Project SherwinRienzo...



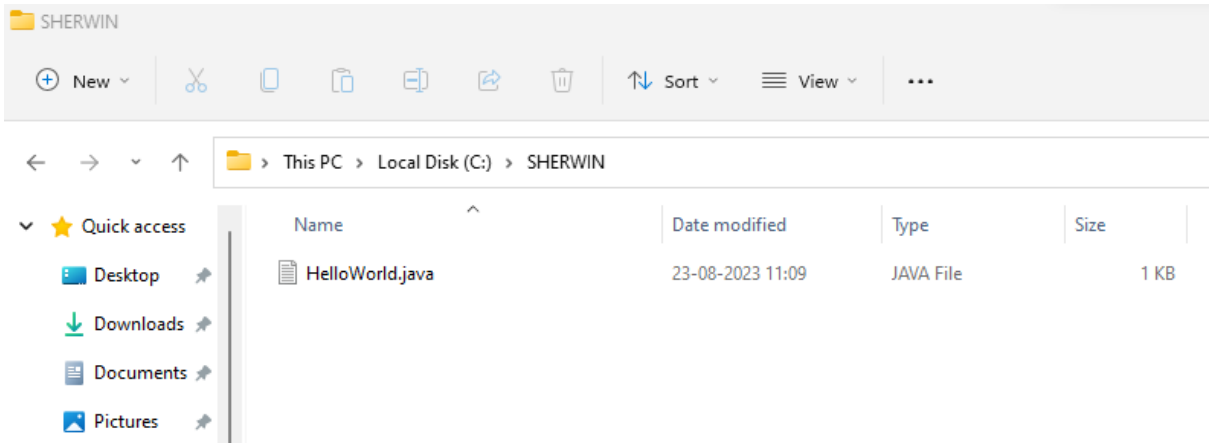
38 Click on Console Output



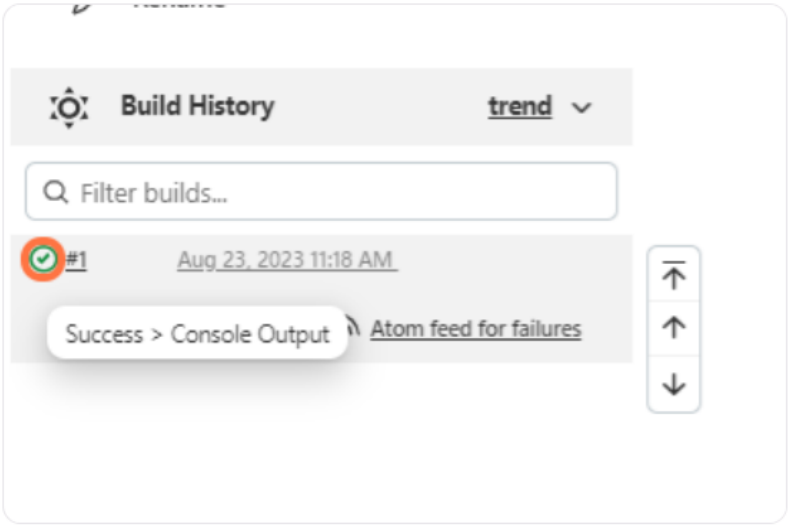
39 Click on Console Output...



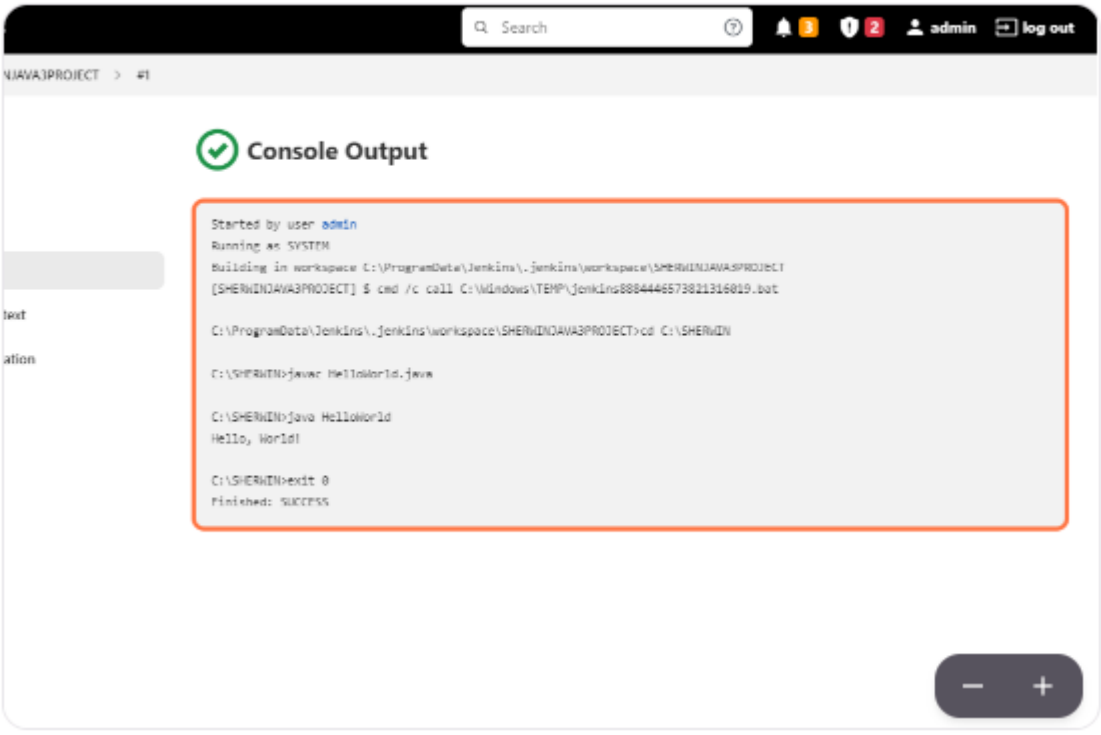
3. Java freestyle project -Hello world



1 Click on highlight

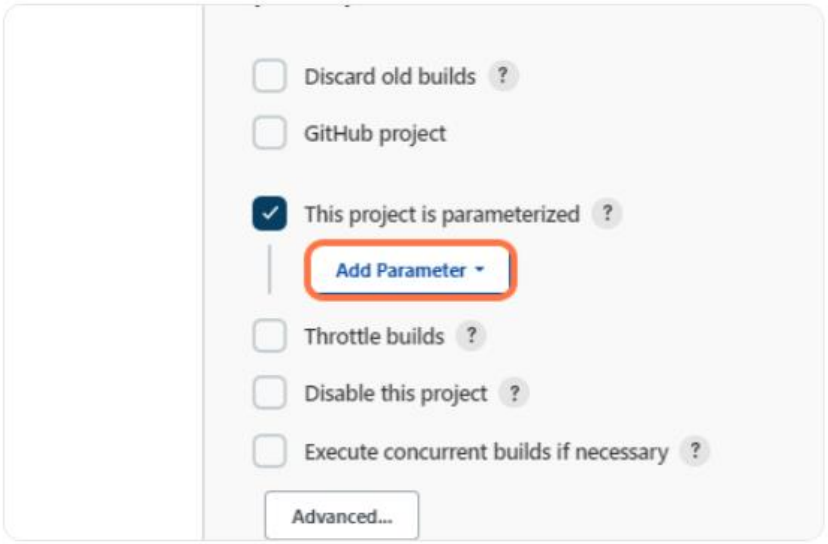


2 Click on Started by user admin...

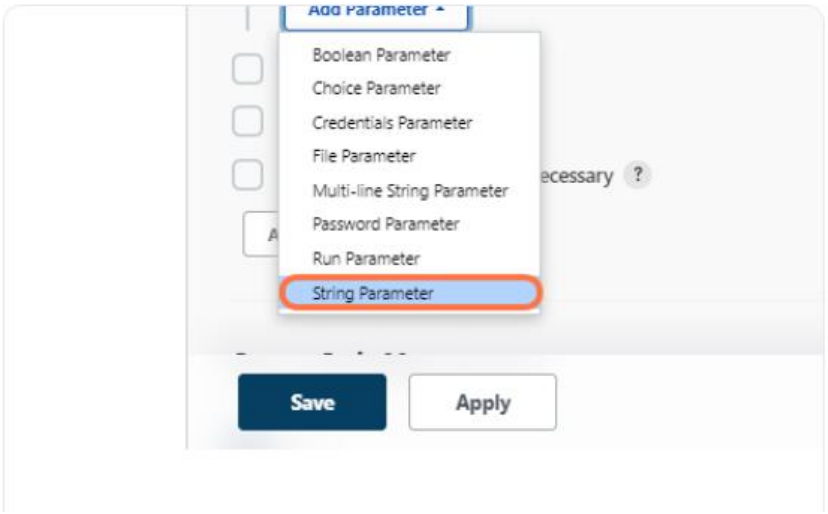


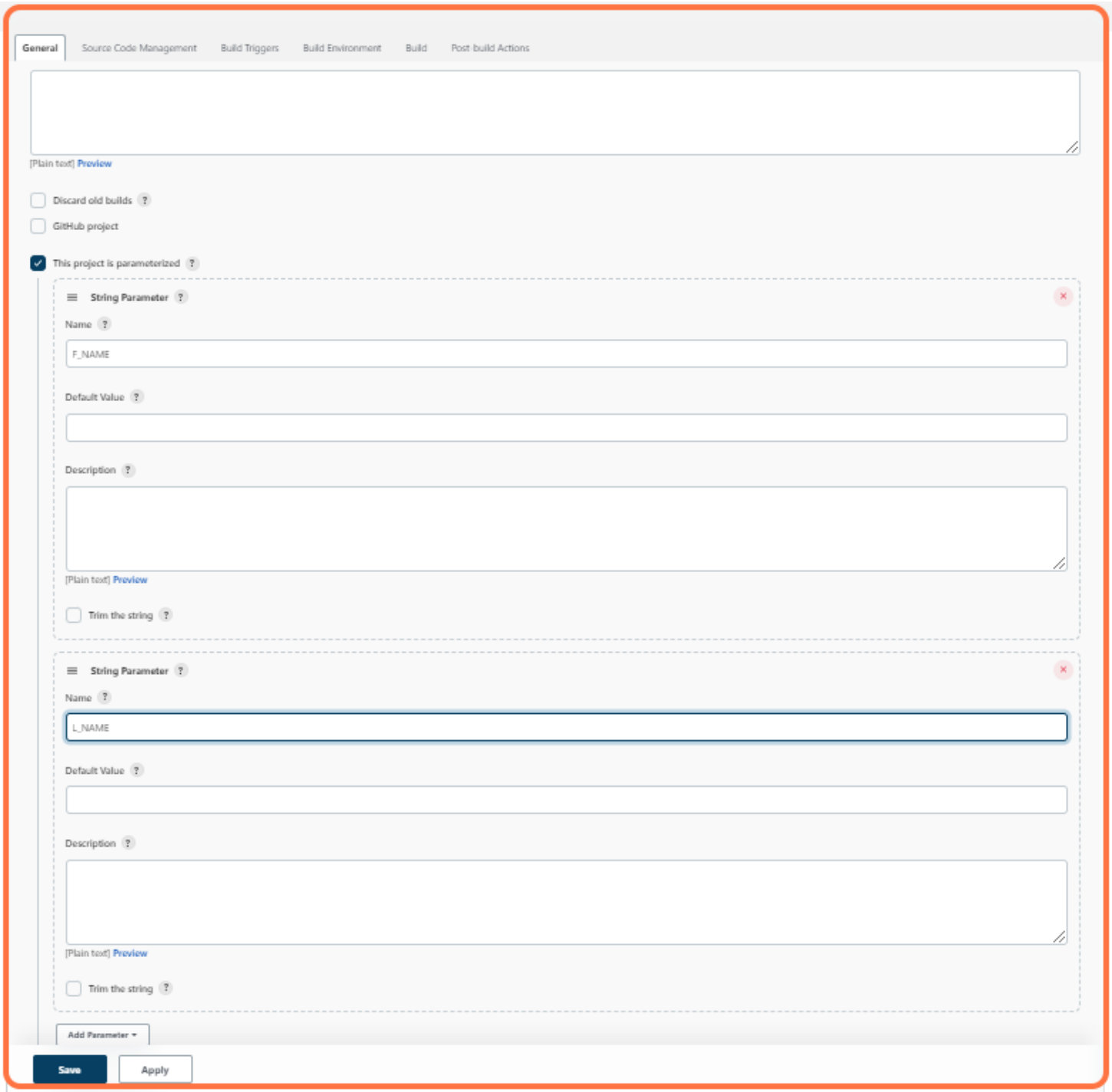
Managing Parameters and Running Windows Batch Commands in Project

1 Click on Add Parameter

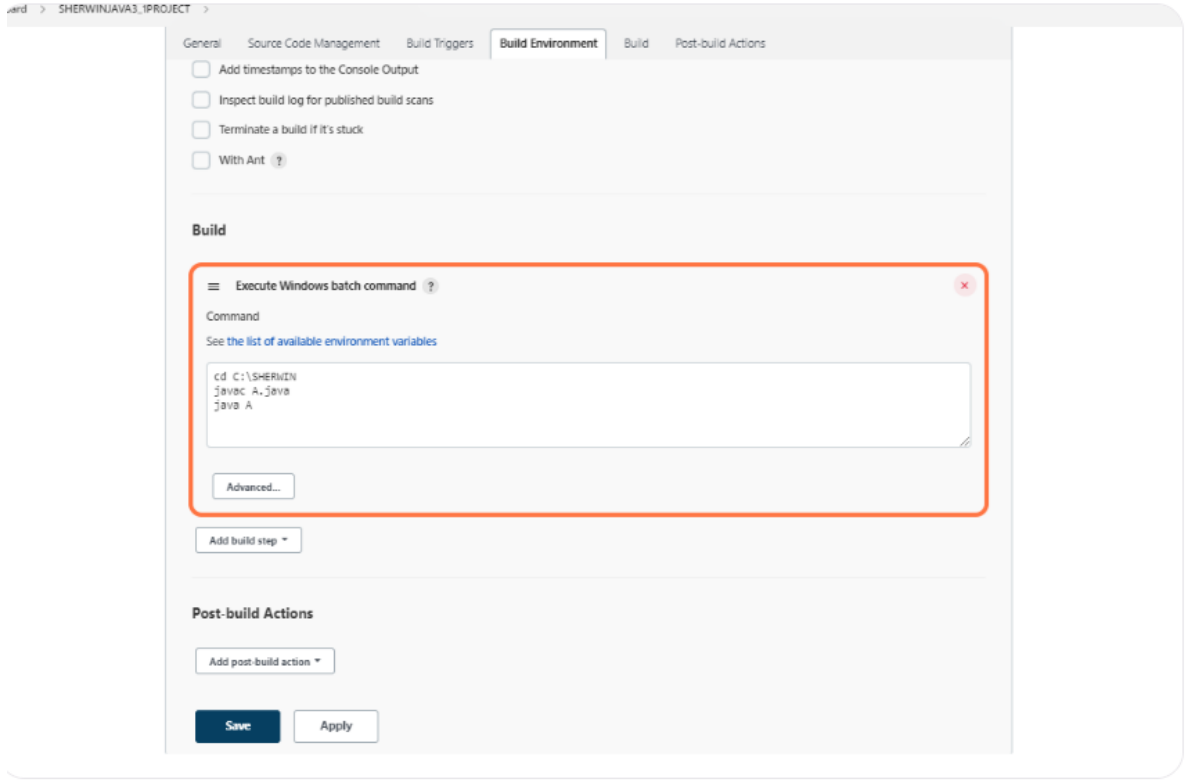


2 Click on String Parameter

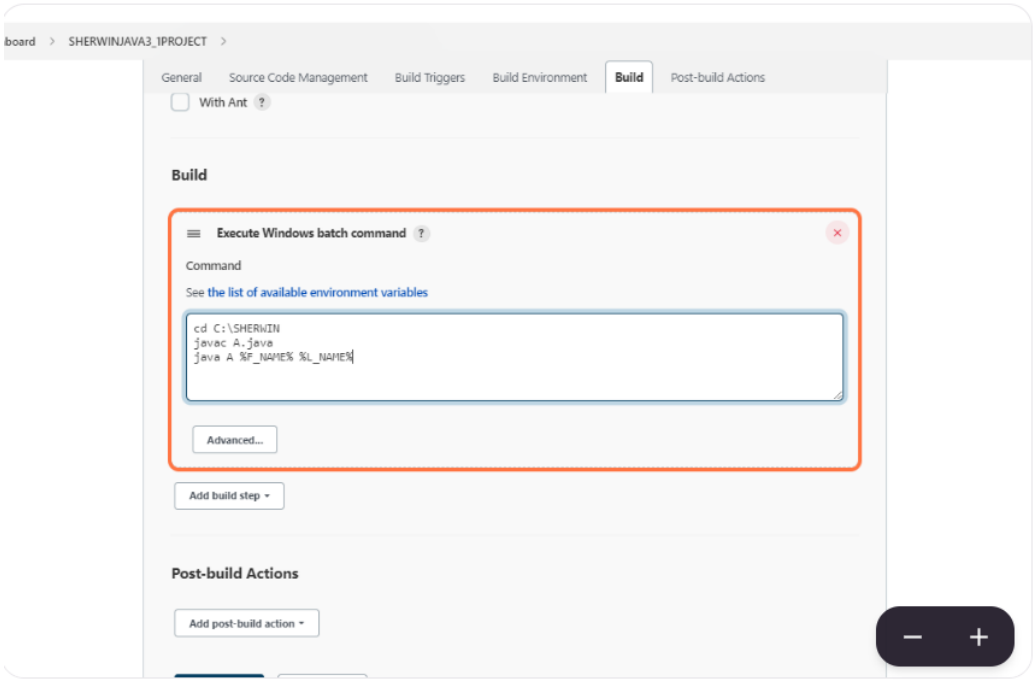



General
Source Code Management
Build Triggers
Build Environment
Build
Post build Actions
[Plain text] Preview
Discard old builds
GitHub project
This project is parameterized
String Parameter
Name
F_NAME
Default Value
Description
[Plain text] Preview
Trim the string
String Parameter
Name
L_NAME
Default Value
Description
[Plain text] Preview
Trim the string
Add Parameter
Save
Apply

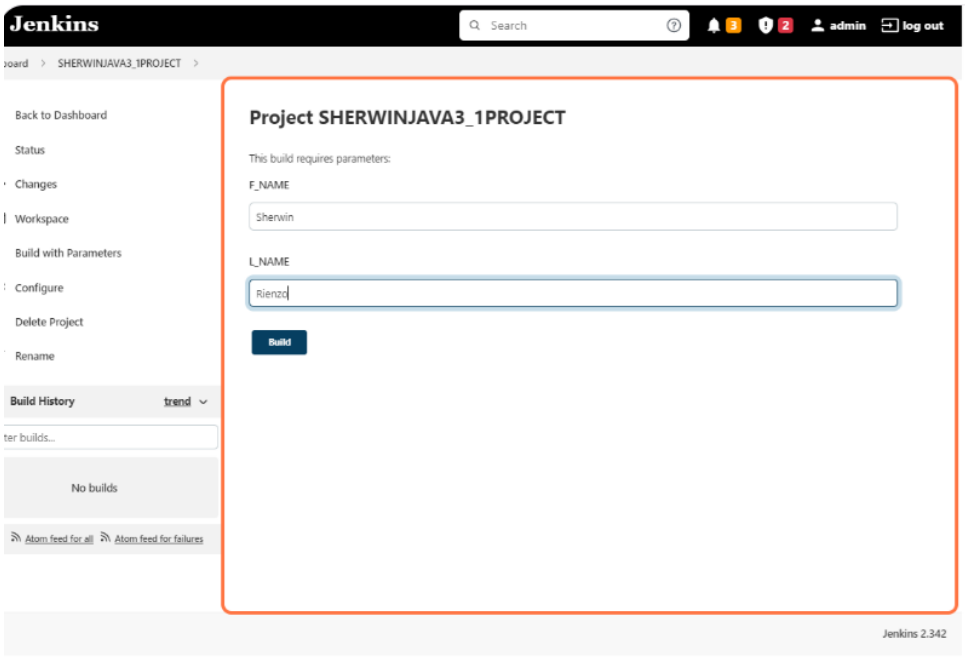
5 Click on Execute Windows batch command...



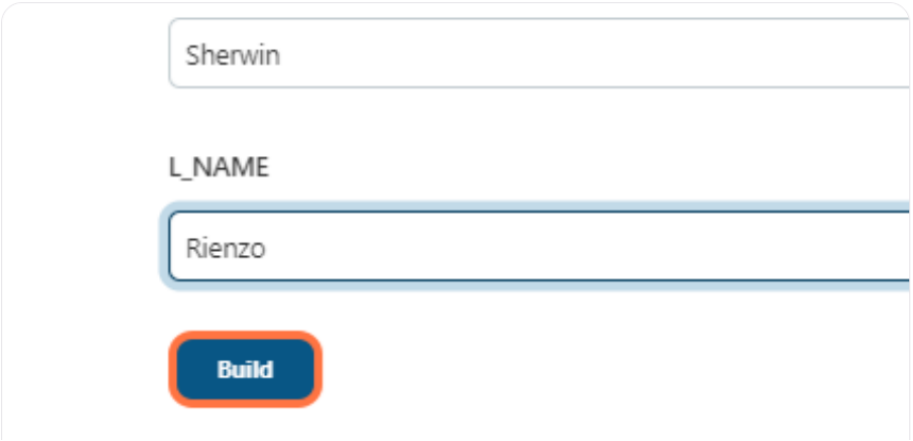
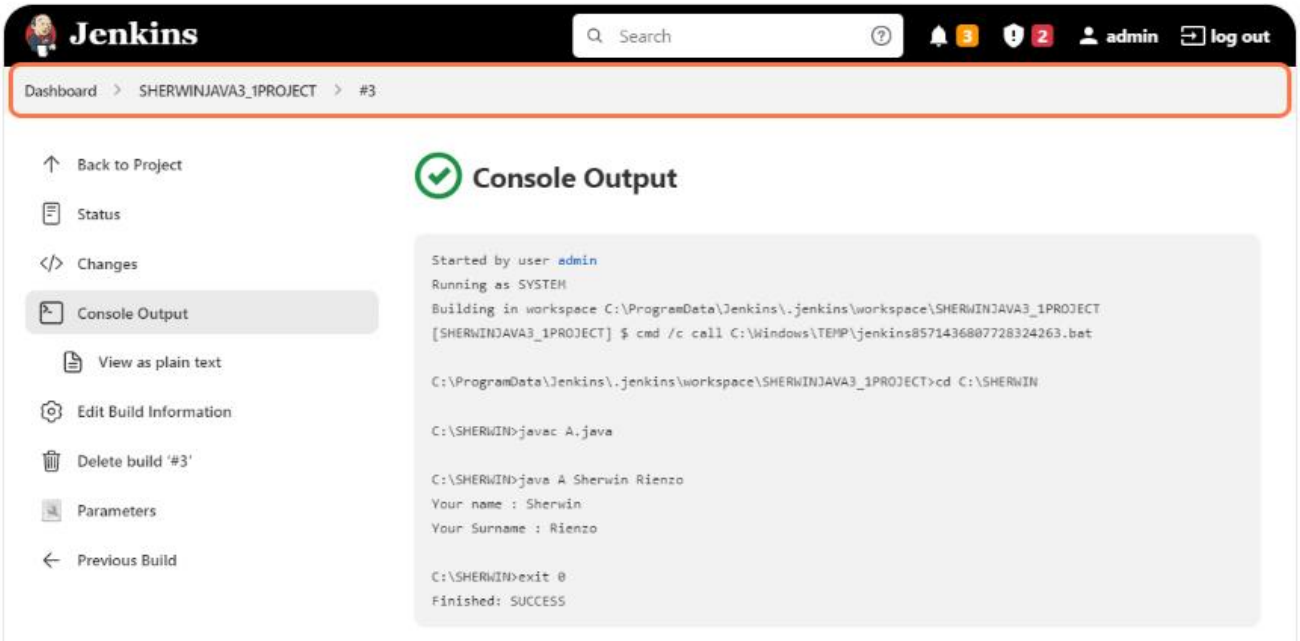
6 Click on Execute Windows batch command...



7 Click on Project SHERWINJAVA3_1PROJECT...



8 Click on Build



9 Click on Dashboard...