

Experiment 5 : Job Pipeline - Jenkins

Aim :

To Build the pipeline of jobs using Maven /Gradle /Ant in Jenkins,create a pipeline script to Test and deploy an application over the tomcat server.

Theory :

Jenkins is an open-source automation server used to implement **Continuous Integration (CI)** and **Continuous Deployment (CD)** in software development. It helps automate tasks like building, testing, and deploying code, improving efficiency and reducing human errors.

Key Concepts:

1. **Automated Builds:** Jenkins automatically compiles code whenever changes are made, ensuring that the software is always in a buildable state.
2. **Continuous Integration:** Developers frequently commit code to a shared repository. Jenkins automatically triggers builds and runs tests to detect issues early.
3. **Pipelines:** Jenkins workflows are defined using **Pipelines** in a **Jenkinsfile**, which can be scripted or declarative.
4. **Plugins:** Jenkins supports plugins for version control (Git), build tools (Maven, Gradle), deployment (Docker, Kubernetes), and more.
5. **Freestyle Projects vs. Pipelines:**
 - **Freestyle Projects:** Simple, GUI-based jobs for basic automation.
 - **Pipelines:** Code-defined workflows for complex CI/CD tasks.

Example of a Simple Jenkins Pipeline (Declarative):

```
pipeline {
  agent any
  stages {
    stage('Build') {
      steps {
        sh 'echo "Building the project"'
      }
    }
    stage('Test') {
      steps {
        sh 'echo "Running tests"'
      }
    }
    stage('Deploy') {
      steps {
        sh 'echo "Deploying the application"'
      }
    }
  }
}
```

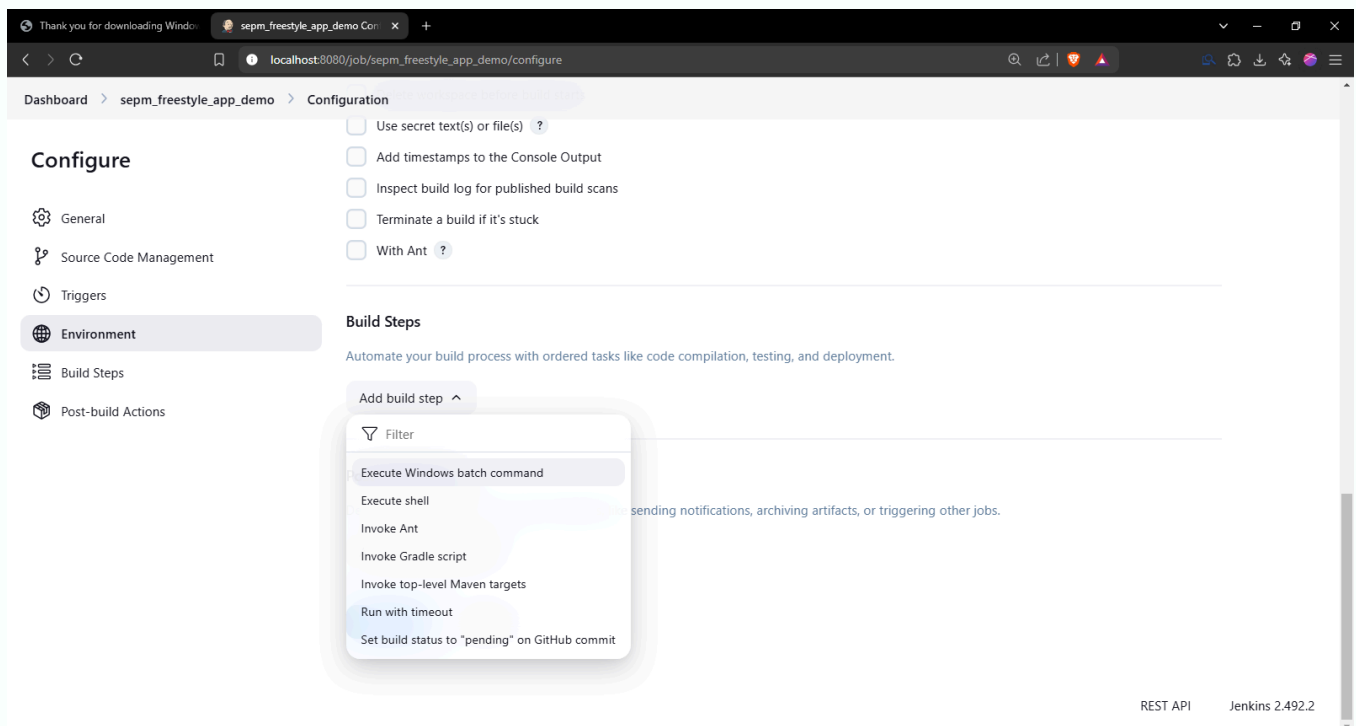
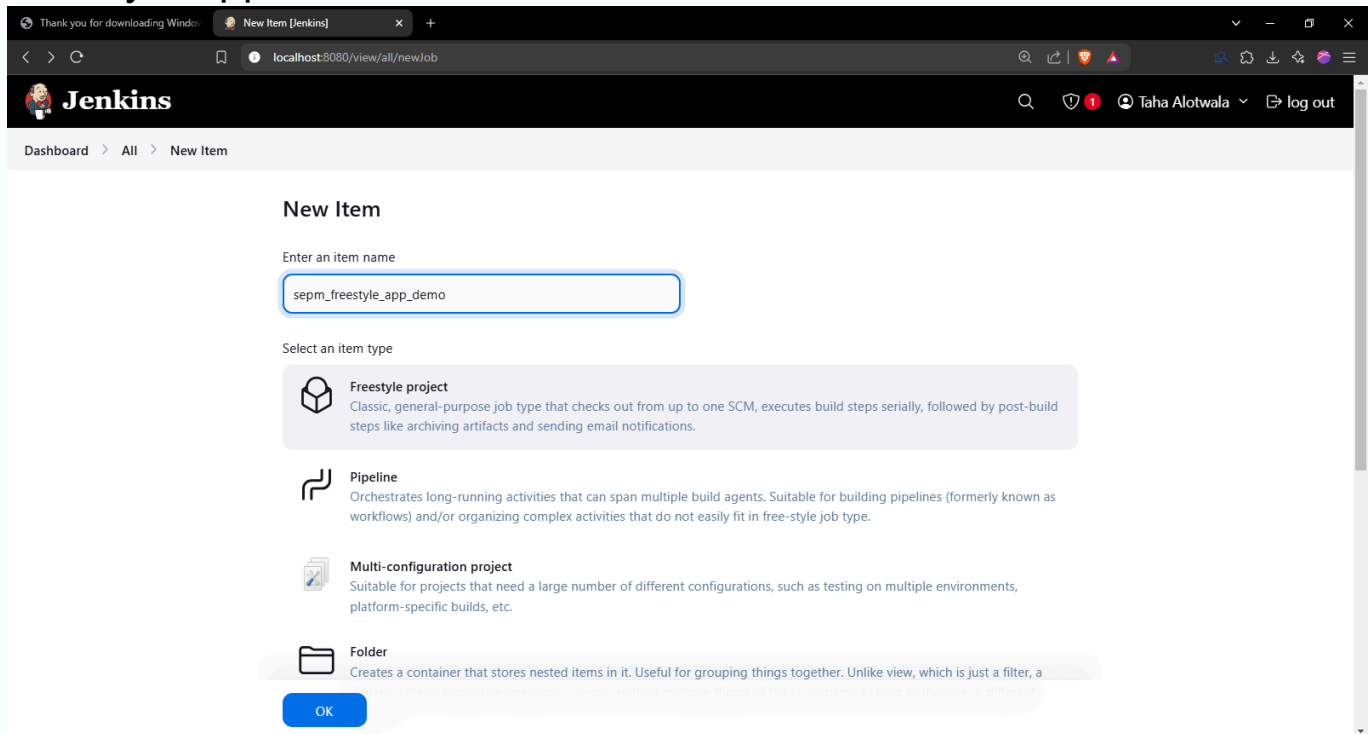
This pipeline defines three stages: **Build**, **Test**, and **Deploy**, each with its own commands.

Benefits of Jenkins in Programming:

- Automates repetitive tasks (builds, tests, deployments).
- Detects bugs early with continuous testing.
- Speeds up the development lifecycle.

Output :

1. Freestyle App



Thank you for downloading Windows
sepm_freestyle_app_demo Con

localhost:8080/job/sepm_freestyle_app_demo/configure

Dashboard > sepm_freestyle_app_demo > Configuration

Configure

- General
- Source Code Management
- Triggers
- Environment**
- Build Steps
- Post-build Actions

☐ Use secret text(s) or file(s) ?

☐ Add timestamps to the Console Output

☐ Inspect build log for published build scans

☐ Terminate a build if it's stuck

☐ With Ant ?

Build Steps

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

Execute Windows batch command ?

Command

[See the list of available environment variables](#)

```
net stats workstation | find "Statistics since"
```

Advanced ▾

Save Apply

Thank you for downloading Windows
sepm_freestyle_app_demo #1

localhost:8080/job/sepm_freestyle_app_demo/1/

Jenkins

Dashboard > sepm_freestyle_app_demo > #1

Status

#1 (Apr 2, 2025, 11:43:13 AM)

[Add description](#) [Keep this build forever](#)

Started by user [Taha Alotwala](#)

Started 4.9 sec ago
Took [0.37 sec](#)

This run spent:

- 12 ms waiting;
- 0.37 sec build duration;
- 0.38 sec total from scheduled to completion.

No changes.

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sepm_freestyle_app_demo #1

localhost:8080/job/sepm_freestyle_app_demo/1/console

Jenkins

Taha Alotwala log out

Dashboard > sepm_freestyle_app_demo > #1 > Console Output

- Status
- Changes
- Console Output
- Edit Build Information
- Delete build '#1'
- Timings

Console Output

Download Copy View as plain text

```
Started by user Taha Alotwala
Running as SYSTEM
Building in workspace C:\ProgramData\Jenkins\jenkins\workspace\sepm_freestyle_app_demo
[sepm_freestyle_app_demo] $ cmd /c call C:\Windows\TEMP\jenkins10778809563619165675.bat

C:\ProgramData\Jenkins\jenkins\workspace\sepm_freestyle_app_demo>net stats workstation | find "Statistics since"
Statistics since 13-03-2025 04:33:05

C:\ProgramData\Jenkins\jenkins\workspace\sepm_freestyle_app_demo>exit 0
Finished: SUCCESS
```

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2. Taking Parameters

script :

```
MSYS:/d/MiscRepos/sepm_lab
```

```
1 @echo off
2 echo "Hello %1... Your address is %2"
```

```
example1.cmd[+] [unix] (05:29 01/01/1970) 2,38 All
-- INSERT --
```

Executing the script (unsuccessful) :

```
Command Prompt
Microsoft Windows [Version 10.0.19045.5608]
(c) Microsoft Corporation. All rights reserved.

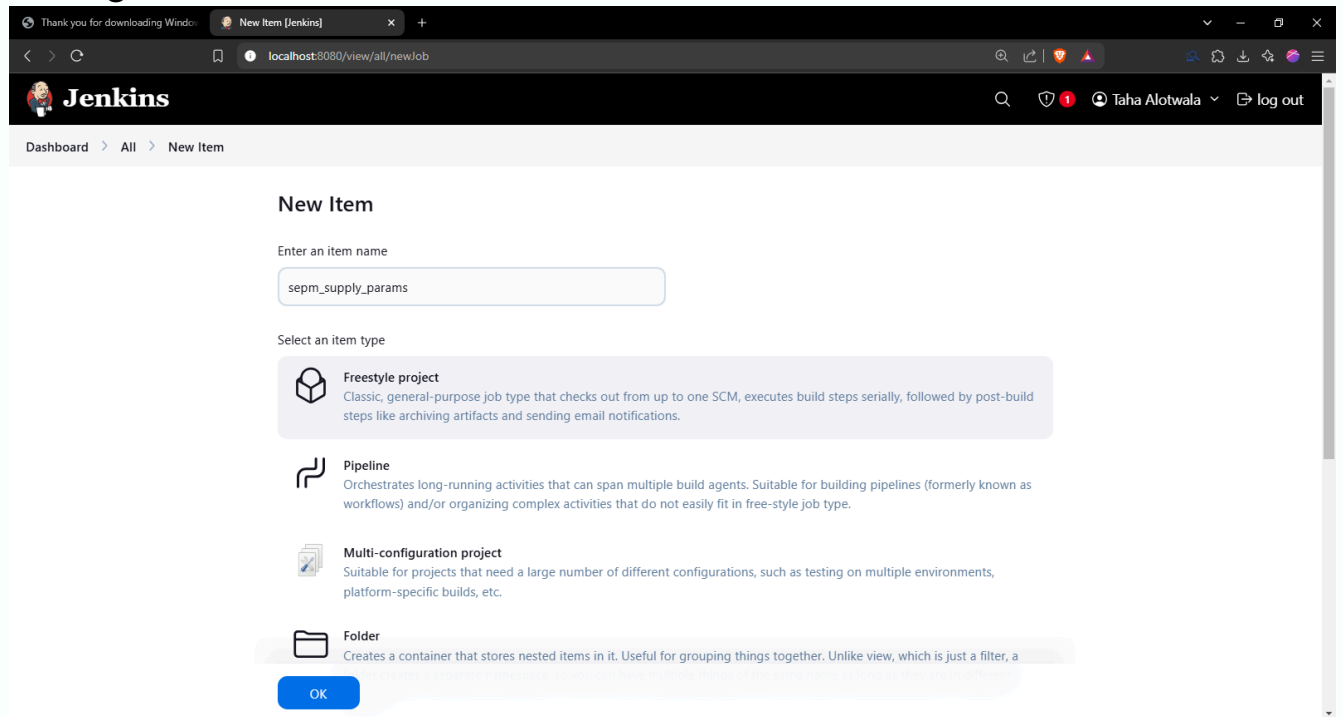
C:\Users\Admin>cd "D:\MiscRepos\sepm_lab\files"

C:\Users\Admin>example1.cmd
'example1.cmd' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\Admin>example1.cmd Taha
'example1.cmd' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\Admin>
```

Configure Jenkins :



Thank you for downloading Windows
sepm_supply_params Config [x] +

localhost:8080/job/sepm_supply_params/configure

Dashboard > sepm_supply_params > Configuration

☐ With Ant ?

Configure

- General
- Source Code Management
- Triggers
- Environment
- Build Steps**
- Post-build Actions

Build Steps

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

≡ **Execute Windows batch command** ?

Command

[See the list of available environment variables](#)

```
D:\MiscRepos\sepm_lab\files\example1.cmd Taha Mazgaon
```

Advanced ▾

Add build step ▾

Post-build Actions

Optional actions after build completes like sending notifications, archiving artifacts or triggering other jobs.

Save Apply

Thank you for downloading Windows
sepm_supply_params #1 [Jenkins] x +

localhost:8080/job/sepm_supply_params/1/

Jenkins

Dashboard > sepm_supply_params > #1

Status

</> Changes

Console Output

Edit Build Information

Delete build '#1'

Timings

✓ #1 (Apr 2, 2025, 12:01:38 PM)

Add description Keep this build forever

Started by user [Taha Alotwala](#)

Started 55 sec ago
Took **0.29 sec**

This run spent:

- 6 ms waiting;
- 0.29 sec build duration;
- 0.29 sec total from scheduled to completion.

</> No changes.

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The screenshot shows the Jenkins web interface in a browser. The address bar indicates the URL is `localhost:8080/job/sepm_supply_params/1/console`. The Jenkins logo and name are at the top left. The top right shows a search icon, a shield icon, the user name "Taha Alotwala", and a "log out" link. The breadcrumb navigation shows "Dashboard > sepm_supply_params > #1 > Console Output". On the left sidebar, there are links for "Status", "Changes", "Console Output" (which is selected), "Edit Build Information", "Delete build '#1'", and "Timings". The main content area is titled "Console Output" with a green checkmark icon. It contains the following text: "Started by user Taha Alotwala", "Running as SYSTEM", "Building in workspace C:\ProgramData\Jenkins\jenkins\workspace\sepm_supply_params", "[sepm_supply_params] \$ cmd /c call C:\Windows\TEMP\jenkins15807160200406300302.bat", "C:\ProgramData\Jenkins\jenkins\workspace\sepm_supply_params>D:\MiscRepos\sepm_lab\files\example1.cmd Taha Mazgaon", "Hello Taha... Your address is Mazgaon", and "Finished: SUCCESS". On the right side of the console output, there are buttons for "Download", "Copy", and "View as plain text". At the bottom right of the page, it says "REST API" and "Jenkins 2.492.2".

3. Running a Java Program

The code :

The screenshot shows a code editor with a dark background. The file name is "vi JavaInJenkins.java". The code is as follows:

```
6 class JavaInJenkins
5 {
4     public static void main(String[] args)
3     {
2         System.out.println("Hello, from the java file");
1     }
7 }
```


Running the file through the terminal :

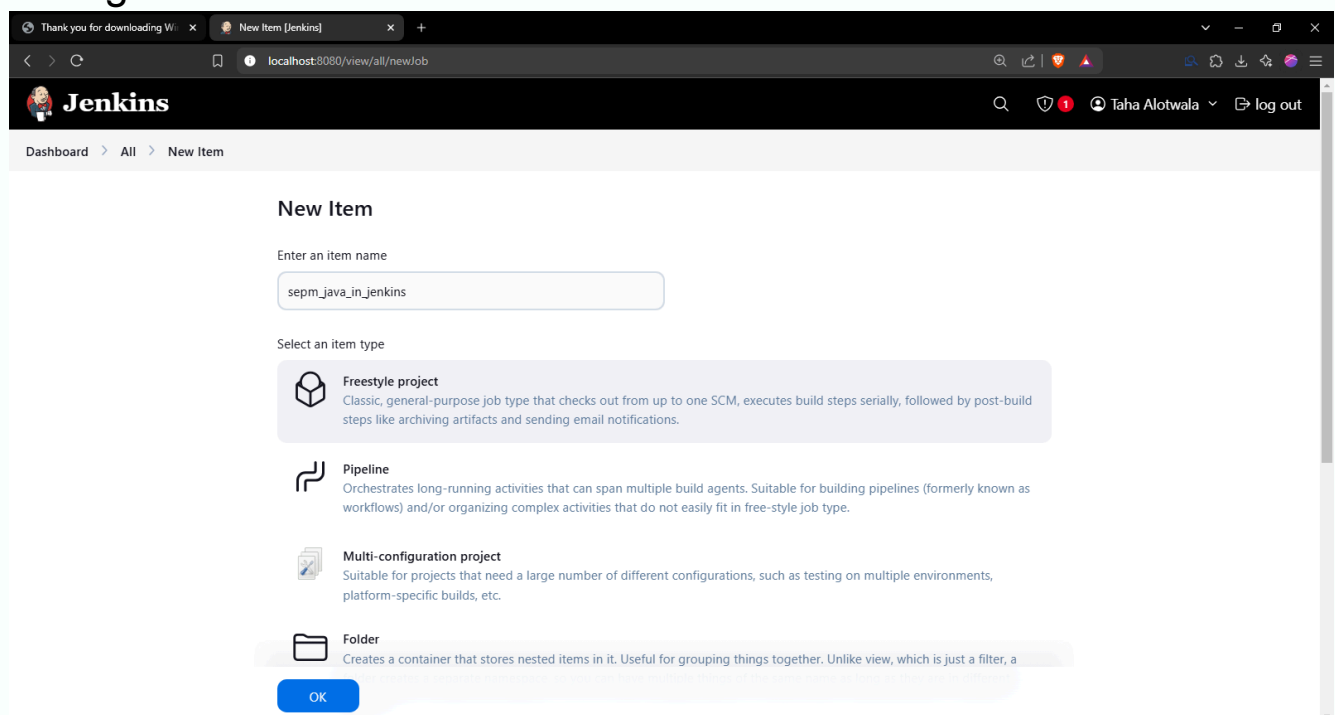
```
/d/MiscRepos/sepm_lab/files git:(master)±5 (5.232s)  
vi JavaInJenkins.java
```

```
/d/MiscRepos/sepm_lab/files git:(master)±5 (1.298s)  
javac JavaInJenkins.java
```

```
/d/MiscRepos/sepm_lab/files git:(master)±5 (1.296s)  
java JavaInJenkins.java  
Hello, from the java file
```

```
/d/MiscRepos/sepm_lab/files git:(master)✓ ±5  
|
```

Configure Jenkins :



Thank you for downloading Windows

sepm_java_in_jenkins Config [1] x +

localhost:8080/job/sepm_java_in_jenkins/configure

Dashboard > sepm_java_in_jenkins > Configuration

Configure

- General
- Source Code Management
- Triggers
- Environment
- Build Steps**
- Post-build Actions

Build Steps

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

Execute Windows batch command ?

Command

See [the list of available environment variables](#)

```
javac D:\MiscRepos\sepm_lab\files\JavaInJenkins.java
java D:\MiscRepos\sepm_lab\files\JavaInJenkins.java
```

Advanced ▾

Add build step ▾

Post-build Actions

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

Add post-build action ▾

Save Apply

Thank you for downloading Windows

sepm_java_in_jenkins #1 Console x +

localhost:8080/job/sepm_java_in_jenkins/1/console

Dashboard > sepm_java_in_jenkins > #1 > Console Output

Console Output

Started by user [Taha Alotwala](#)

Running as SYSTEM

Building in workspace C:\ProgramData\Jenkins\jenkins\workspace\sepm_java_in_jenkins

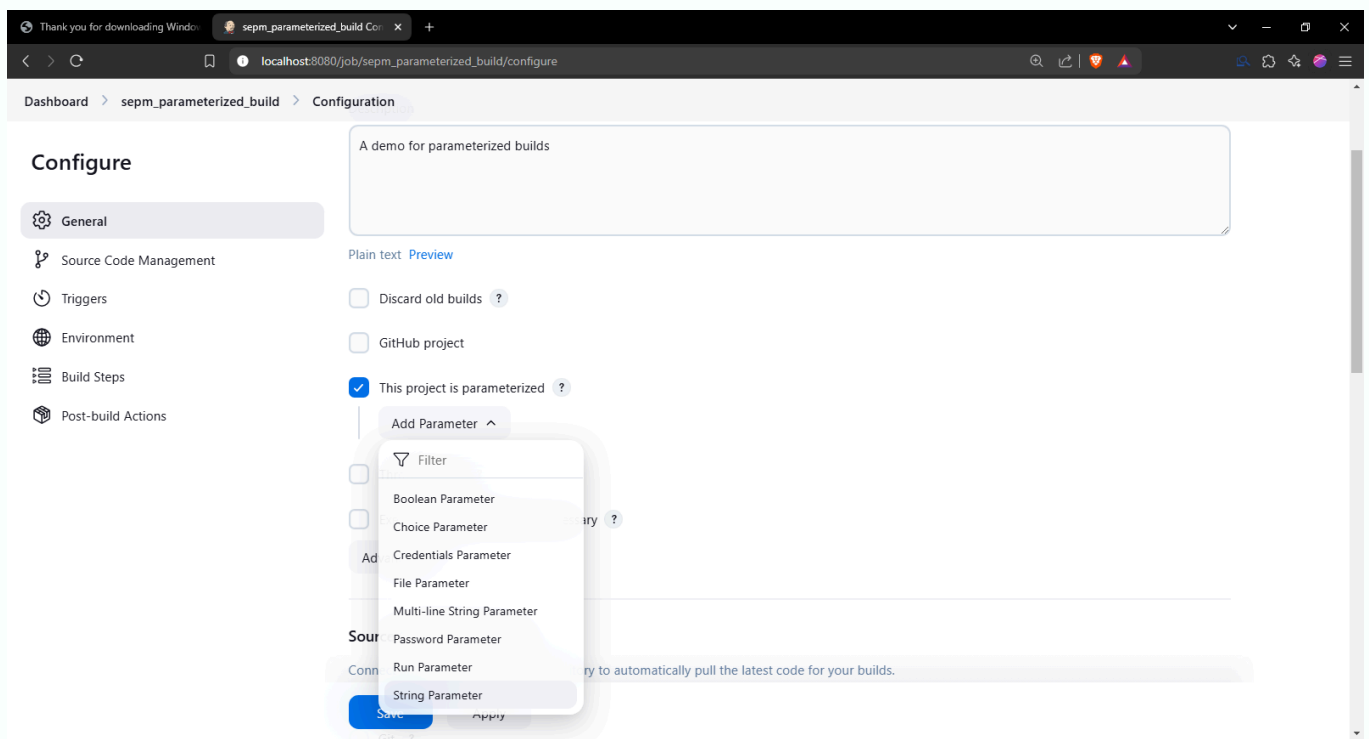
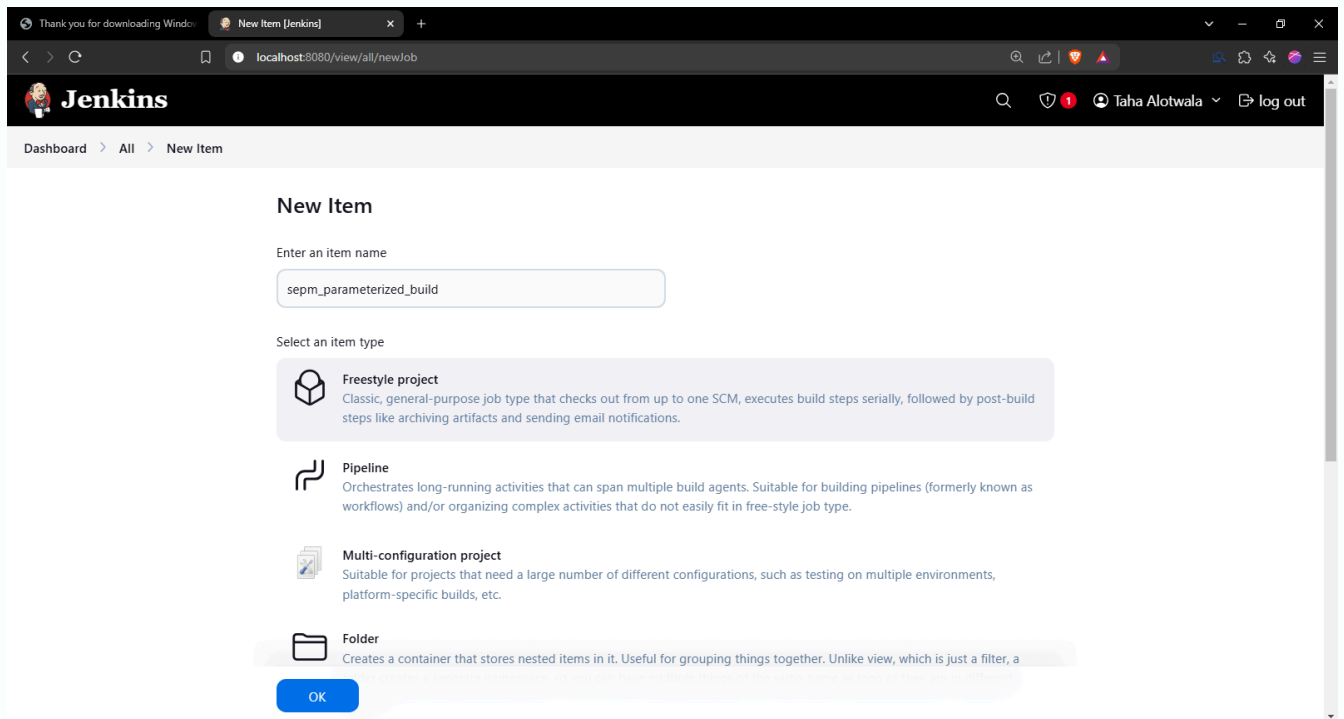
[sepm_java_in_jenkins] \$ cmd /c call C:\Windows\TEMP\jenkins13007954911449735543.bat

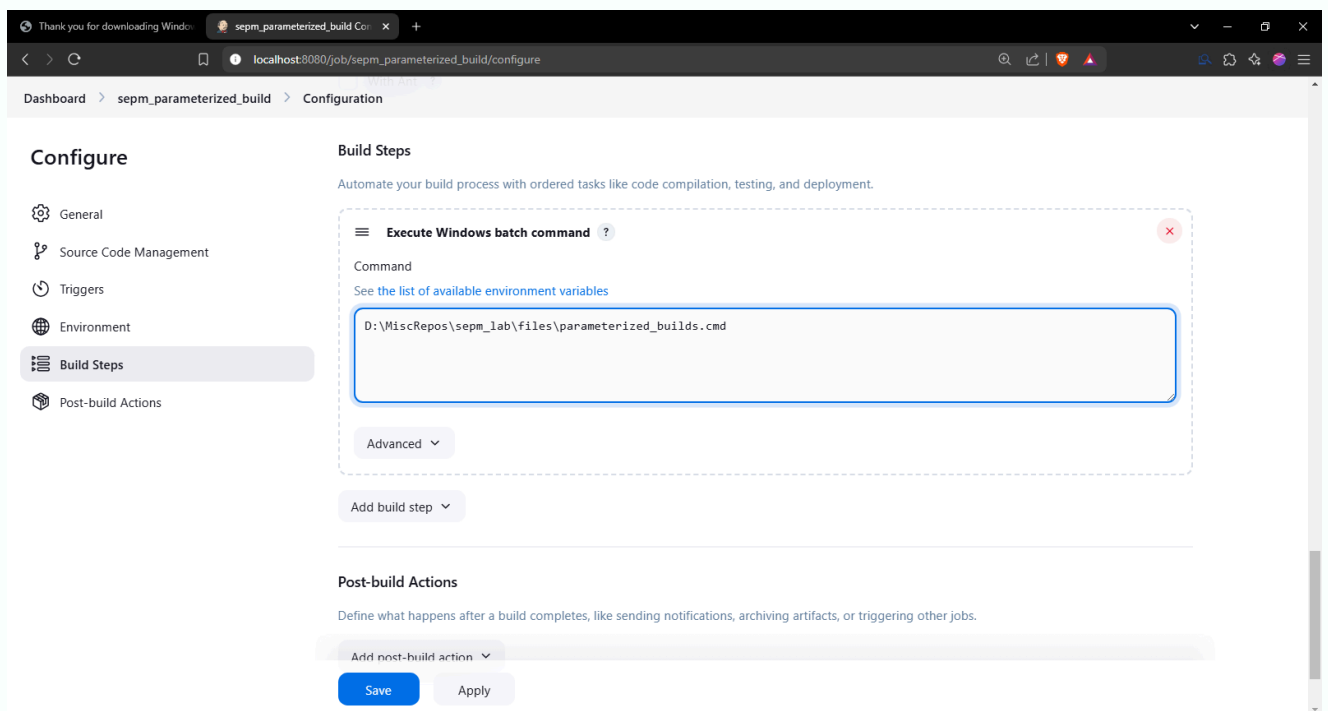
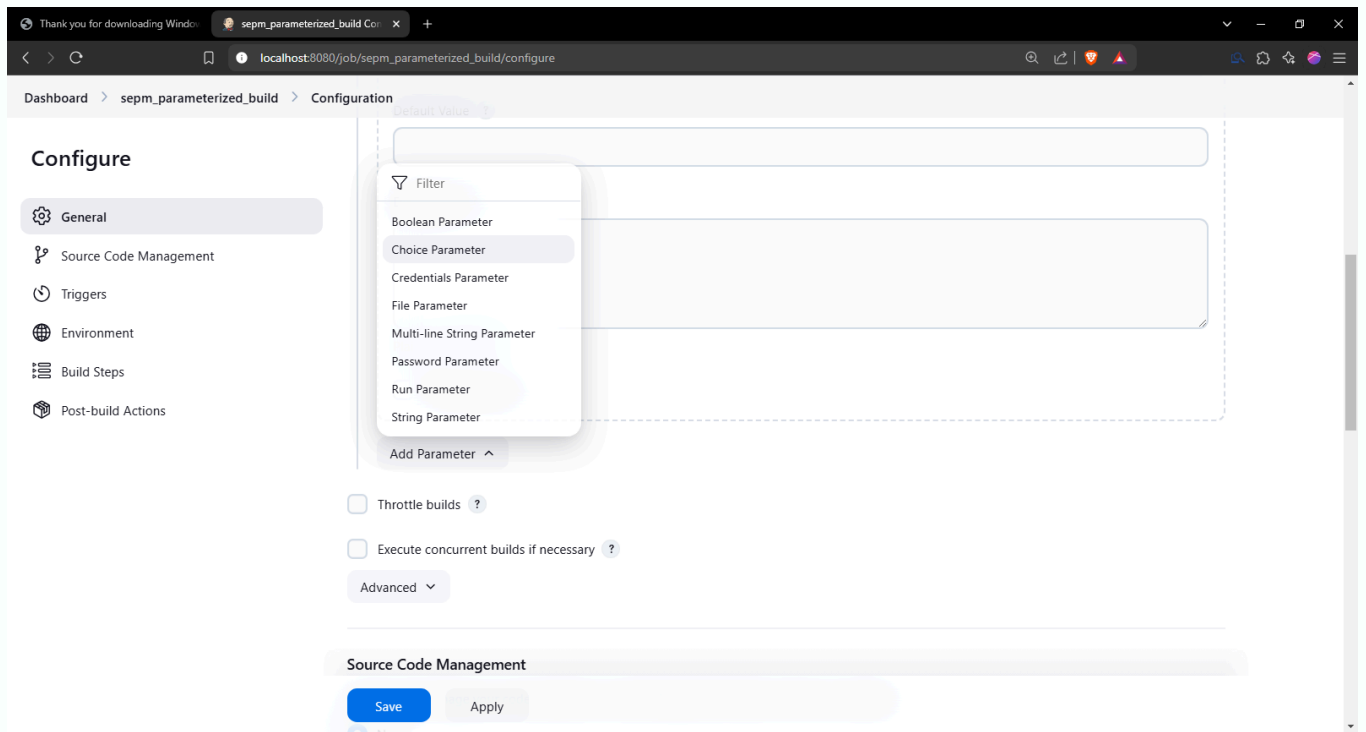
```
C:\ProgramData\Jenkins\jenkins\workspace\sepm_java_in_jenkins>javac D:\MiscRepos\sepm_lab\files\JavaInJenkins.java
C:\ProgramData\Jenkins\jenkins\workspace\sepm_java_in_jenkins>java D:\MiscRepos\sepm_lab\files\JavaInJenkins.java
Hello, from the java file
C:\ProgramData\Jenkins\jenkins\workspace\sepm_java_in_jenkins>exit 0
Finished: SUCCESS
```

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4. Parameterized Builds





Thank you for downloading Windows Jenkins

localhost:8080/job/sepm_parameterized_build/build?delay=0sec

Jenkins

Taha Alotwala log out

Dashboard > sepm_parameterized_build >

Project sepm_parameterized_build

This build requires parameters:

name
Taha

city
Mumbai

Builds

No builds

Build Cancel

Jenkins 2.492.2

```
.. parameterized_builds.cmd
1 @echo off
2 echo "Hello your name is : %name%, and your city is %city%."
```

Thank you for downloading Windows sepm_parameterized_build #2

localhost:8080/job/sepm_parameterized_build/2/console

Jenkins

Taha Alotwala log out

Dashboard > sepm_parameterized_build > #2 > Console Output

Console Output

Download Copy View as plain text

Started by user Taha Alotwala

Running as SYSTEM

Building in workspace C:\ProgramData\Jenkins\.jenkins\workspace\sepm_parameterized_build

[sepm_parameterized_build] \$ cmd /c call C:\Windows\TEMP\jenkins2249229840313057984.bat

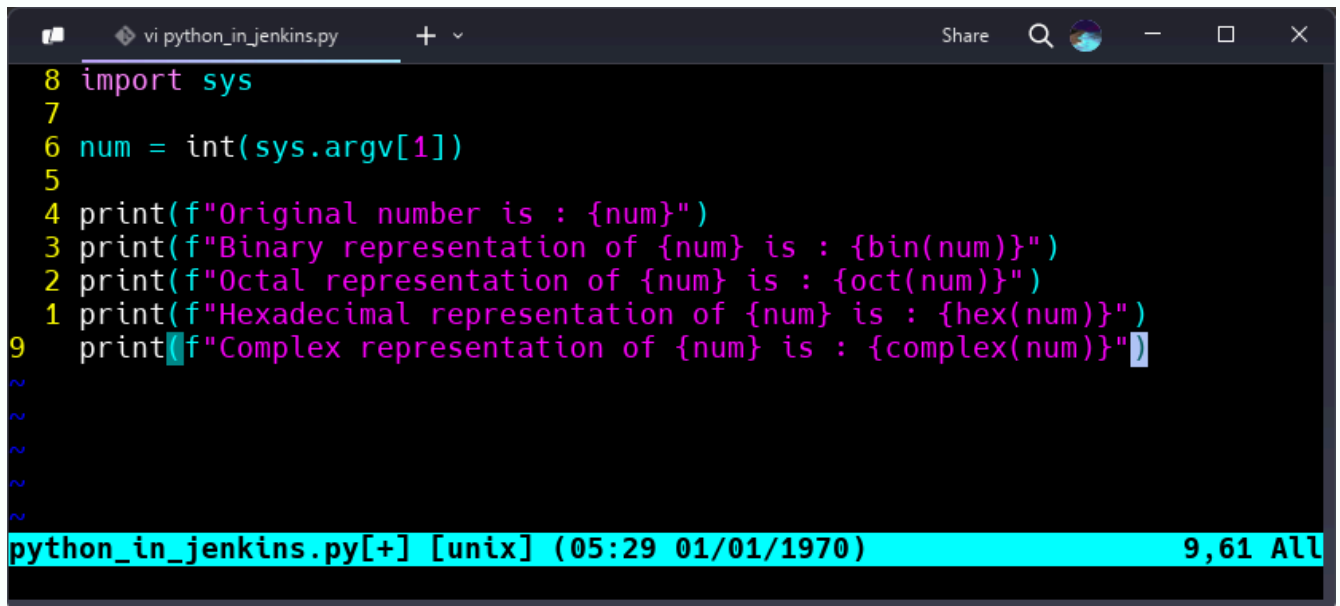
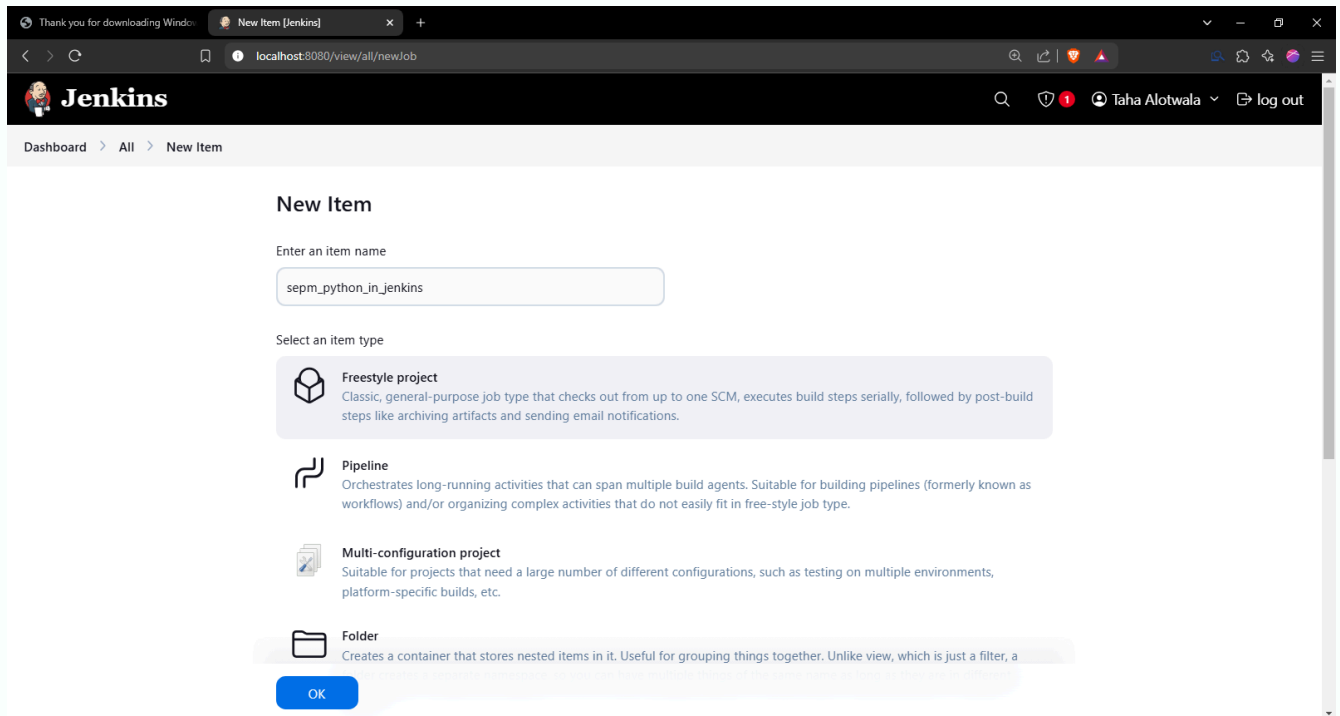
C:\ProgramData\Jenkins\.jenkins\workspace\sepm_parameterized_build>D:\MiscRepos\sepm_lab\files\parameterized_builds.cmd

"Hello your name is : Taha, and your city is Mumbai."

Finished: SUCCESS

REST API Jenkins 2.492.2

5. Running a python script

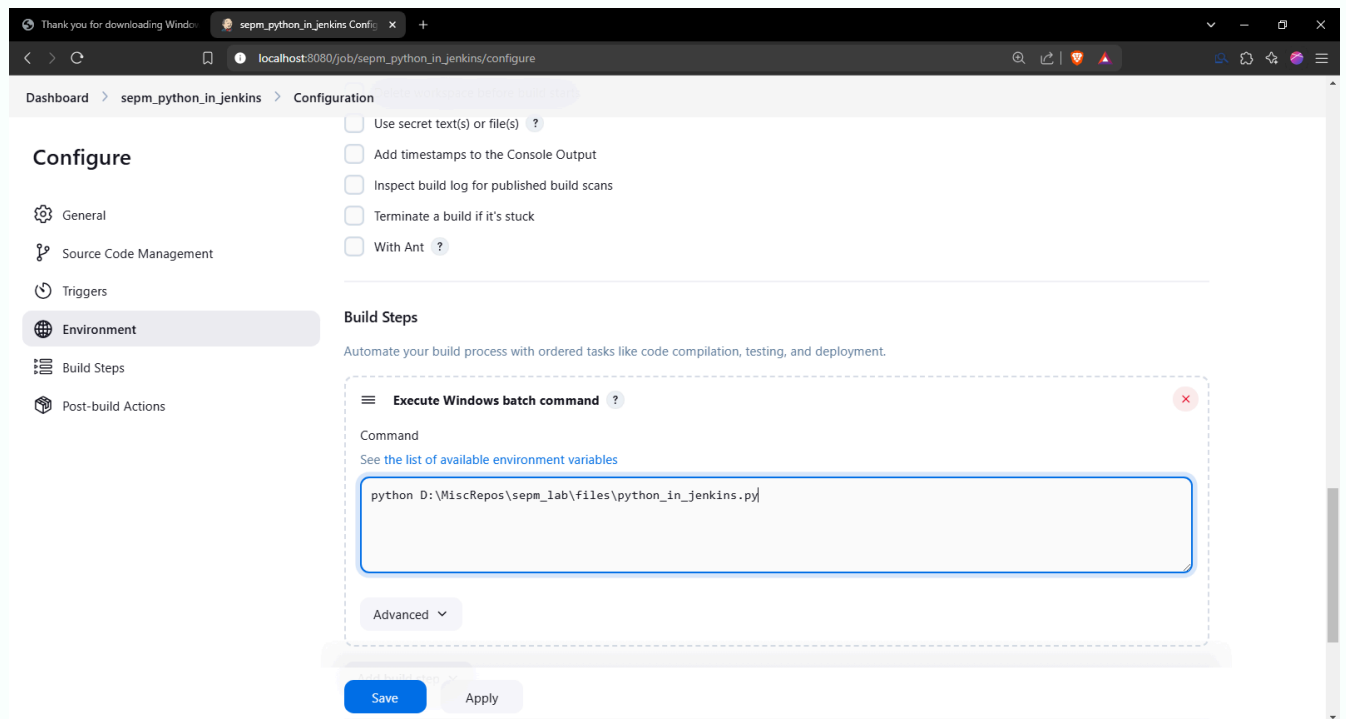


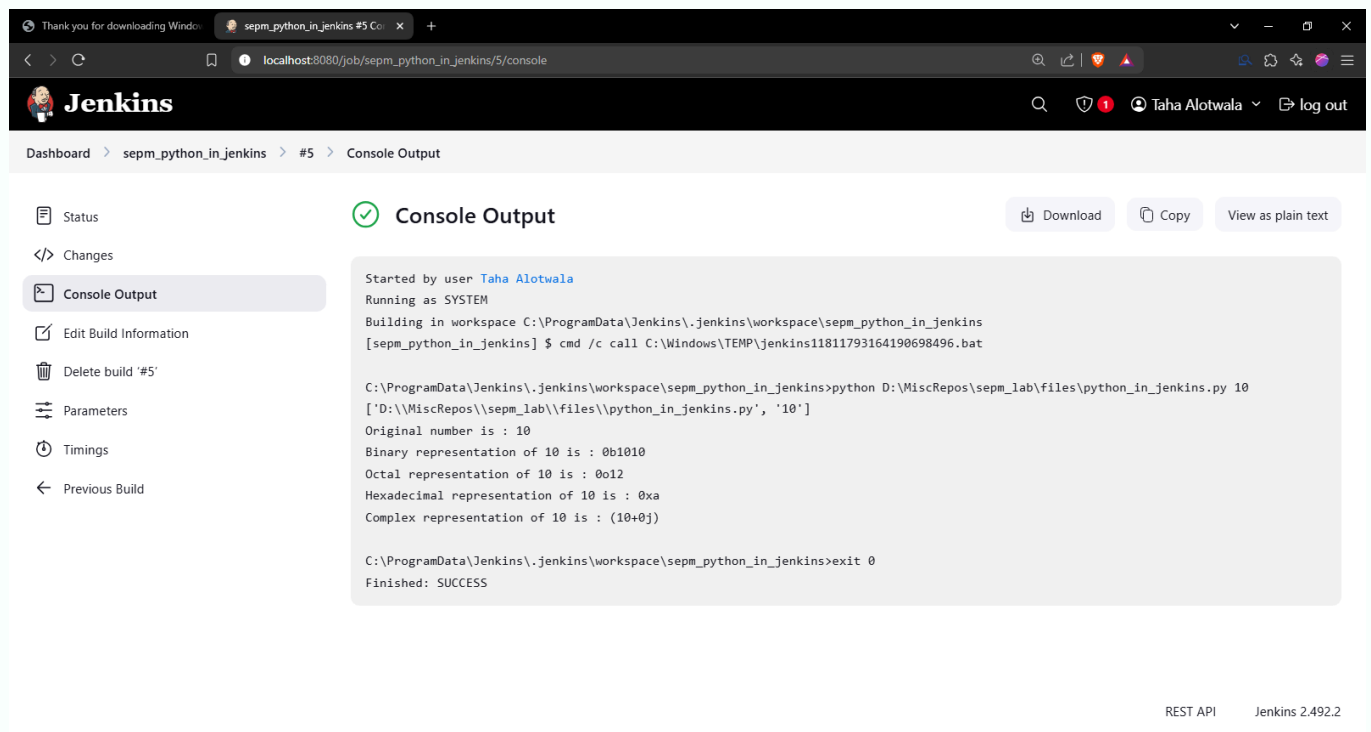
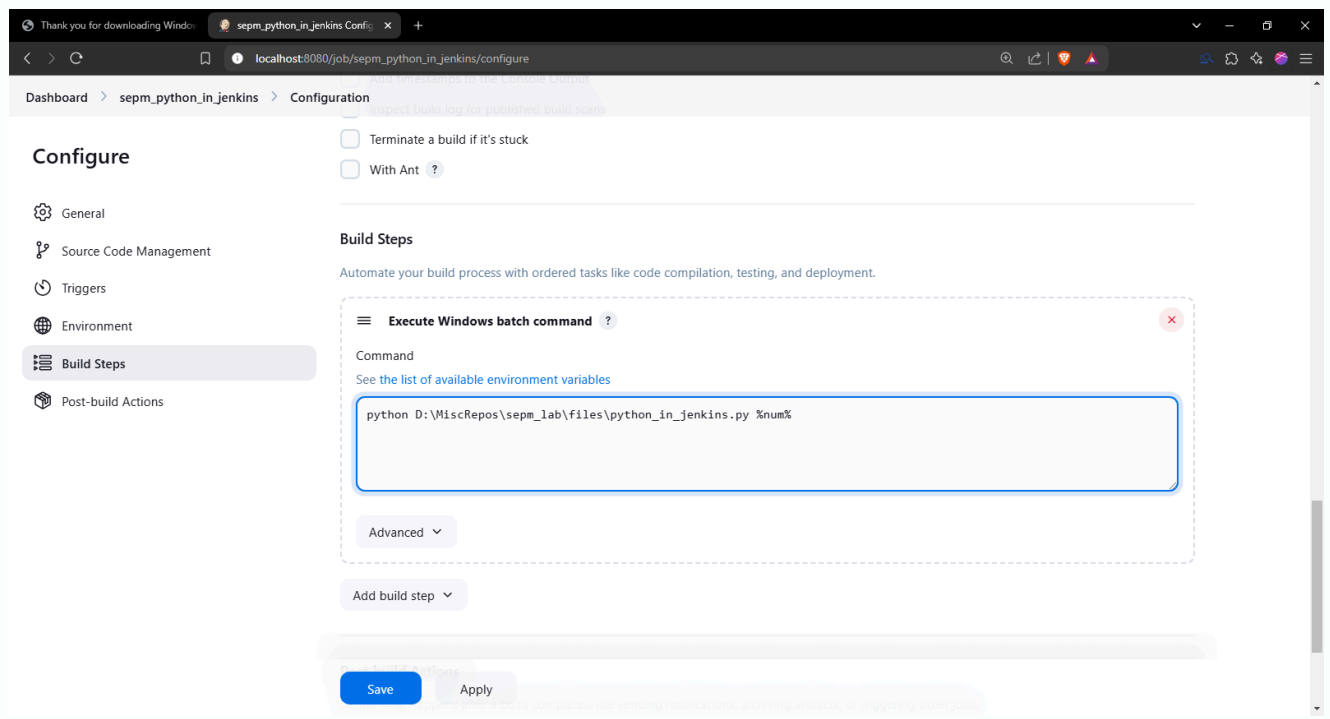
```
../MiscRepos/sepm_lab/files + v
Share 🔍 🌐 - □ ×

/d/MiscRepos/sepm_lab/files git:(master)±5 (4m 5.85s)
vi python_in_jenkins.py

/d/MiscRepos/sepm_lab/files git:(master)±5 (0.612s)
python python_in_jenkins.py 10
Original number is : 10
Binary representation of 10 is : 0b1010
Octal representation of 10 is : 0o12
Hexadecimal representation of 10 is : 0xa
Complex representation of 10 is : (10+0j)

/d/MiscRepos/sepm_lab/files git:(master) v ±5
```





Conclusion :

Thus, we have successfully studied Continuous Integration and installed, configured, and understood programming with Jenkins.