

Experiment 5

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 :

Programming in Jenkins:

Continuous Integration is a software development practice where members of a team integrate their work frequently, usually each person integrates at least daily leading to multiple integrations per day. Each integration is verified by an automated build (including test) to detect integration errors as quickly as possible.” In simple way, Continuous integration (CI) is the practice of frequently building and testing each change done to your code automatically. 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. Our first job will execute the shell commands. The freestyle project provides enough options and features to build the complex jobs that you will need in your projects.

Example 1

Example 1.1: Deploying a freestyle app in Jenkins

Creating a job:

Start building your software project

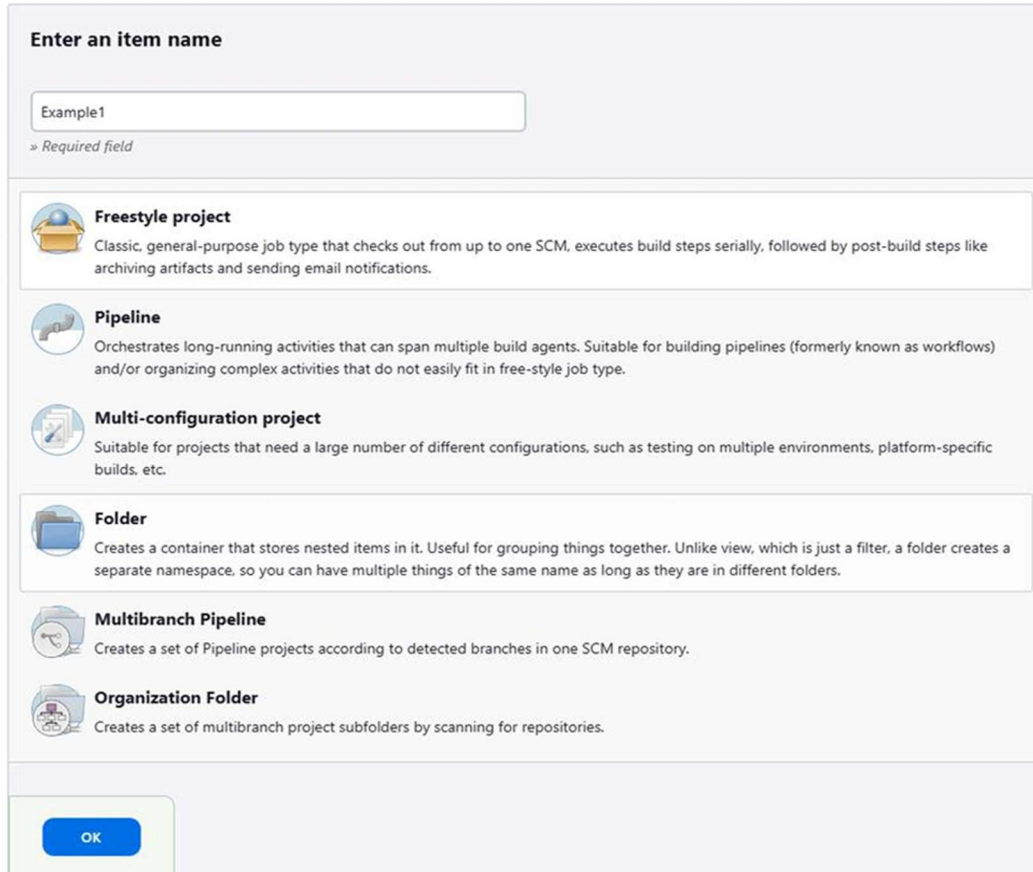
Create a job



Experiment 5

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

Naming the job and setting it as freestyle:



Enter an item name

Example1

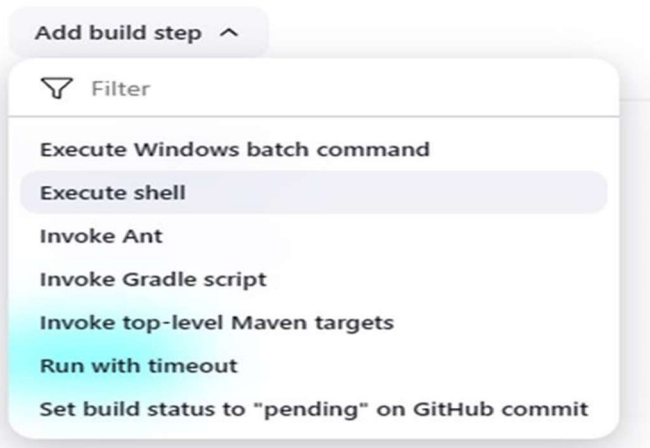
» Required field

- Freestyle project**
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.
- Pipeline**
Orchestrates long-running activities that can span 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**
Creates a container that stores nested 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

Selecting build type as "Execute shell":

Build Steps



Add build step ^

Filter

- Execute Windows batch command
- Execute shell**
- Invoke Ant
- Invoke Gradle script
- Invoke top-level Maven targets
- Run with timeout
- Set build status to "pending" on GitHub commit

Experiment 5

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

Entering a simple command for the shell execution:

Build Steps

Execute shell ?

Command

See the list of available environment variables

```
echo "Hello TSEC"
```

Advanced ▾

Applying and saving the project configuration:

Save

Apply

✓ Saved

Building the project:

▶ Build Now

Console output (after building):

Status

Changes

Console Output

View as plain text

Edit Build Information

Delete build #3

✓ Console Output

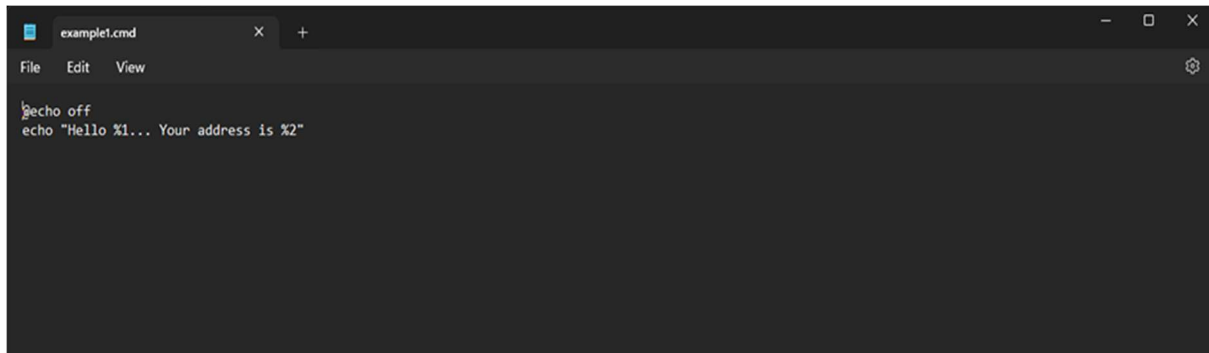
```
Started by user Siddhant Chatur
Running as SYSTEM
Building in workspace C:\ProgramData\Jenkins\jenkins\workspace\Example1
[Example1] $ "C:\Program Files\Git\bin\sh.exe" -xe C:\WINDOWS\TEMP\Jenkins5583852534385488955.sh
+ echo "Hello TSEC"
Hello TSEC
Finished: SUCCESS
```

Experiment 5

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

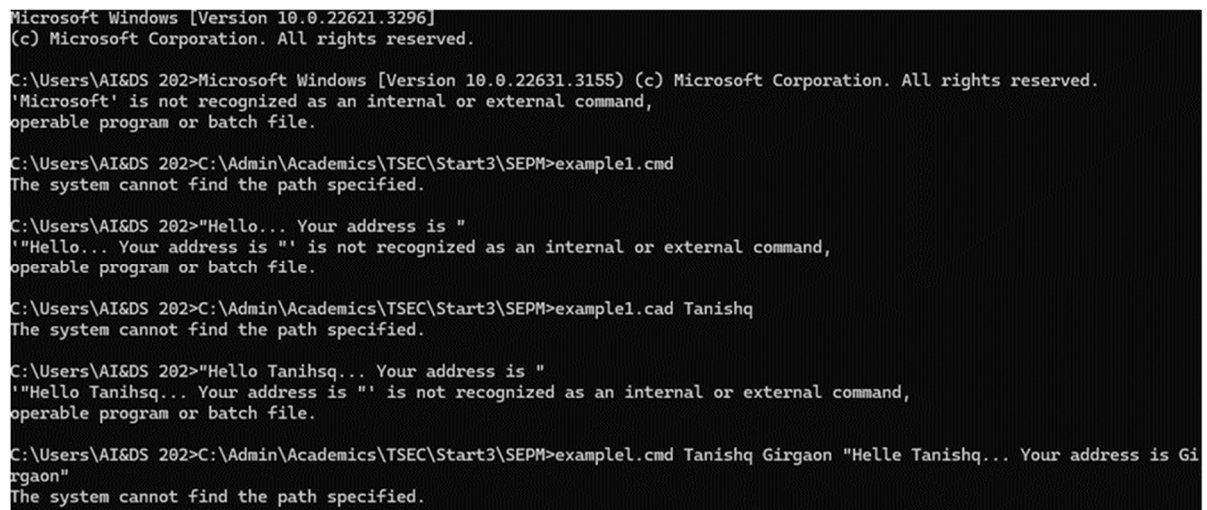
Example 1.2: Taking parameters through files

Contents of script example1.cmd:



```
example1.cmd
File Edit View
echo off
echo "Hello %1... Your address is %2"
```

Executing script example1.cmd on the terminal:



```
Microsoft Windows [Version 10.0.22621.3296]
(c) Microsoft Corporation. All rights reserved.

C:\Users\AI&DS 202>Microsoft Windows [Version 10.0.22631.3155] (c) Microsoft Corporation. All rights reserved.
'Microsoft' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\AI&DS 202>C:\Admin\Academics\TSEC\Start3\SEPM>example1.cmd
The system cannot find the path specified.

C:\Users\AI&DS 202>"Hello... Your address is "
'"Hello... Your address is "' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\AI&DS 202>C:\Admin\Academics\TSEC\Start3\SEPM>example1.cad Tanishq
The system cannot find the path specified.

C:\Users\AI&DS 202>"Hello Tanihsq... Your address is "
'"Hello Tanihsq... Your address is "' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\AI&DS 202>C:\Admin\Academics\TSEC\Start3\SEPM>example1.cmd Tanishq Girgaon "Helle Tanishq... Your address is Gi
rgaon"
The system cannot find the path specified.
```

Modifying the Jenkins project to execute the script while supplying required parameters:



Experiment 5

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

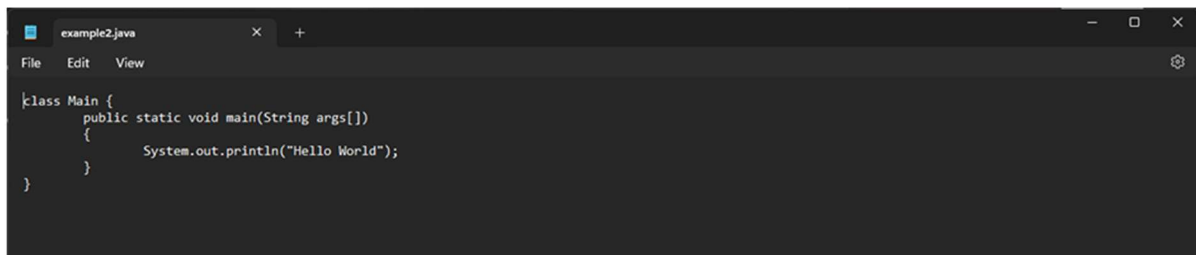
Console output after building the modified project:



Example 2

Example 2.1: Running a Java program under Jenkins

Creating a simple Java program:



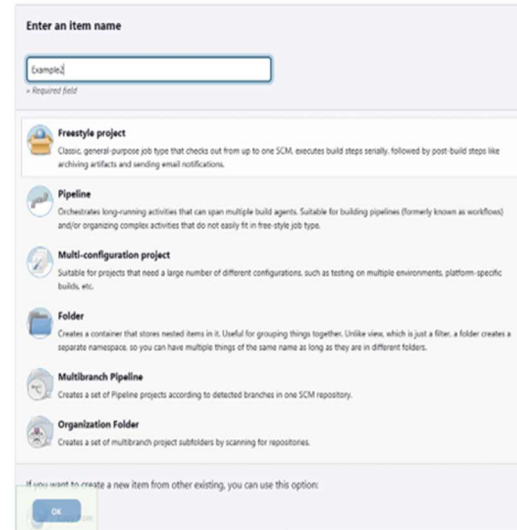
Compiling and running the program on the terminal:



Experiment 5

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

Creating a new freestyle project:



Enter an item name

example2

Required field

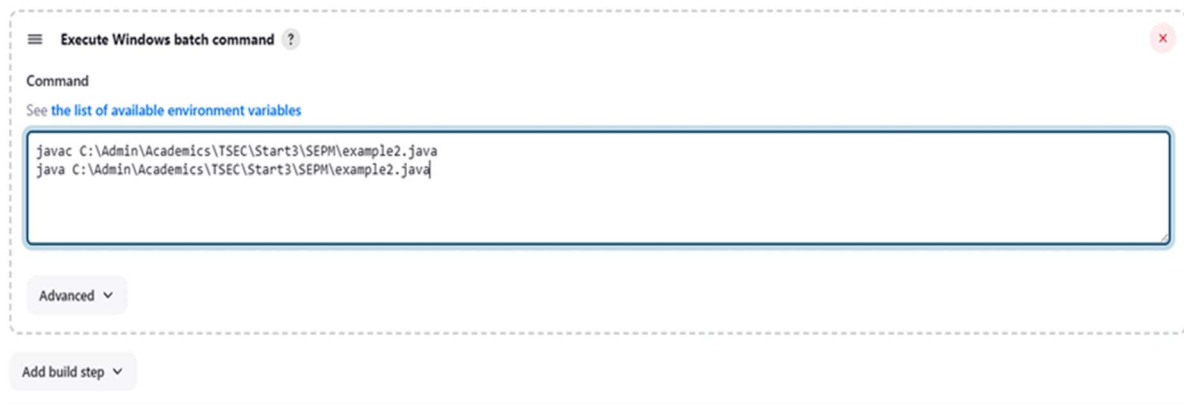
- Freestyle project**
Classic, general purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.
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- Folder**
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- 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.

If you want to create a new item from other existing, you can use this option

OK

Configure new project:

Build Steps



Execute Windows batch command ?

Command

See the list of available environment variables

```
javac C:\Admin\Academics\TSEC\Start3\SEPM\example2.java
java C:\Admin\Academics\TSEC\Start3\SEPM\example2.java
```

Advanced ▾

Add build step ▾

Console output after building:

✓ Console Output

```
Started by user Siddhant Chetiar
Running as SYSTEM
[EnvInject] - Loading node environment variables.
Building in workspace C:\ProgramData\Jenkins\jenkins\workspace\Example2
[Example2] $ cmd /c call C:\WINDOWS\TEMP\Jenkins15296462484398614135.bat

C:\ProgramData\Jenkins\jenkins\workspace\Example2>javac C:\Admin\Academics\TSEC\Start3\SEPM\example2.java

C:\ProgramData\Jenkins\jenkins\workspace\Example2>java C:\Admin\Academics\TSEC\Start3\SEPM\example2.java
Hello World

C:\ProgramData\Jenkins\jenkins\workspace\Example2>exit 0
Finished: SUCCESS
```

Experiment 5

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

Example 3

Example 3.1: Parameterise build

Creating a new freestyle project:

Enter an item name

Example3

» Required field

- Freestyle project**
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.
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If you want to create a new item from other existing, you can use this option:

OK

Enabling parameterisation and adding a String parameter:

☒ This project is parameterized ?

Add Parameter ^

- Filter
- Boolean Parameter
- Choice Parameter
- Credentials Parameter
- File Parameter
- Multi-line String Parameter
- Password Parameter
- Run Parameter
- String Parameter

Experiment 5

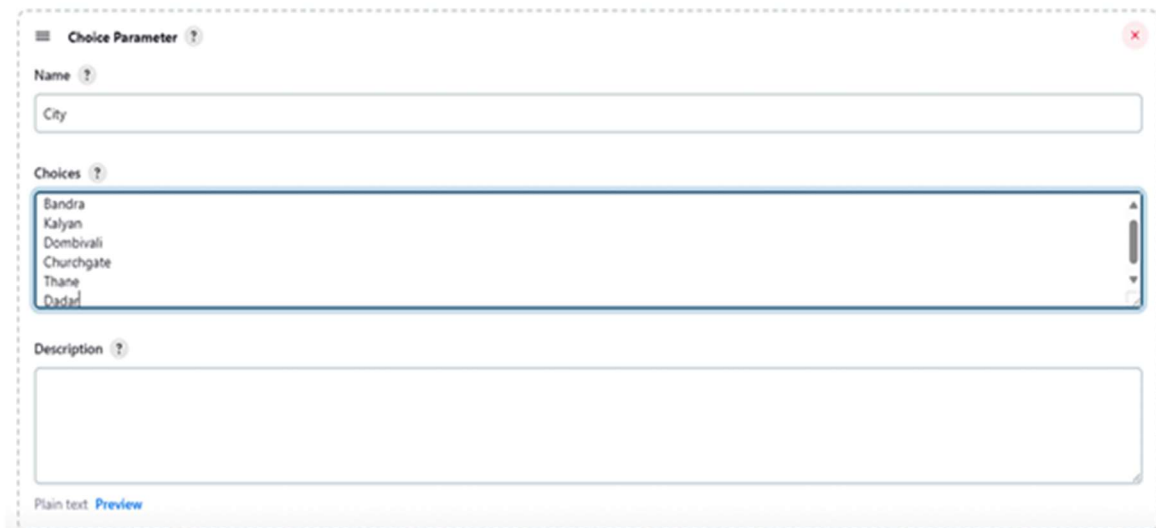
Aim: To Build the pipeline of jobs using Maven / Gradle / Ant in Jenkins, create a pipeline script to Test and deploy an application over the tomcat server

Configuring the string parameter as Fname:



The screenshot shows the Jenkins 'String Parameter' configuration page. It has a title bar 'String Parameter' with a help icon and a close button. The form includes a 'Name' field with the value 'Fname', a 'Default Value' field, and a 'Description' text area. At the bottom, there is a 'Trim the string' checkbox and a 'Plain text' label with a 'Preview' link.

Adding a choice parameter and configuring it as City with the following choices:



The screenshot shows the Jenkins 'Choice Parameter' configuration page. It has a title bar 'Choice Parameter' with a help icon and a close button. The form includes a 'Name' field with the value 'City', a 'Choices' list box containing 'Bandra', 'Kalyan', 'Dombivli', 'Churchgate', 'Thane', and 'Dadar', and a 'Description' text area. At the bottom, there is a 'Plain text' label with a 'Preview' link.

Experiment 5

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

Creating a script which takes 2 arguments for name and city:

```
C:\Users\AI&DS 202>Microsoft Windows [Version 10.0.22631.3155] (c) Microsoft Corporation. All rights reserved.
'Microsoft' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\AI&DS 202>C:\Admin\Academics\TSEC\Start3\SEPH>example3.cnd
The system cannot find the path specified.

C:\Users\AI&DS 202>Hello your name is and your city is
'Hello' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\AI&DS 202>C:\Admin\Academics\TSEC\Start3\SEPH example3.cmd Tanishq
The system cannot find the path specified.

C:\Users\AI&DS 202>Hello your name is Tanishq and your city is
'Hello' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\AI&DS 202>C:\Admin\Academics\TSEC\Start3\SEPH>example3.cmd Tansishq Bandra
The system cannot find the path specified.

C:\Users\AI&DS 202>Hello your name is Tanishq and your city is Bandra
'Hello' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\AI&DS 202>C:\Admin\Academics\TSEC\Start3\SEPH
```

Configuring build steps:

Build Steps

Execute Windows batch command ?

Command

See the list of available environment variables

C:\Admin\Academics\TSEC\Start3\SEPH\example3.cmd %fname% %city%

Advanced ▾

Add build step ▾

Experiment 5

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

Entering parameters for build:

Project Example3

This build requires parameters:

Fname

City

Console output after building:

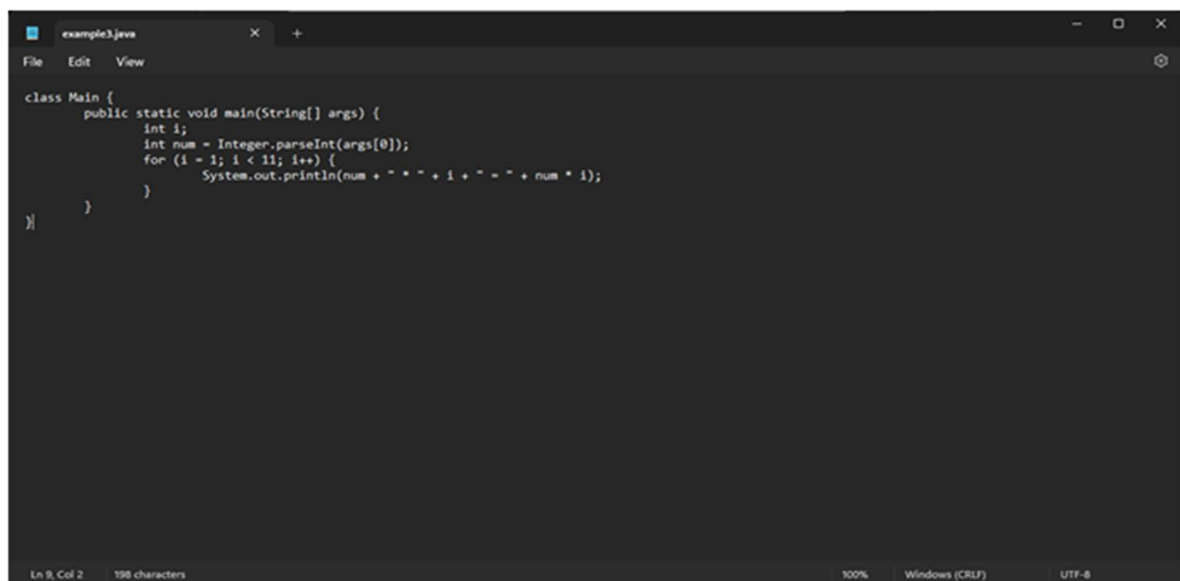
✓ Console Output

```
Started by user Siddhant Chetlur
Running as SYSTEM
[EnvInject] - Loading node environment variables.
Building in workspace C:\ProgramData\Jenkins\workspace\Example3
[Example3] $ cmd /c call C:\WINDOWS\TEMP\Jenkins4894536165150986151.bat

C:\ProgramData\Jenkins\workspace\Example3>C:\Admin\Academico\TSEC\Start3\SEPM\example3.cmd Siddhant Bandra
Hello your name is Siddhant and your city is Bandra
Finished: SUCCESS
```

Example 3.2: Running a Java program with parameters

Creating a Java program with an input argument:



```
example3.java
File Edit View

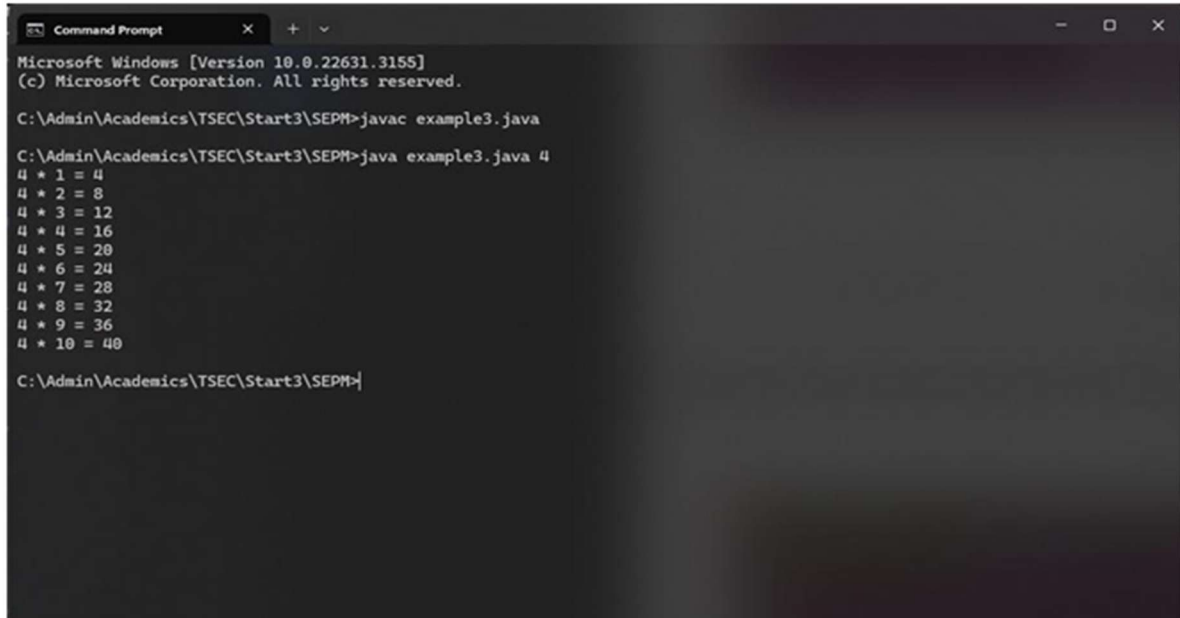
class Main {
    public static void main(String[] args) {
        int i;
        int num = Integer.parseInt(args[0]);
        for (i = 1; i < 11; i++) {
            System.out.println(num + " * " + i + " = " + num * i);
        }
    }
}
```

Ln 9, Col 2 198 characters 100% Windows (CRLF) UTF-8

Experiment 5

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

Testing the program on the terminal:



```
Command Prompt
Microsoft Windows [Version 10.0.22631.3155]
(c) Microsoft Corporation. All rights reserved.

C:\Admin\Academics\TSEC\Start3\SEPM>javac example3.java

C:\Admin\Academics\TSEC\Start3\SEPM>java example3.java 4
4 * 1 = 4
4 * 2 = 8
4 * 3 = 12
4 * 4 = 16
4 * 5 = 20
4 * 6 = 24
4 * 7 = 28
4 * 8 = 32
4 * 9 = 36
4 * 10 = 40

C:\Admin\Academics\TSEC\Start3\SEPM>
```

Experiment 5

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

Creating a new freestyle project:

Enter an item name

Example4

» Required field

- Freestyle project**
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.
- Pipeline**
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- Multi-configuration project**
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- 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.

If you want to create a new item from other existing, you can use this option:

OK

Parameterise the project by adding a string parameter as follows:

☒ This project is parameterized

String Parameter

Name: num

Default Value:

Description:

Plain text [Preview](#)

☐ Trim the string

Add Parameter

Experiment 5

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

Configure the build steps:

Build Steps



The screenshot shows the 'Execute Windows batch command' step configuration in Jenkins. The 'Command' field contains the following text:

```
javac C:\Admin\Academics\TSEC\Start3\SEPH\example3.java
java C:\Admin\Academics\TSEC\Start3\SEPH\example3.java %num%
```

Below the command field, there is an 'Advanced' dropdown menu and an 'Add build step' button.

Entering the parameter for the build:

Project Example4

This build requires parameters:

num

Console output after building:

✓ Console Output

```
Started by user Siddhant Chetlur
Running as SYSTEM
[EnvInject] - Loading node environment variables.
Building in workspace C:\ProgramData\Jenkins\jenkins\workspace\Example4
[Example4] $ cmd /c call C:\WINDOWS\TEMP\jenkins15119185770823247708.bat

C:\ProgramData\Jenkins\jenkins\workspace\Example4>javac C:\Admin\Academics\TSEC\Start3\SEPH\example3.java

C:\ProgramData\Jenkins\jenkins\workspace\Example4>java C:\Admin\Academics\TSEC\Start3\SEPH\example3.java 25
25 * 1 = 25
25 * 2 = 50
25 * 3 = 75
25 * 4 = 100
25 * 5 = 125
25 * 6 = 150
25 * 7 = 175
25 * 8 = 200
25 * 9 = 225
25 * 10 = 250

C:\ProgramData\Jenkins\jenkins\workspace\Example4>exit 0
Finished: SUCCESS
```

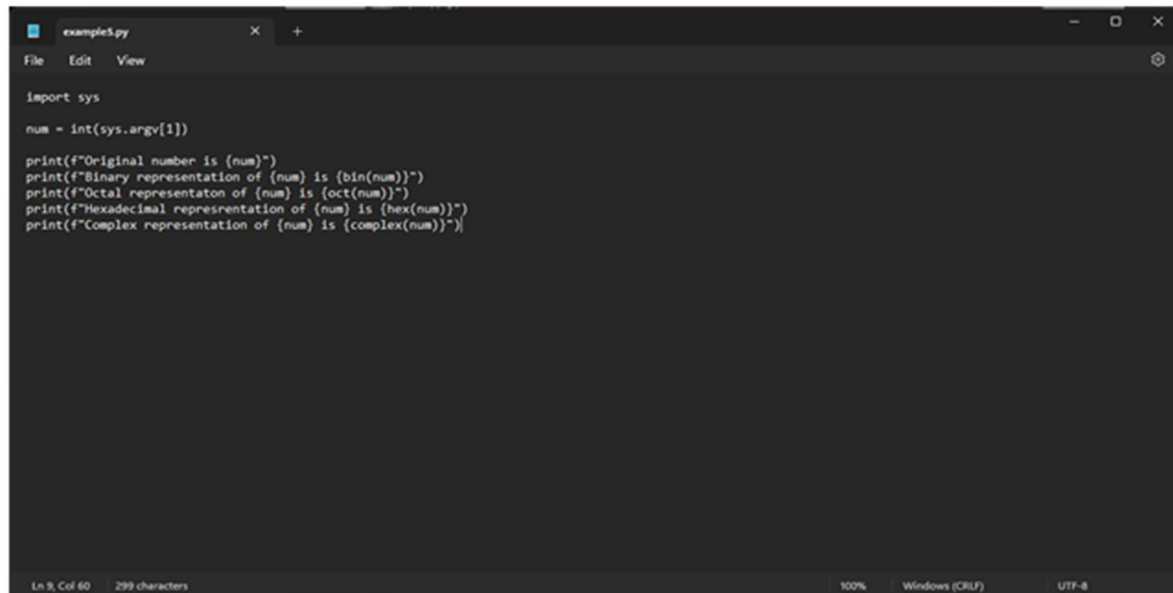
Experiment 5

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

Example 5 Example

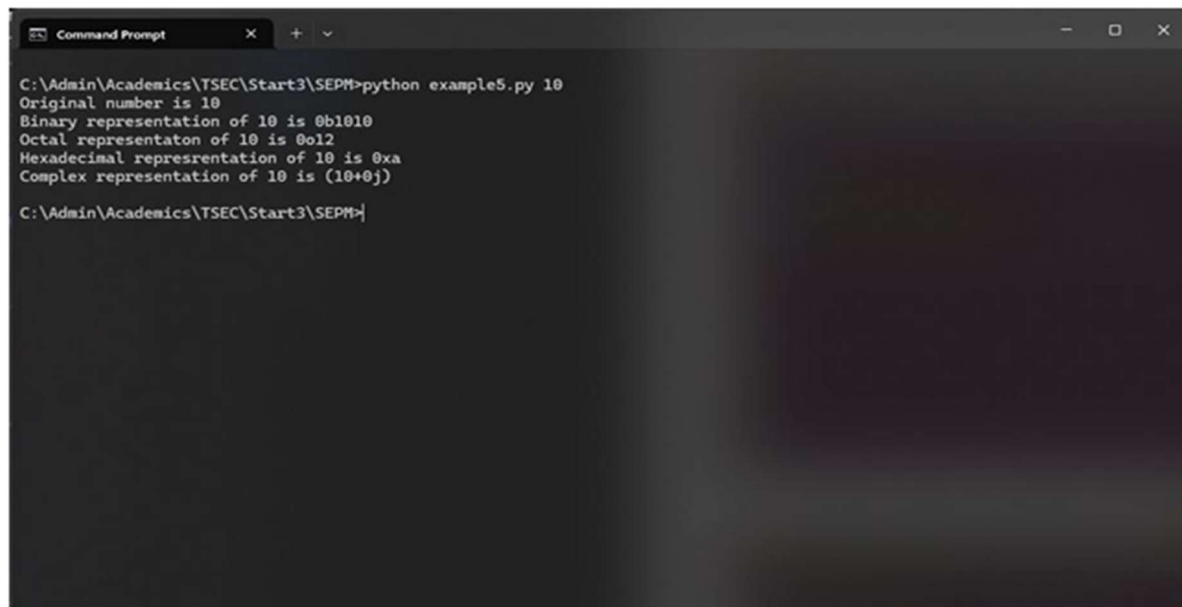
5.1: Running a Python program

Creating a simple Python script:



```
example5.py
File Edit View
import sys
num = int(sys.argv[1])
print(f"Original number is {num}")
print(f"Binary representation of {num} is {bin(num)}")
print(f"Octal representation of {num} is {oct(num)}")
print(f"Hexadecimal representation of {num} is {hex(num)}")
print(f"Complex representation of {num} is {complex(num)}")
Ln 9, Col 60 299 characters 100% Windows (CRLF) UTF-8
```

Running the Python script on the terminal:

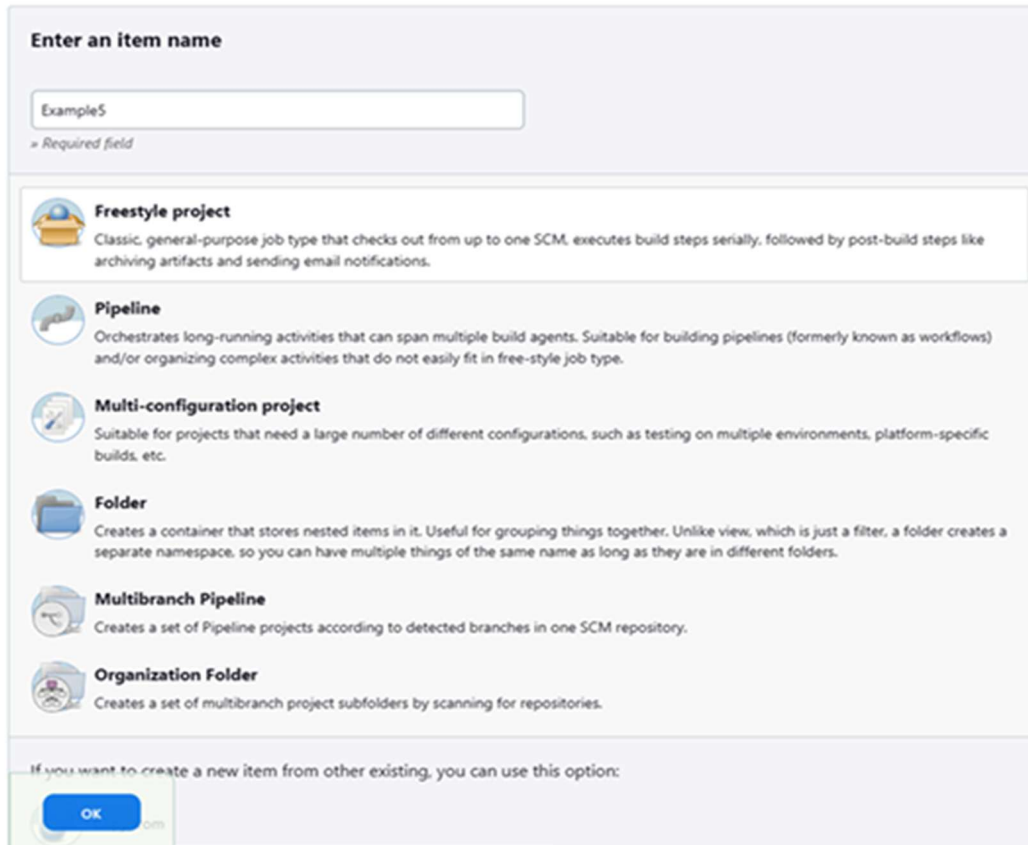


```
Command Prompt
C:\Admin\Academics\TSEC\Start3\SEPM>python example5.py 10
Original number is 10
Binary representation of 10 is 0b1010
Octal representation of 10 is 0o12
Hexadecimal representation of 10 is 0xa
Complex representation of 10 is (10+0j)
C:\Admin\Academics\TSEC\Start3\SEPM>
```

Experiment 5

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

Creating a new freestyle project:

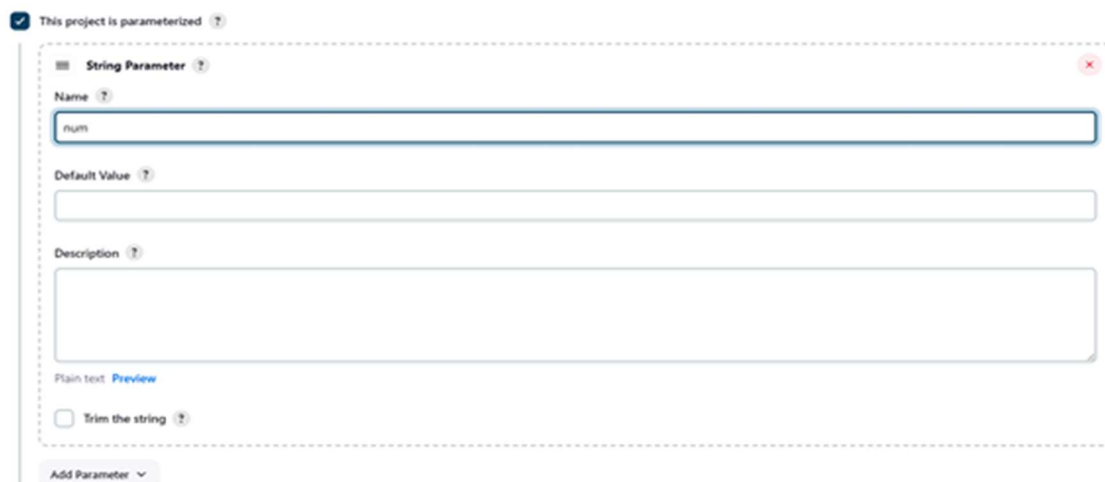


The screenshot shows the Jenkins 'Create new item' dialog. At the top, there is a text input field labeled 'Enter an item name' with the placeholder text 'Example5' and a note '» Required field'. Below this, there is a list of project types with icons and descriptions:

- Freestyle project**: Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.
- Pipeline**: Orchestrates long-running activities that can span 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.
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- 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.

At the bottom, there is a note: 'If you want to create a new item from other existing, you can use this option:' followed by a blue 'OK' button.

Parameterising the project with a string parameter as follows:



The screenshot shows the Jenkins 'String Parameter' configuration dialog. At the top, there is a checkbox labeled 'This project is parameterized' which is checked. Below this, there is a section titled 'String Parameter' with a red 'X' icon in the top right corner. Inside this section, there are three input fields:

- Name**: A text input field containing the value 'num'.
- Default Value**: An empty text input field.
- Description**: A large text area for describing the parameter.

Below the input fields, there is a 'Plain text' label and a 'Preview' link. At the bottom, there is a checkbox labeled 'Trim the string' which is unchecked. Below the entire configuration area, there is a button labeled 'Add Parameter' with a dropdown arrow.

Experiment 5

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

Configuring the build steps:

Build Steps

Execute Windows batch command ?

Command

See the list of available environment variables

```
python C:\Admin\Academics\TSEC\Start3\SEPH\example5.py %num%
```

Advanced ▾

Add build step ▾

Setting the parameter for the build:

Project Example5

This build requires parameters:

num

▶ Build

Cancel

Console output after building:

✓ Console Output

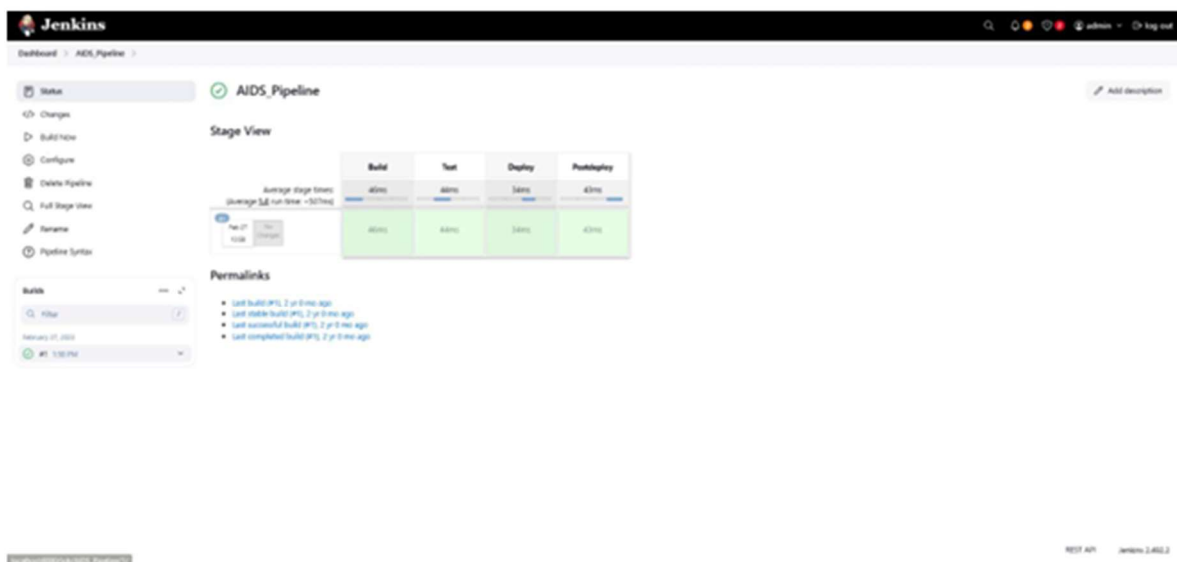
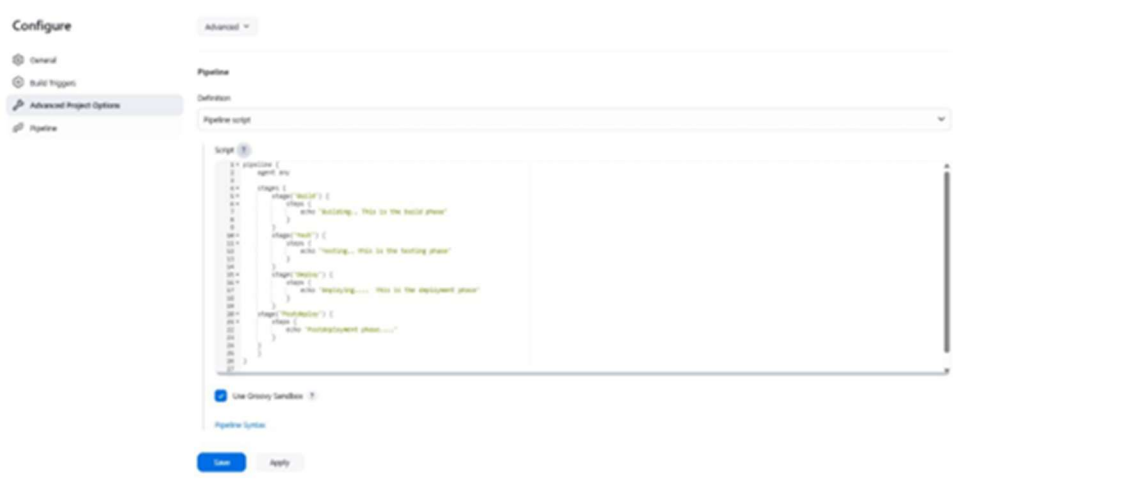
```
Started by user Siddhant Chetlur
Running as SYSTEM
[EnvInject] - Loading node environment variables.
Building in workspace C:\ProgramData\Jenkins\jenkins\workspace\Example5
[Example5] $ cmd /c call C:\WINDOWS\TEMP\jenkins11157306491994478222.bat

C:\ProgramData\Jenkins\jenkins\workspace\Example5>python C:\Admin\Academics\TSEC\Start3\SEPH\example5.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)

C:\ProgramData\Jenkins\jenkins\workspace\Example5>exit 0
Finished: SUCCESS
```

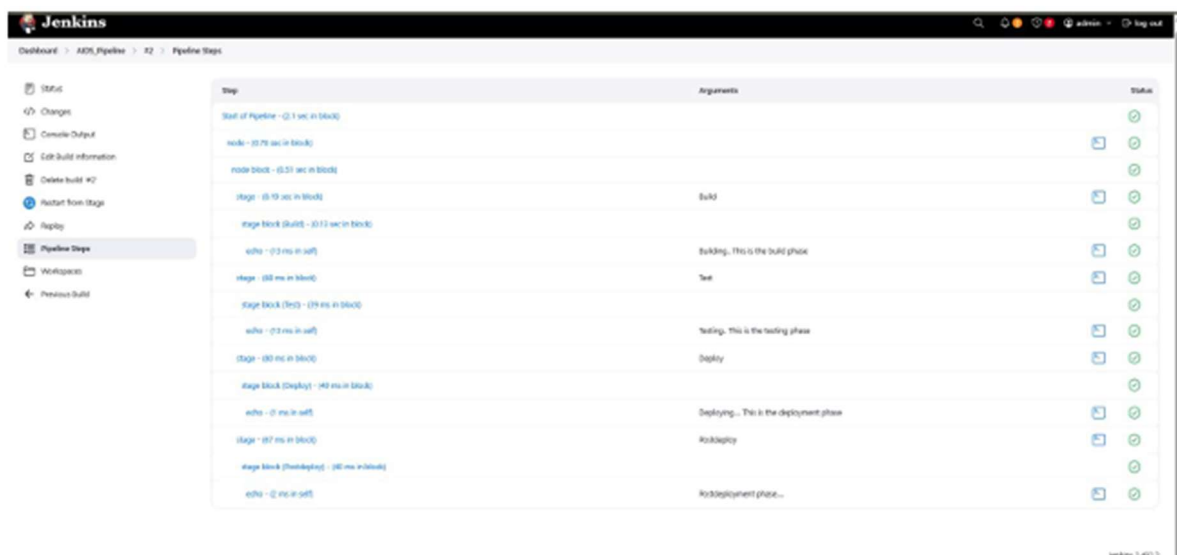
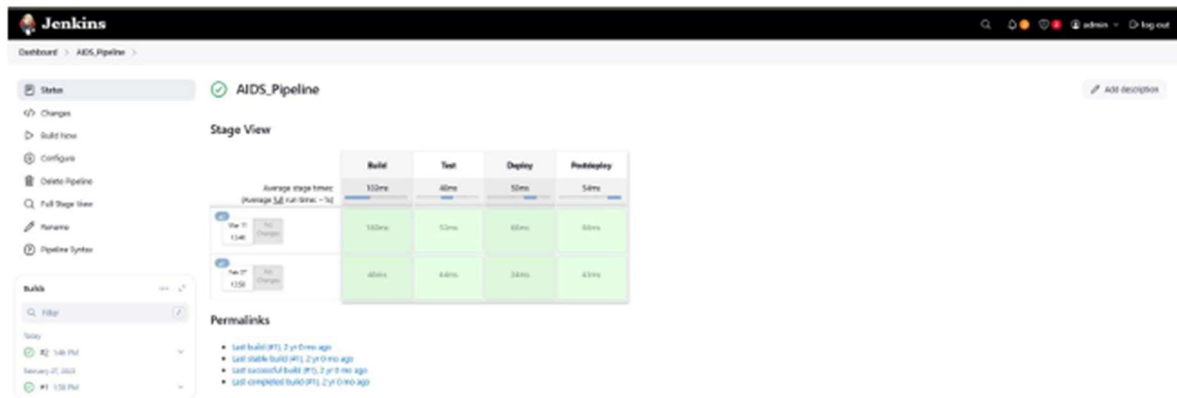

Experiment 5

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Conclusion: Thus, we have successfully Build the pipeline of jobs using Maven / Gradle / Ant in Jenkins, created a pipeline script to Test and deploy an application over the tomcat server.