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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"'
      }
    }
  }
}
```

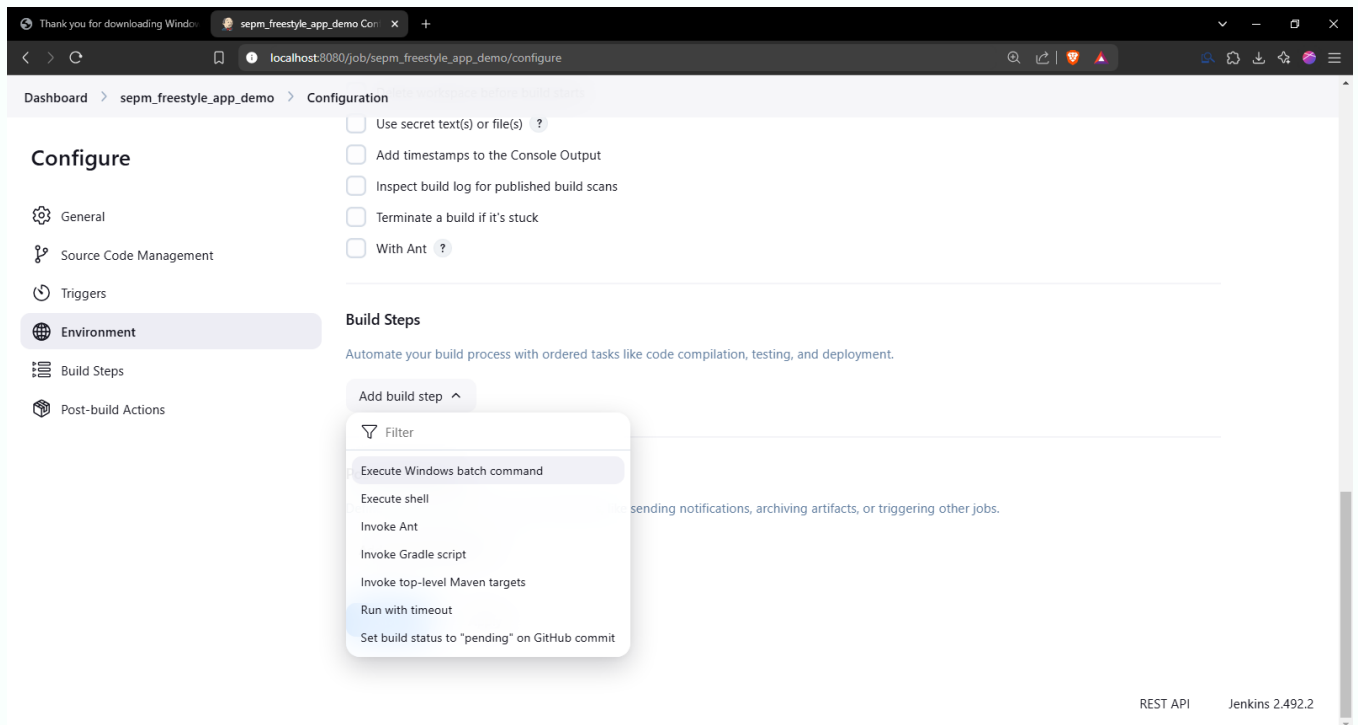
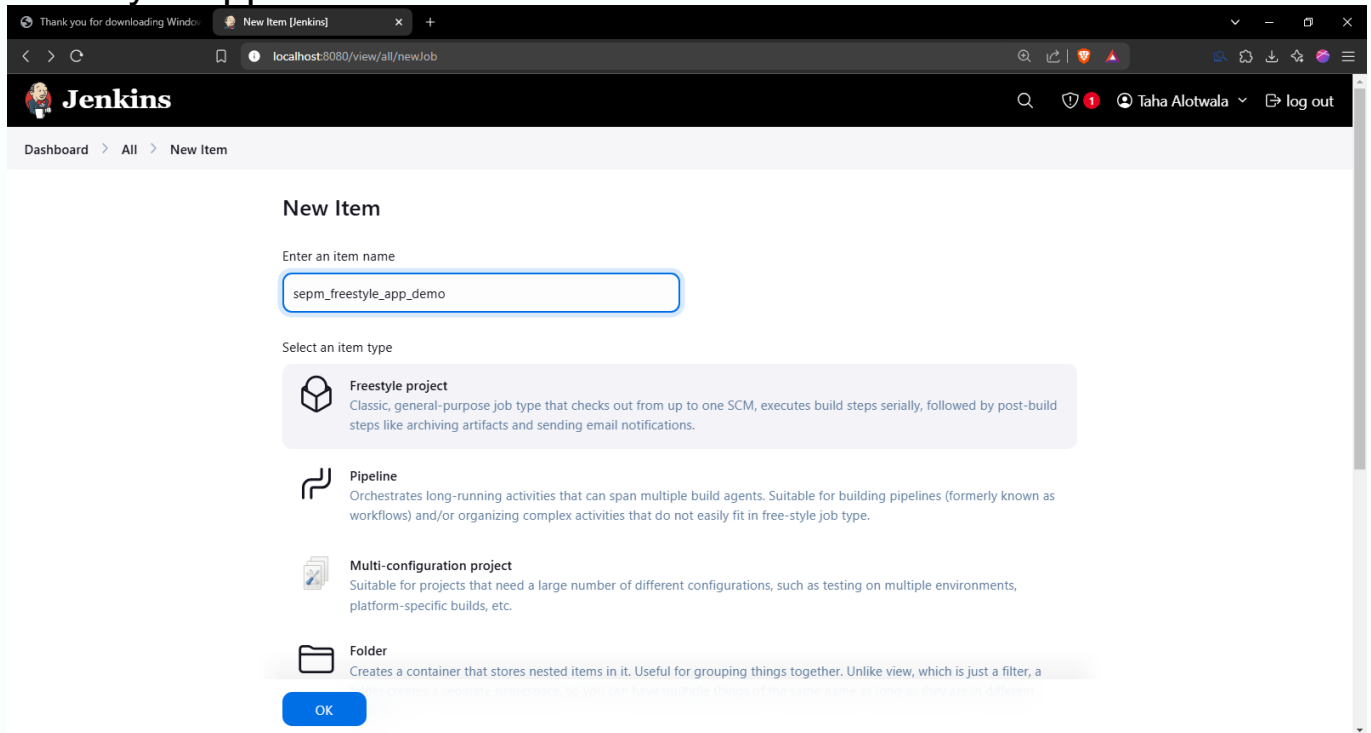
This pipeline defines three stages: **Build**, **Test**, and **Deploy**, each with its own commands.

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 Configuration

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

</> Changes

Console Output

Edit Build Information

Delete build '#1'

Timings

✓ #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.

REST API Jenkins 2.492.2

The screenshot shows the Jenkins web interface. The breadcrumb navigation is 'Dashboard > sepm_freestyle_app_demo > #1 > Console Output'. On the left sidebar, 'Console Output' is selected. The main area shows a green checkmark icon and the title 'Console Output'. There are buttons for 'Download', 'Copy', and 'View as plain text'. The console output text is as follows:

```
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
```

At the bottom right, it says 'REST API' and 'Jenkins 2.492.2'.

2. Taking Parameters

script :

The screenshot shows a Windows command prompt window with the title 'MSYS:/d/MiscRepos/sepm_lab'. The script content is:

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

Below the script, there is a cyan-colored status bar that reads: 'example1.cmd[+] [unix] (05:29 01/01/1970) 2,38 All -- INSERT --'.

Executing the script (unsuccessful) :

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

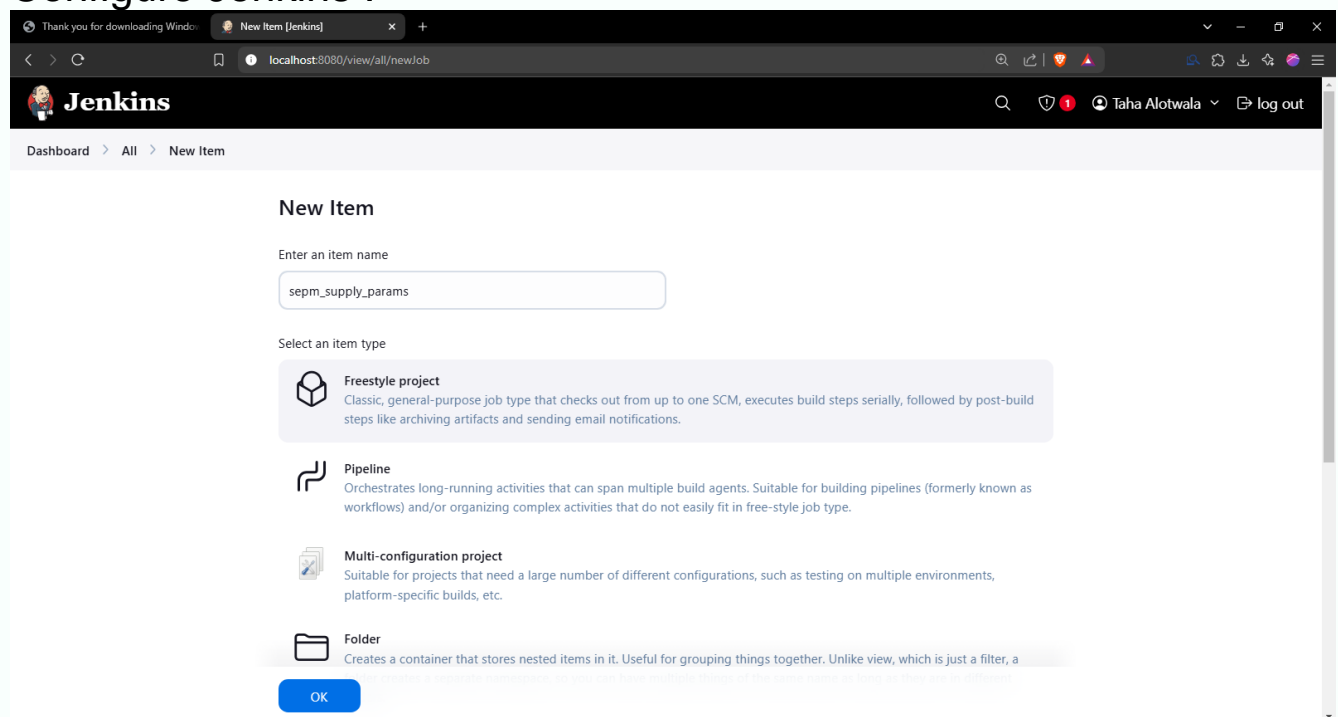
C:\Users\Admin>cd "D:\MiscRepos\sepm_lab\files"

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] x

localhost:8080/job/sepm_supply_params/configure

Dashboard > sepm_supply_params > Configuration

Configure

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

☐ 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](#)

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

Advanced ▾

Add build step ▾

Post-build Actions

Define what happens after a build completes. For example, notifications, publishing 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/

Dashboard > sepm_supply_params > #1

Jenkins

Search 🔍 | 🔒 | 👤 Taha Alotwala | 🚪 log out

Status

Changes

Console Output

Edit Build Information

Delete build '#1'

Timings

✅ #1 (Apr 2, 2025, 12:01:38 PM)

Started by user [Taha Alotwala](#)

This run spent:

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

</> No changes.

[Add description](#)

[Keep this build forever](#)

Started 55 sec ago
Took 0.29 sec

REST API Jenkins 2.492.2

The screenshot shows the Jenkins web interface. The breadcrumb navigation is Dashboard > sepm_supply_params > #1 > Console Output. On the left sidebar, the 'Console Output' tab is selected. The main area displays the console output for build #1, which is a successful build. The output text is as follows:

```
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"
Finished: SUCCESS
```

At the bottom right of the console output area, it says 'REST API' and 'Jenkins 2.492.2'.

3. Running a Java Program

The code :

The screenshot shows a code editor with a file named 'vi JavaInJenkins.java'. The code is a simple Java class with a main method. 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 :

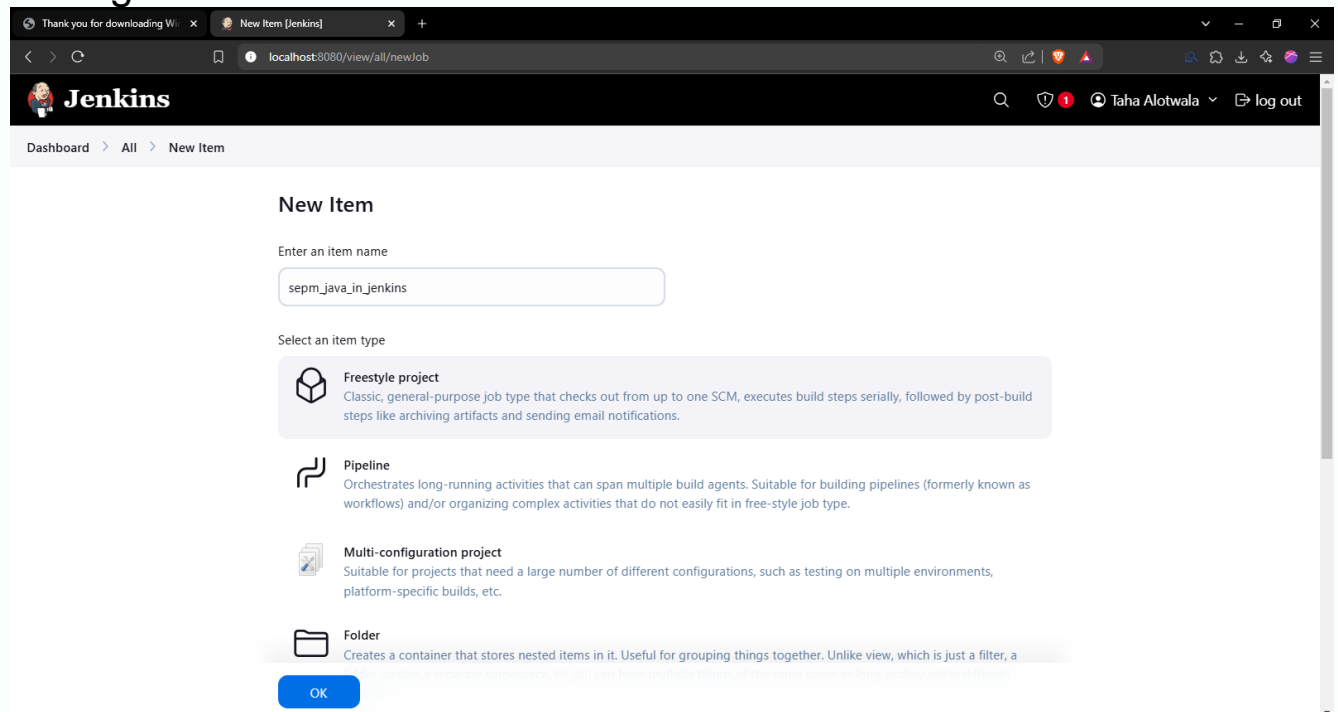
```
/d/MiscRepos/sepm_lab/files git:(master)±5 (5.232s)  
vi JavaInJenkins.java
```

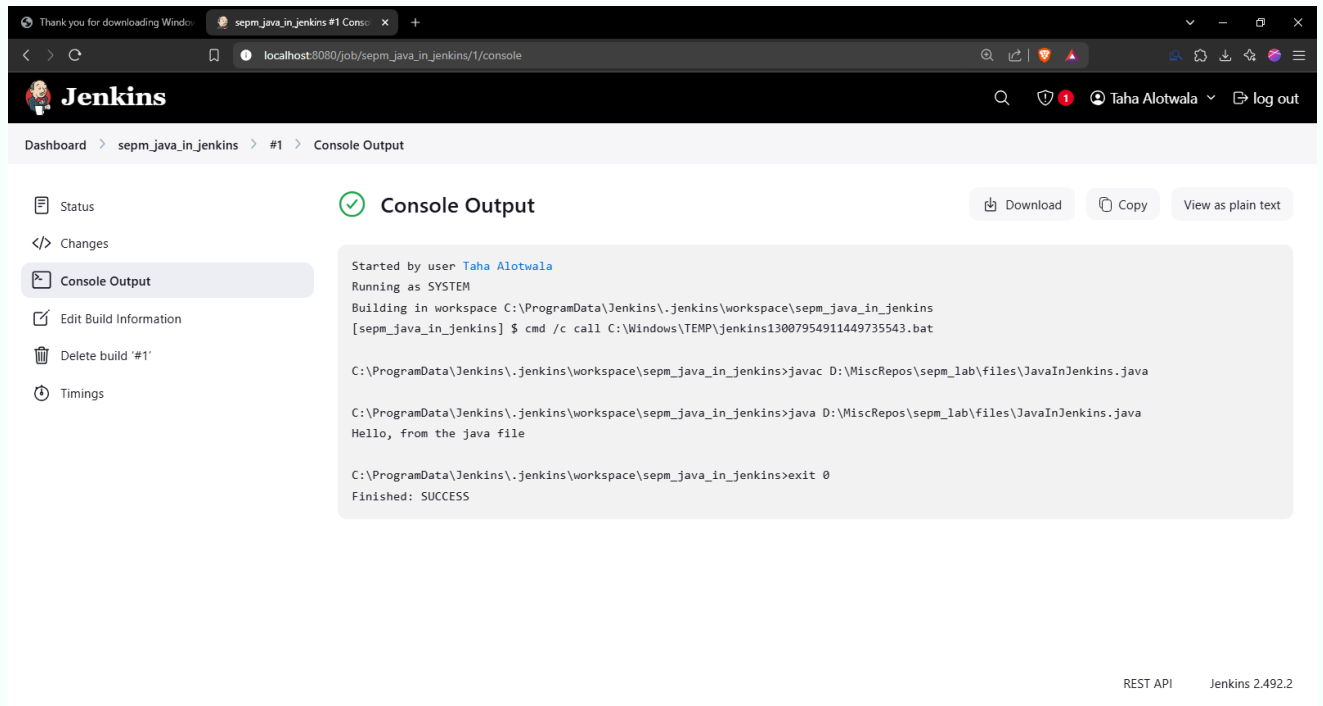
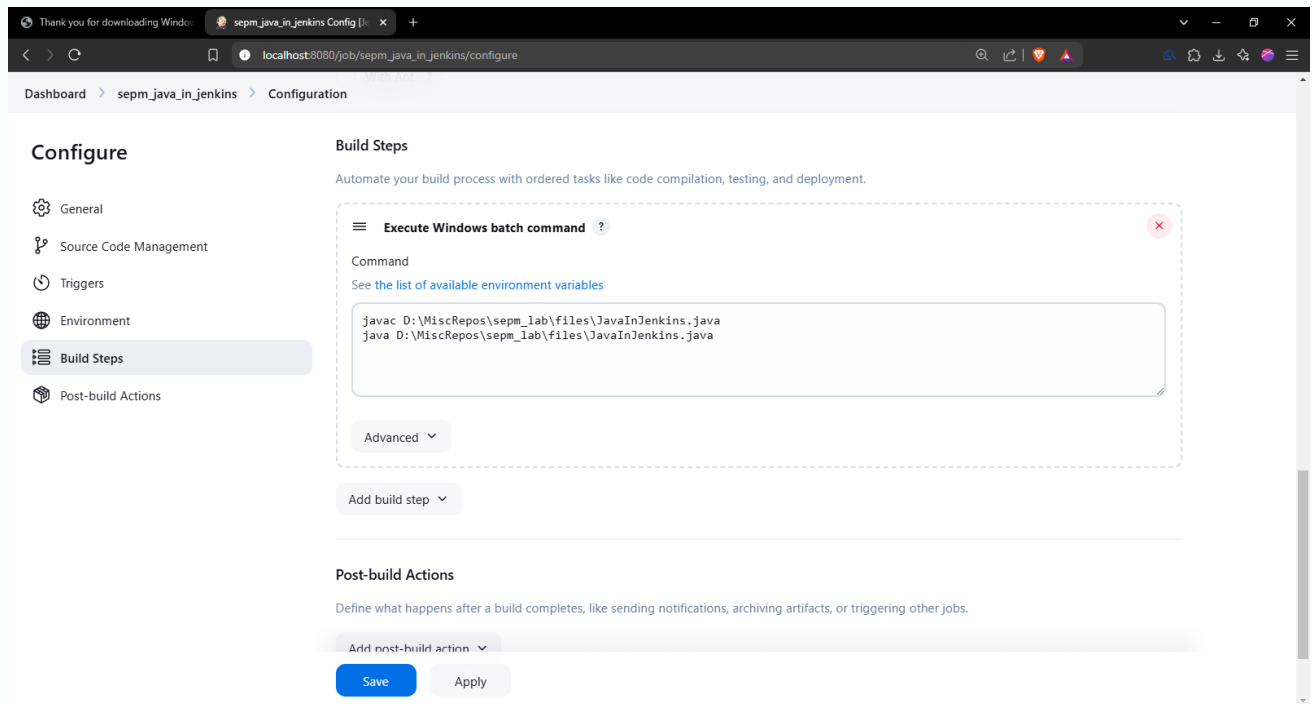
```
/d/MiscRepos/sepm_lab/files git:(master)±5 (1.298s)  
javac JavaInJenkins.java
```

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

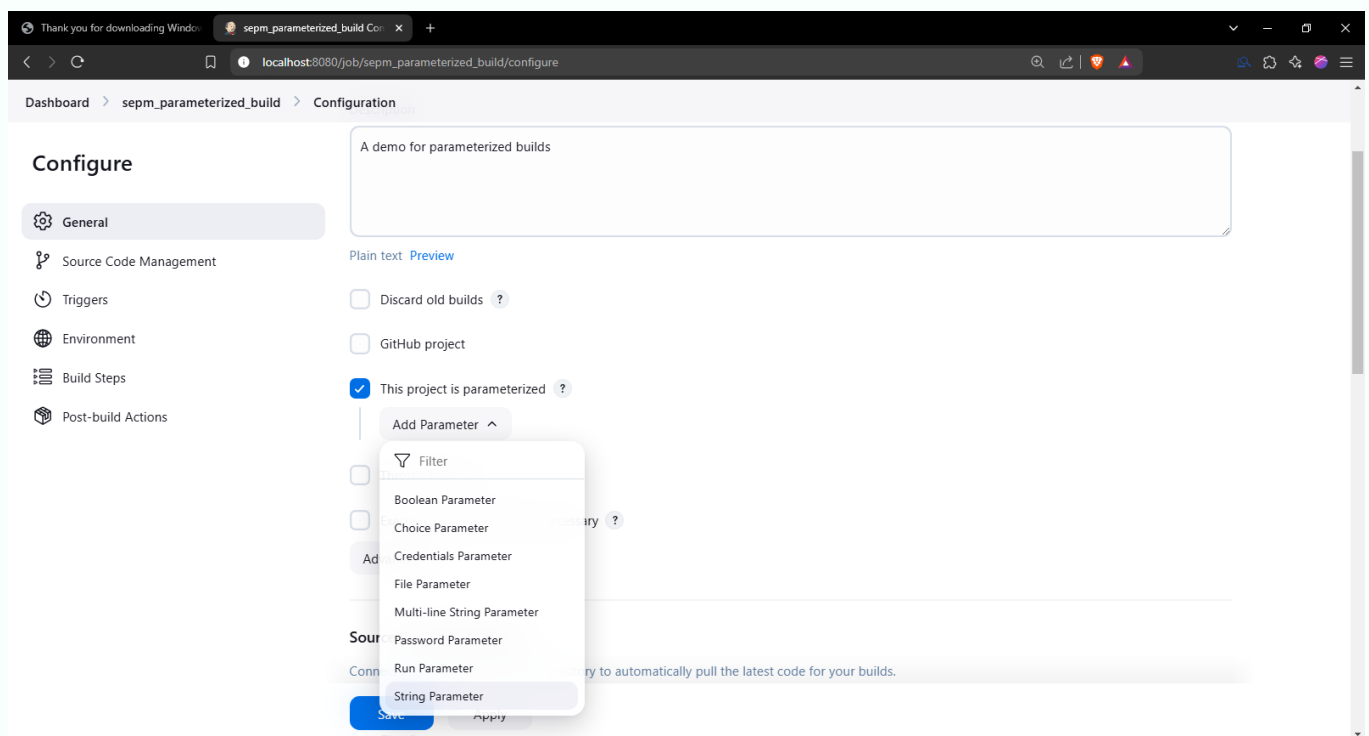
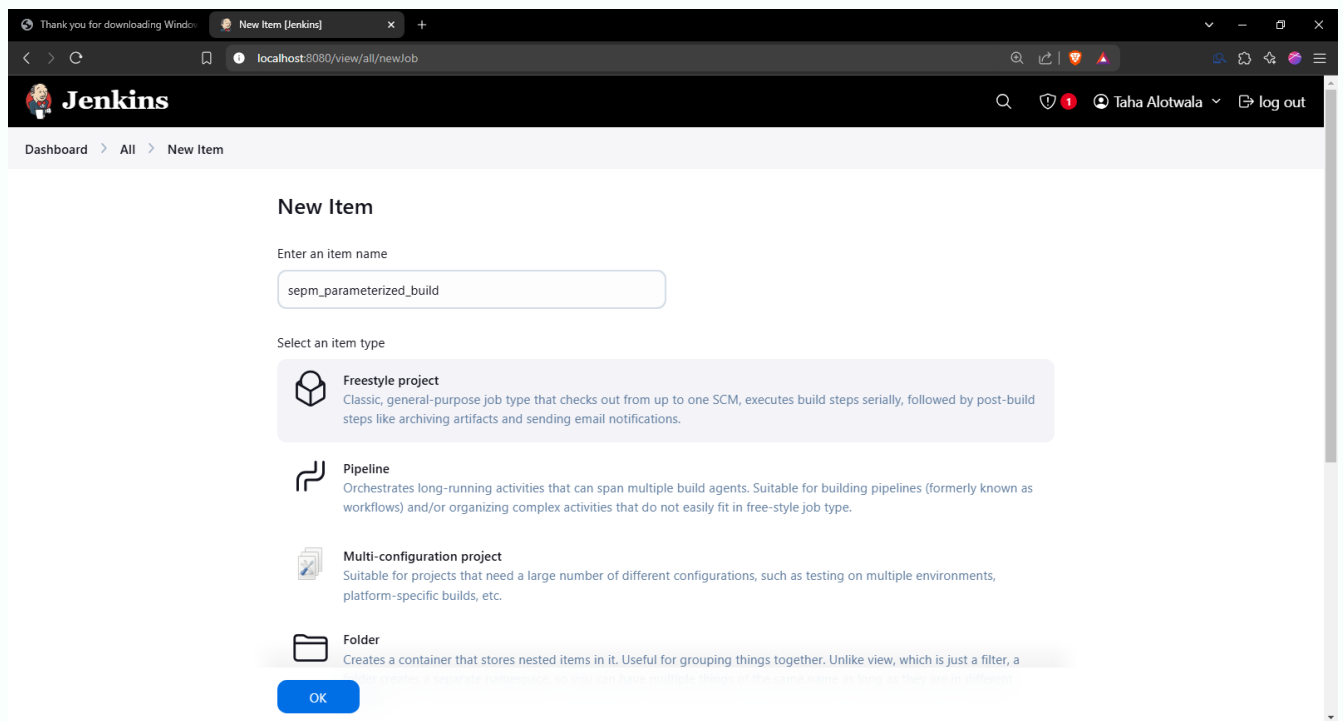
```
/d/MiscRepos/sepm_lab/files git:(master)✓ ±5  
|
```

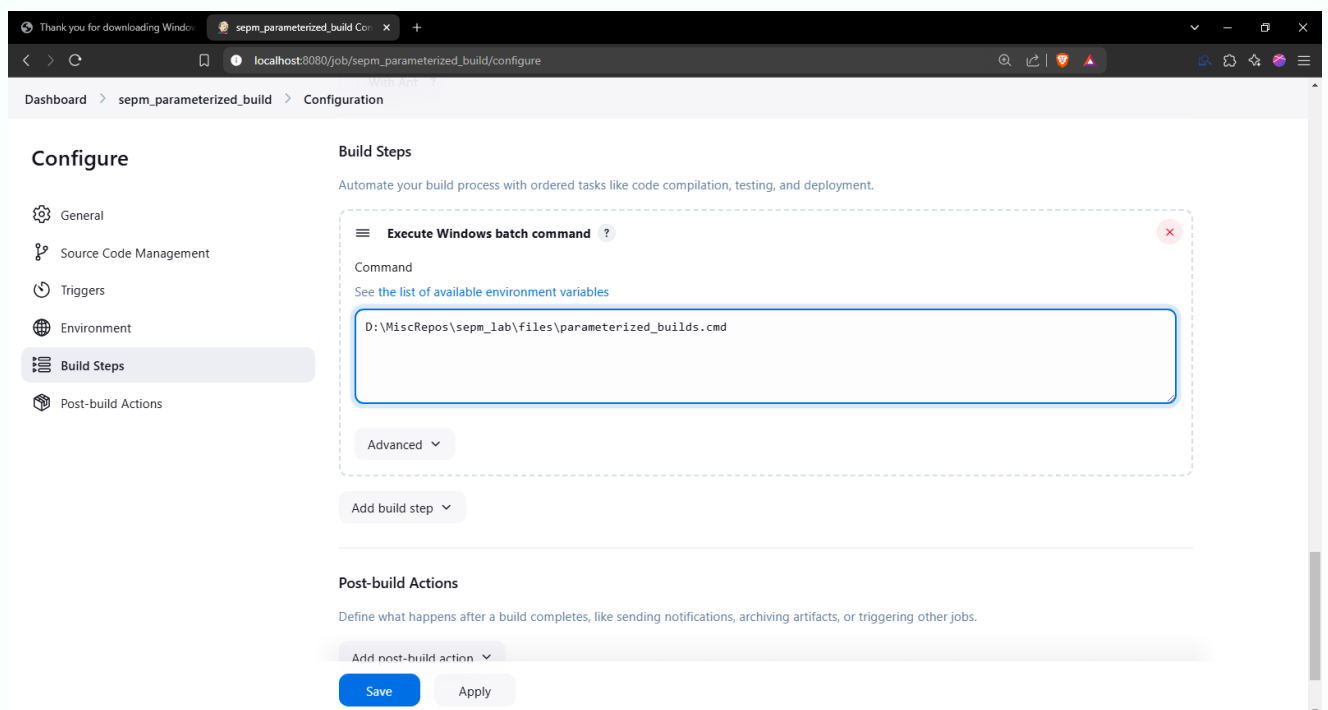
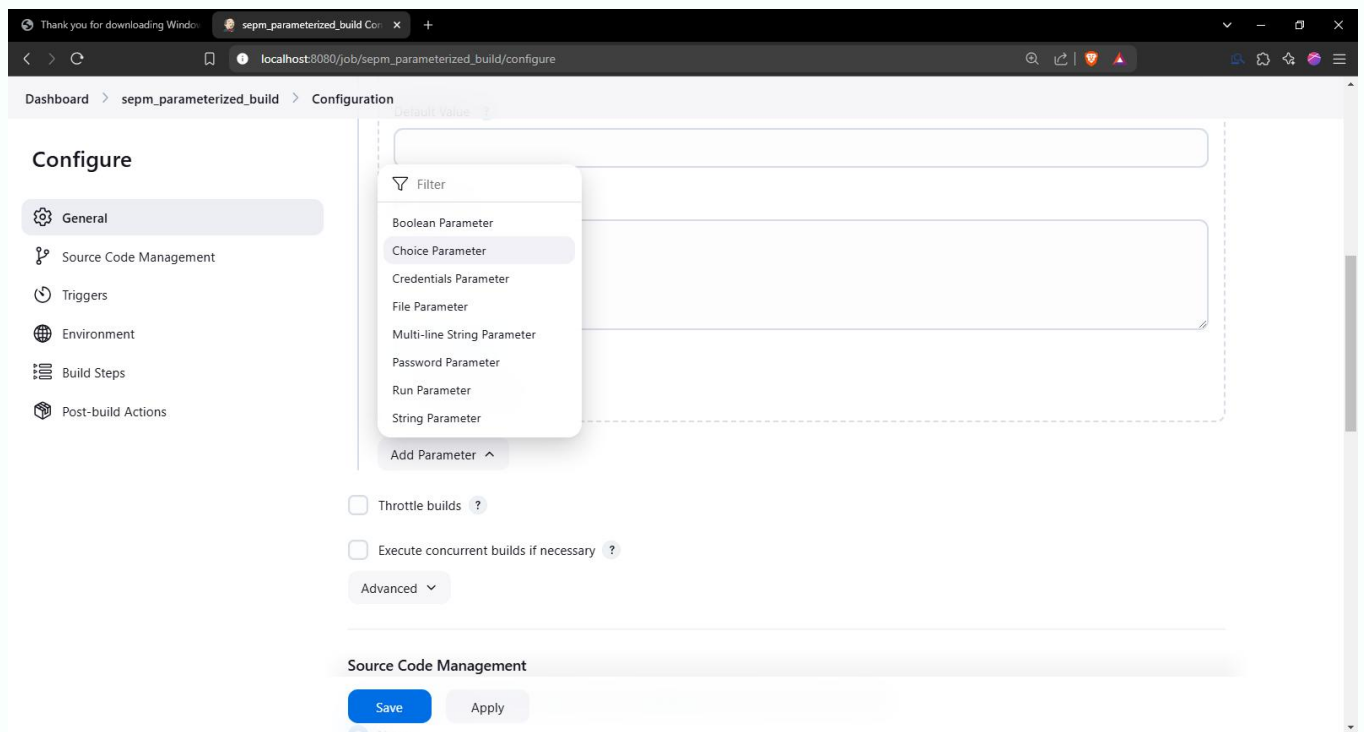
Configure Jenkins :





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

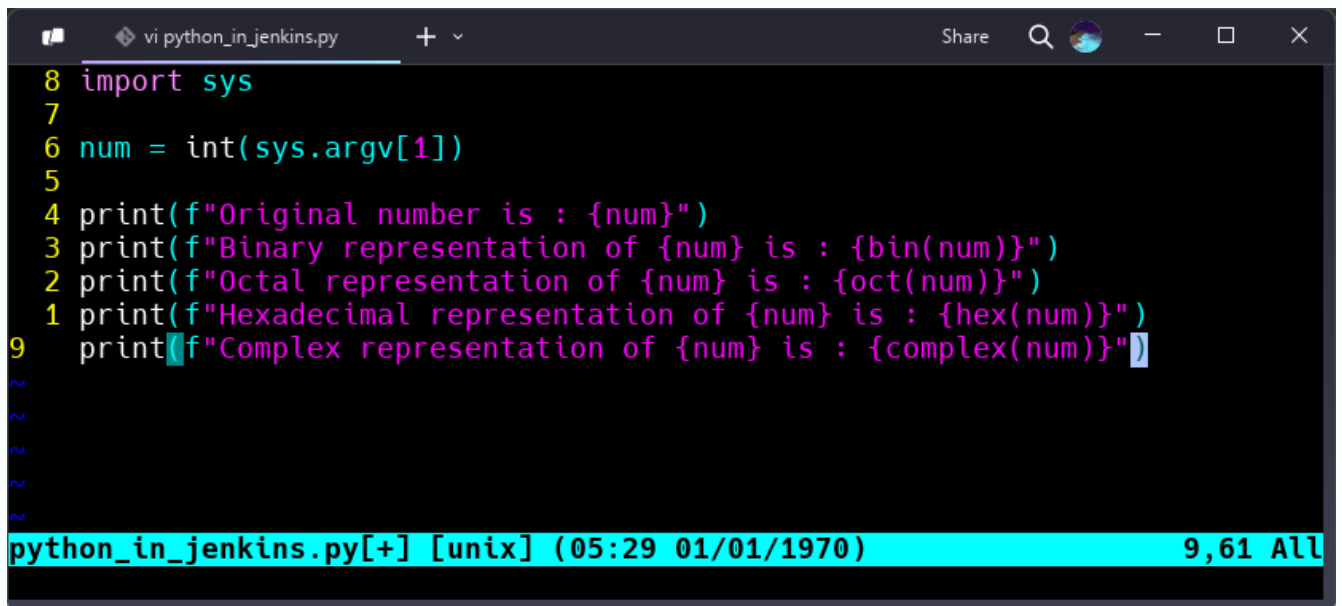
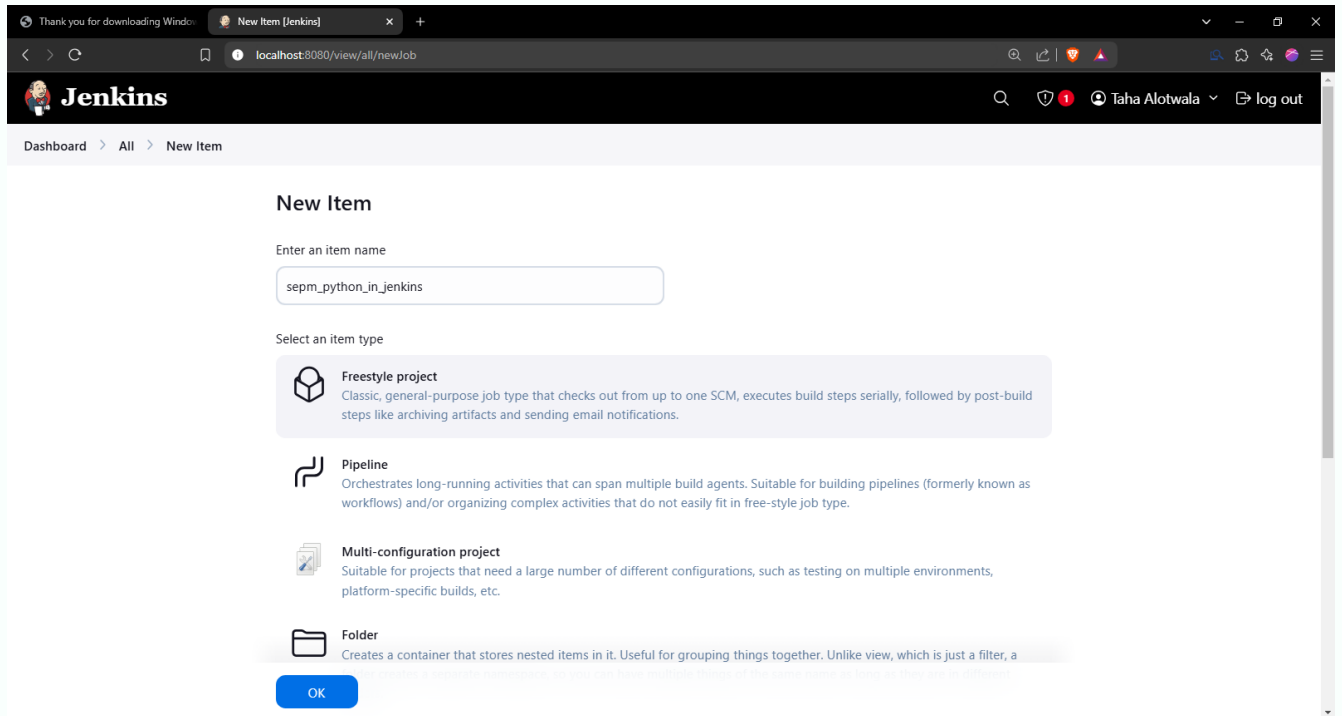
Download Copy View as plain text

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

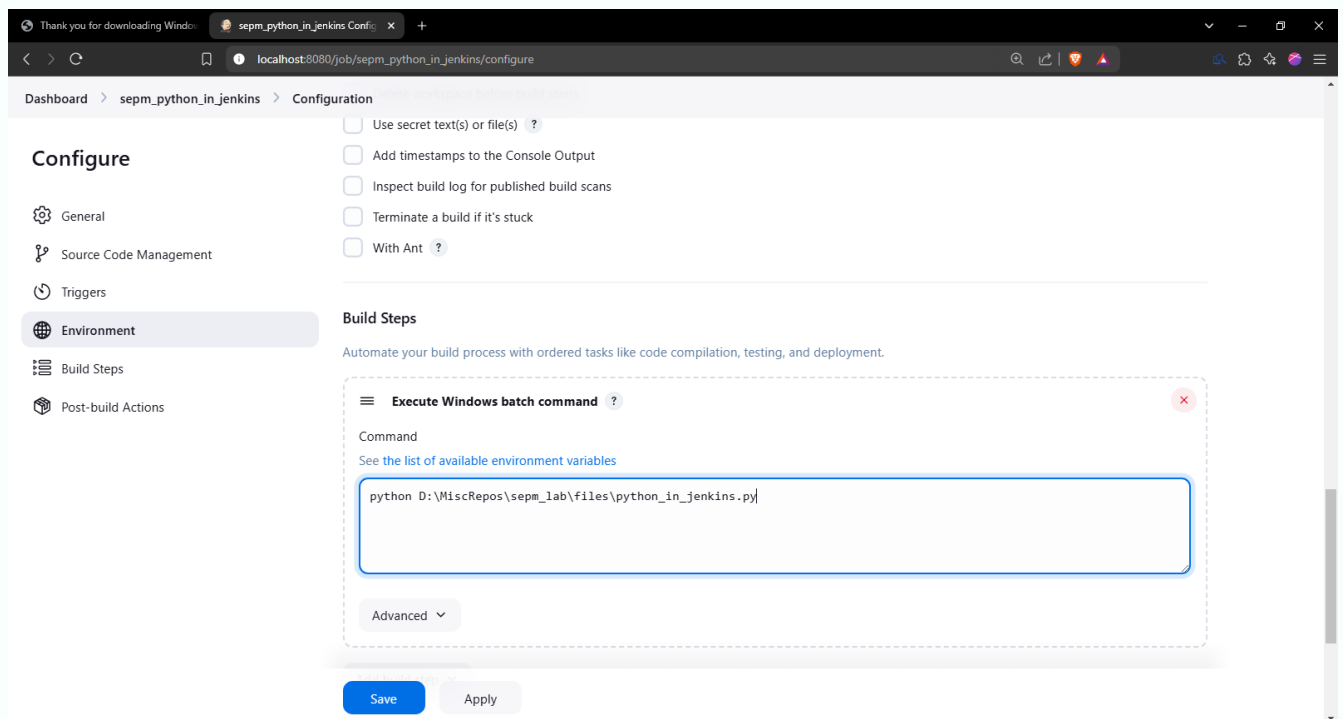


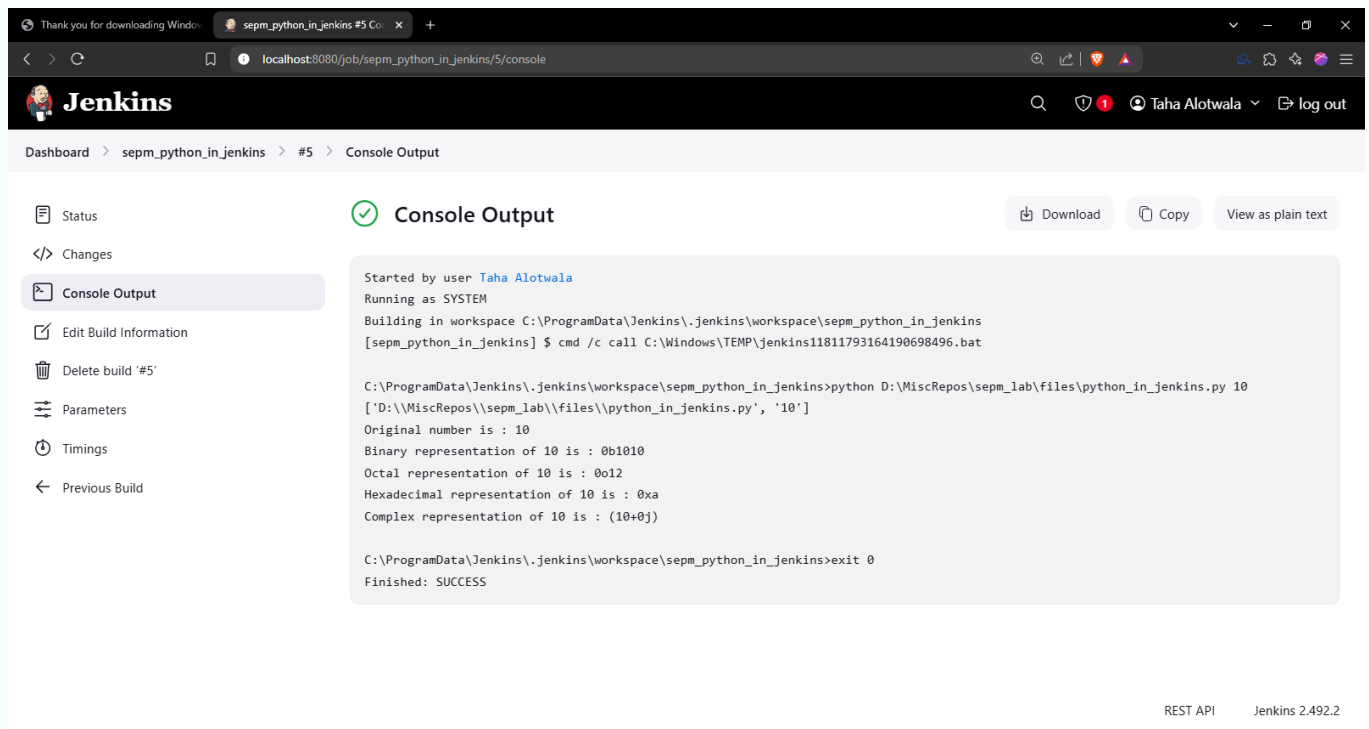
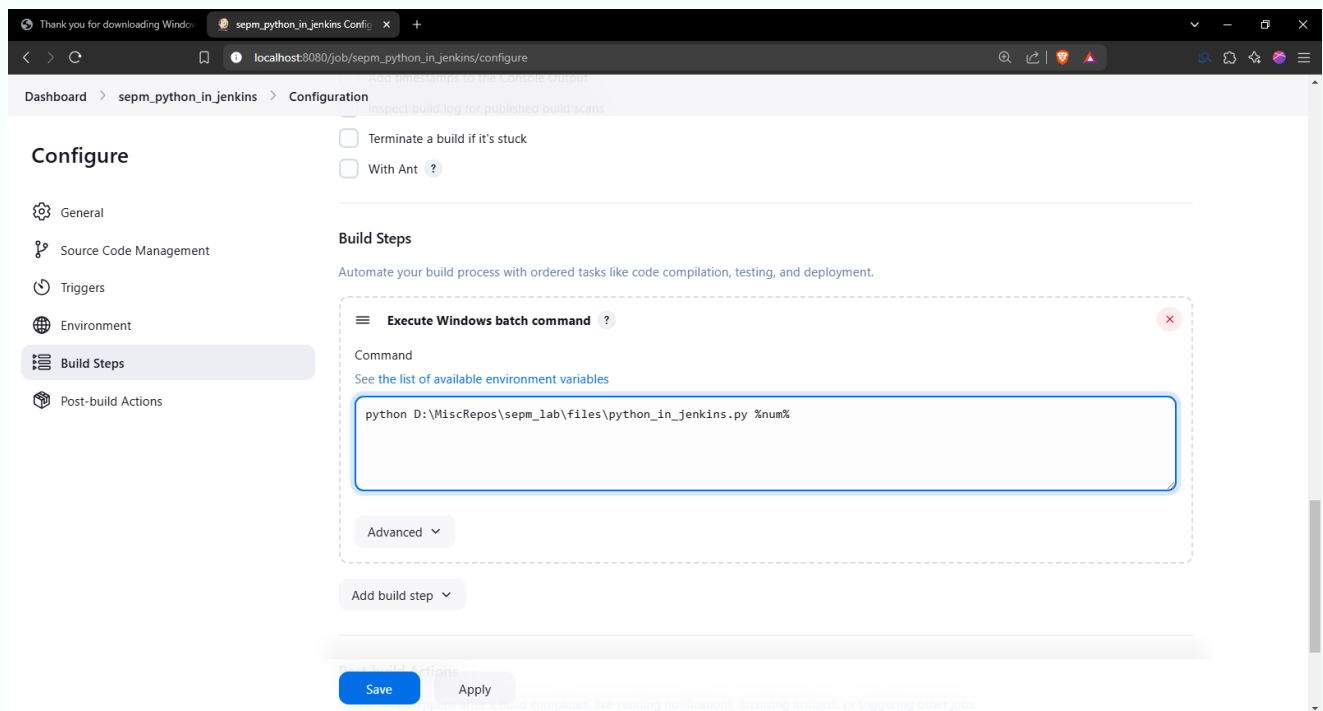
```
./MiscRepos/sepm_lab/files  + v
Share  🔍  🌐  -  □  ✕

/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.