

School of Computer Science

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
DEHRADUN, UTTARAKHAND**



**Continuous Integration and Continuous Delivery
Lab**

**Lab File
(2023-2024)**

for

5th Semester

Submitted To:

Dr. Hitesh Kumar Sharma

Submitted By:

Dhruv Agarwal

B. Tech. CSE

[DevOps]

500093041

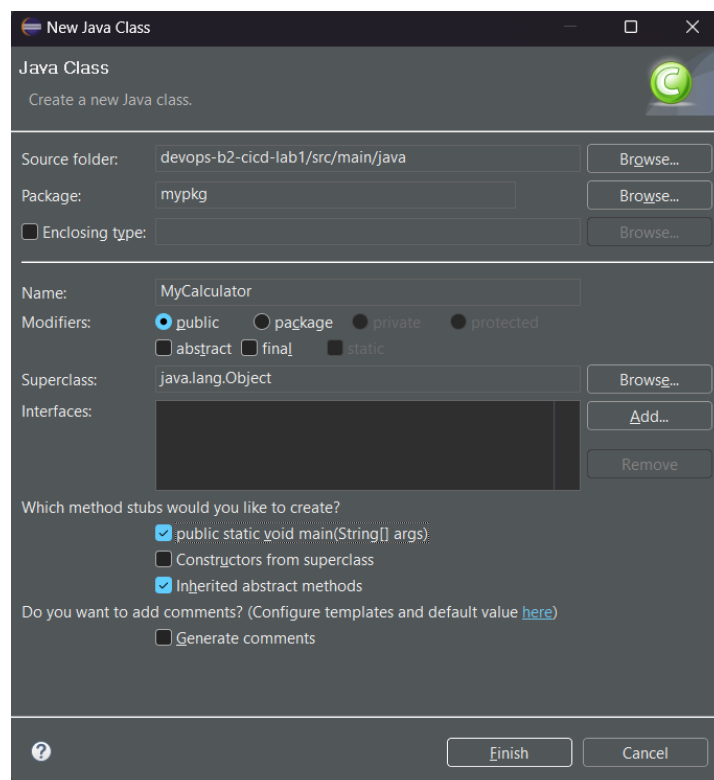
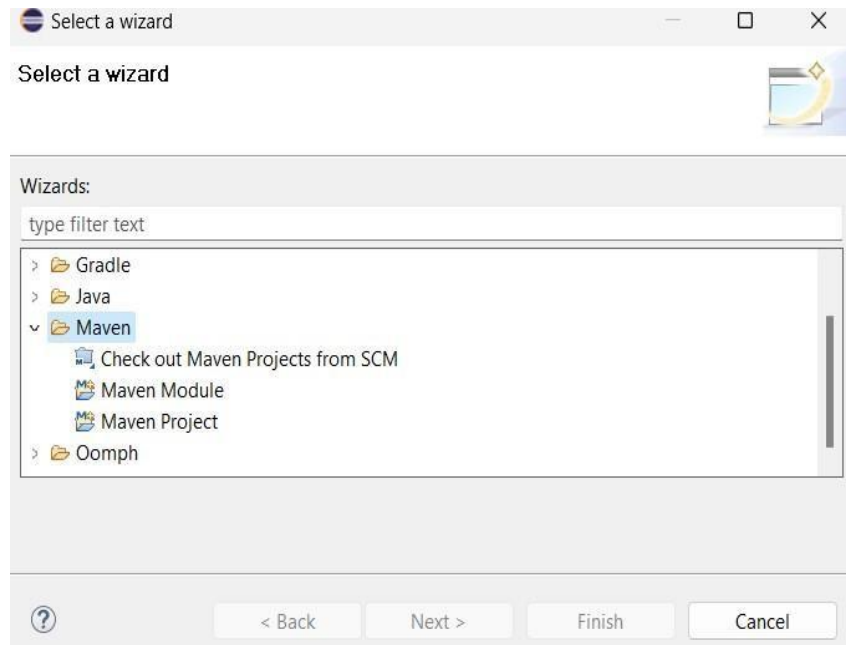
R2142210273

B2- DevOps (Non-Hons)

LAB EXERCISE - 1

Aim:

1] Create a Maven Project in eclipse.



```
devops-b2-cicd-lab1/pom.xml  MyCalculator.java ×
1 package mypkg;
2
3 public class MyCalculator {
4
5     public int sum(int a, int b)
6     {
7         return(a+b);
8     }
9
10    public int diff(int a, int b)
11    {
12        return(a-b);
13    }
14    public static void main(String[] args) {
15
16        MyCalculator calc = new MyCalculator ();
17        System.out.println("Sum is "+calc.sum(20, 10));
18        System.out.println("Diff is "+calc.diff(20, 10));
19
20
21    }
22
23 }
```

Problems Javadoc Declaration Console ×

<terminated> MyCalculator [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Aug
Sum is 30
Diff is 10

```
devops-b2-cicd-lab1/pom.xml × MyCalculator.java
https://maven.apache.org/xsd/maven-4.0.0.xsd (xsi:schemaLocation)
1 <?xml version="1.0" encoding="UTF-8" ?>
2 <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3     xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
4     <modelVersion>4.0.0</modelVersion>
5     <groupId>devops-b2-cicd-lab1</groupId>
6     <artifactId>devops-b2-cicd-lab1</artifactId>
7     <version>0.0.1-SNAPSHOT</version>
8
9     <properties>
10         <maven.compiler.source>1.8</maven.compiler.source>
11         <maven.compiler.target>1.8</maven.compiler.target>
12     </properties>
13
14     <dependencies>
15         <dependency>
16             <groupId>junit</groupId>
17             <artifactId>junit</artifactId>
18             <version>4.13</version>
19             <scope>test</scope>
20         </dependency>
21         <dependency>
22             <groupId>org.sonarsource.scanner.maven</groupId>
23             <artifactId>sonar-maven-plugin</artifactId>
24             <version>3.9.0.2155</version>
25         </dependency>
26     </dependencies>
27
28     <build>
29         <finalName>my-calculator</finalName>
30         <plugins>
31             <plugin>
32                 <!-- Build an executable JAR test ABC-->
33                 <groupId>org.apache.maven.plugins</groupId>
34                 <artifactId>maven-jar-plugin</artifactId>
35                 <version>3.1.0</version>
36                 <configuration>
37                     <archive>
38                         <addClasspath>true</addClasspath>
39                         <classpathPrefix>lib</classpathPrefix>
40                         <mainClass>mypkg.MyCalculator</mainClass>
41                     </archive>
42                 </configuration>
43             </plugin>
44         </plugins>
45     </build>
46 </project>
```

2] Push project on github.

```
HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git config --global user.email "dhruvag1978@gmail.com"

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git config --global user.name "dhruvag1978"

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git remote add origin https://github.com/dhruvag1978/CICD-Lab1.git
error: remote origin already exists.

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git remote remove origin

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git remote add origin https://github.com/dhruvag1978/CICD-Lab1.git

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git remote -v
origin https://github.com/dhruvag1978/CICD-Lab1.git (fetch)
origin https://github.com/dhruvag1978/CICD-Lab1.git (push)

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git add .

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git commit -m "Second Build"
[main 2dc3b5b] Second Build
2 files changed, 11 insertions(+), 2 deletions(-)

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git push
fatal: The current branch main has no upstream branch.
To push the current branch and set the remote as upstream, use

    git push --set-upstream origin main

To have this happen automatically for branches without a tracking
upstream, see 'push.autoSetupRemote' in 'git help config'.

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git push -u origin main
Enumerating objects: 21, done.
Counting objects: 100% (21/21), done.
Delta compression using up to 8 threads
Compressing objects: 100% (5/5), done.
Writing objects: 100% (11/11), 1.39 KiB | 1.39 MiB/s, done.
Total 11 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/dhruvag1978/CICD-Lab1.git
d47e980..2dc3b5b main -> main
branch 'main' set up to track 'origin/main'.
```

3] Start Jenkins and add maven Integration Plugin and create a maven project name as “Cicd-lab1” and add URL of our repo in github and configure it.

Git ?

Repositories ?

Repository URL ?

https://github.com/dhruvag1978/CICD-Lab1.git

Credentials ?

- none -

Add ▾

Advanced ▾

Add Repository

Branches to build ?

Branch Specifier (blank for 'any') ?

*/main

Save Apply

Pre Steps

Add pre-build step ▾

Build

Root POM ?

pom.xml

Goals and options ?

install

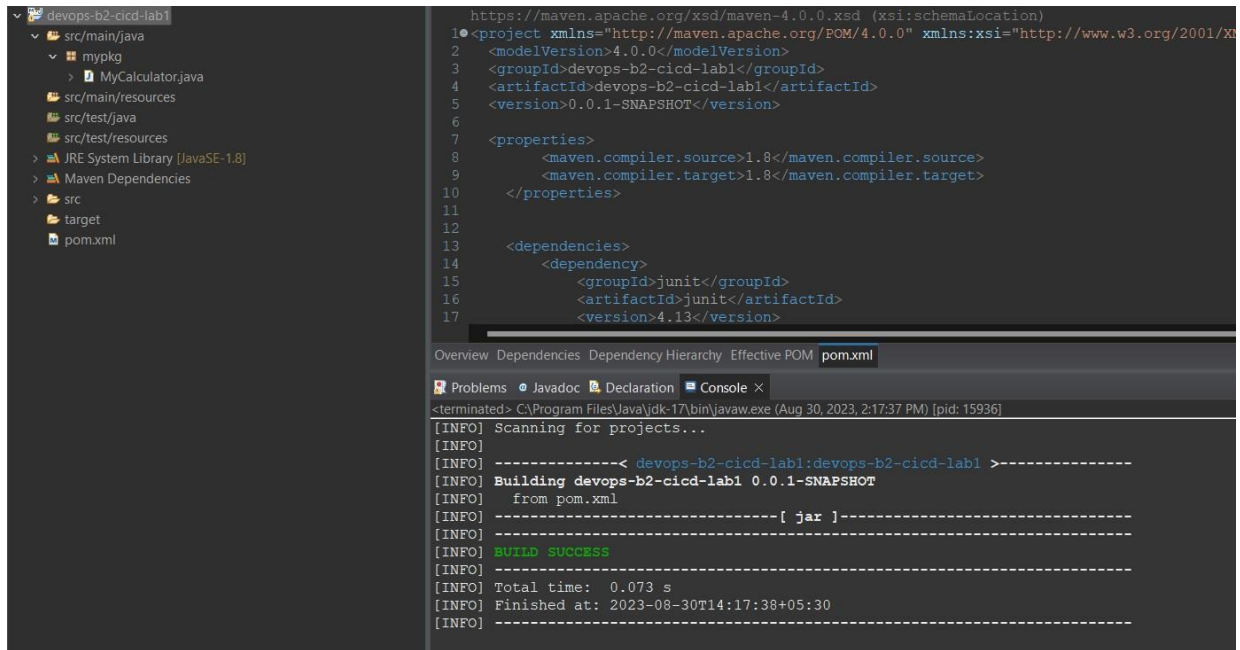
Advanced ▾

Post Steps

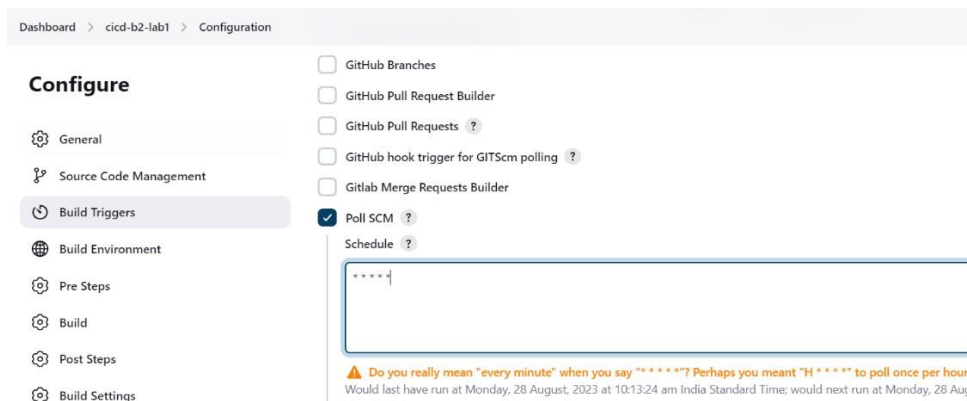
☐ Run only if build succeeds

Save Apply

4] Now Build it.



5] edit the code and add poll scm in jenkins configuration then again commit and push it.



6] After push we can see it will make automatic build.

```
Dashboard > CICD-Lab1 > #2 > Console Output

[INFO] --- ajv:6.12.5:ajv compile (default) @ devops-b2-cicd-lab1 ---
[INFO] Installing C:\ProgramData\Jenkins\jenkins\workspace\CICD-Lab1\pom.xml to C:\WINDOWS\system32\config\systemprofile\.m2\repository\devops-b2-cicd-lab1\devops-b2-cicd-lab1\0.0.1-SNAPSHOT\devops-b2-cicd-lab1-0.0.1-SNAPSHOT.pom
[INFO] Installing C:\ProgramData\Jenkins\jenkins\workspace\CICD-Lab1\target\my-calculator.jar to C:\WINDOWS\system32\config\systemprofile\.m2\repository\devops-b2-cicd-lab1\devops-b2-cicd-lab1\0.0.1-SNAPSHOT\devops-b2-cicd-lab1-0.0.1-SNAPSHOT.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 3.650 s
[INFO] Finished at: 2023-08-30T15:43:16+05:30
[INFO] -----
[WARNING]
[WARNING] Plugin validation issues were detected in 3 plugin(s)
[WARNING]
[WARNING] * org.apache.maven.plugins:maven-jar-plugin:3.1.0
[WARNING] * org.apache.maven.plugins:maven-compiler-plugin:3.10.1
[WARNING] * org.apache.maven.plugins:maven-resources-plugin:3.3.0
[WARNING]
[WARNING] For more or less details, use 'maven.plugin.validation' property with one of the values (case insensitive): [BRIEF, DEFAULT, VERBOSE]
[WARNING]
Waiting for Jenkins to finish collecting data
[JENKINS] Archiving C:\ProgramData\Jenkins\jenkins\workspace\CICD-Lab1\pom.xml to devops-b2-cicd-lab1\devops-b2-cicd-lab1\0.0.1-SNAPSHOT\devops-b2-cicd-lab1-0.0.1-SNAPSHOT.pom
[JENKINS] Archiving C:\ProgramData\Jenkins\jenkins\workspace\CICD-Lab1\target\my-calculator.jar to devops-b2-cicd-lab1\devops-b2-cicd-lab1\0.0.1-SNAPSHOT\devops-b2-cicd-lab1-0.0.1-SNAPSHOT.jar
channel stopped
Finished: SUCCESS
```

Status

Changes

Console Output

Edit Build Information

Delete build '#1'

Git Build Data

Redeploy Artifacts

See Fingerprints

Open Blue Ocean

Next Build

Build #1 (Aug 30, 2023, 3:33:25 PM)

Keep this build forever

No changes.

Started by user [Dhruv Agarwal](#)

Revision: d47e9805887582a2a733531167e8029cadad4fdb

Repository: <https://github.com/dhruvag1978/CICD-Lab1.git>

• refs/remotes/origin/main

Module Builds

devops-b2-cicd-lab1

15 sec

Status

Changes

Console Output

Edit Build Information

Delete build '#2'

Polling Log

Git Build Data

Redeploy Artifacts

See Fingerprints

Open Blue Ocean

Previous Build

Build #2 (Aug 30, 2023, 3:43:09 PM)

Keep this build forever

Changes

1. Second Build ([details](#) / [githubweb](#))

Started by an SCM change

Revision: 2dc3b5b5cc551d667f5209fa56c57a74eb813f4e

Repository: <https://github.com/dhruvag1978/CICD-Lab1.git>

• refs/remotes/origin/main

Module Builds

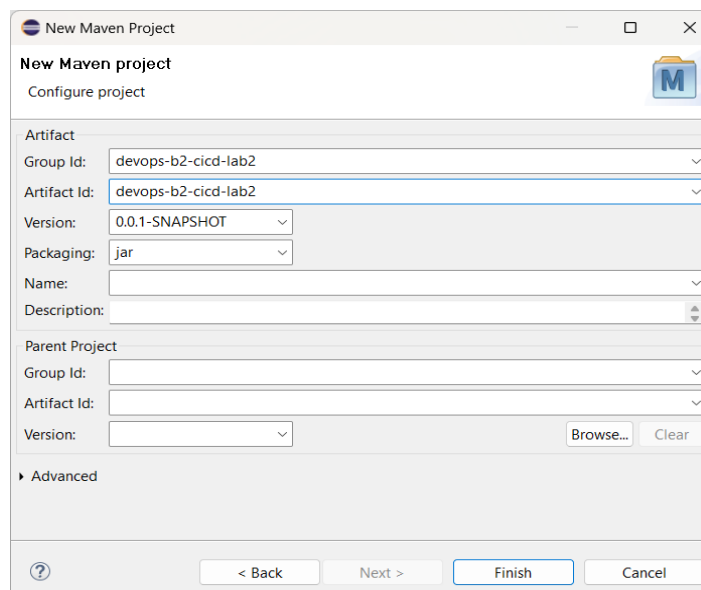
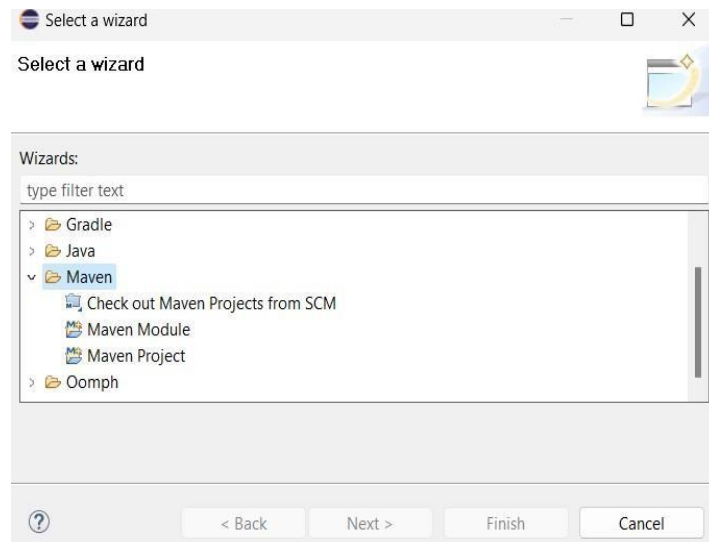
devops-b2-cicd-lab1

3.4 sec

LAB EXERCISE - 2

Aim: Creating a Jenkins Pipeline with a Jenkins file.

1] Create a Maven Project in eclipse.



New Java Class

Create a new Java class.

Source folder:

Package:

☐ Enclosing type:

Name:

Modifiers: ☒ public ☐ package ☐ private ☐ protected
☐ abstract ☐ final ☐ static

Superclass:

Interfaces:

Which method stubs would you like to create?

☒ public static void main(String[] args)
☐ Constructors from superclass
☒ Inherited abstract methods

Do you want to add comments? (Configure templates and default value [here](#))
☐ Generate comments

```

devops-b2-cicd-lab2/pom.xml  MyCalc.java x
1 package mypkg;
2
3 import java.util.Scanner;
4
5 public class MyCalc {
6     public int sum(int a, int b)
7     {
8         return(a+b);
9     }
10    public int diff(int a, int b)
11    {
12        return(a-b);
13    }
14    public static void main(String[] args) {
15        int num1, num2;
16        MyCalc calc = new MyCalc();
17        Scanner sc = new Scanner(System.in);
18        System.out.println("Enter num1 : ");
19        num1 = sc.nextInt();
20        System.out.println("Enter num2 : ");
21        num2 = sc.nextInt();
22        System.out.println("Sum is : "+calc.sum(num1, num2) );
23        System.out.println("Diff is : "+calc.diff(num1, num2) );
24    }
25 }

```

Console x

```

<terminated> MyCalc [Java Application] C:\Users\kamdi\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.j
Enter num1 :
20
Enter num2 :
30
Sum is : 50
Diff is : -10

```

```

devops-b2-cicd-lab2/pom.xml x  MyCalc.java
1 <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w
2     <modelVersion>4.0.0</modelVersion>
3     <groupId>devops-b2-cicd-lab2</groupId>
4     <artifactId>devops-b2-cicd-lab2</artifactId>
5     <version>0.0.1-SNAPSHOT</version>
6
7     <properties>
8         <maven.compiler.source>17</maven.compiler.source>
9         <maven.compiler.target>17</maven.compiler.target>
10    </properties>
11
12
13 </project>

```


2] Make a repo name as “CICD-Lab2_Jenkinsfile” and Push project on github.

.settings	first commit
src/main/java/mypkg	first commit
target/classes/mypkg	first commit
.classpath	first commit
.project	first commit
pom.xml	first commit

```
HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1
$ git init
Initialized empty Git repository in c:/Users/HP/eclipse-workspace/devops-b2-cicd-lab1/.git/

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (master)
$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        .classpath
        .project
        .settings/
        pom.xml
        src/
        target/

nothing added to commit but untracked files present (use "git add" to track)

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (master)
$ git add .

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (master)
$ git commit -m "first version"
[master (root-commit) d47e980] first version
10 files changed, 216 insertions(+)
create mode 100644 .classpath
create mode 100644 .project
create mode 100644 .settings/org.eclipse.jdt.core.prefs
create mode 100644 .settings/org.eclipse.m2e.core.prefs
create mode 100644 pom.xml
create mode 100644 src/main/java/mypkg/MyCalculator.java
create mode 100644 target/classes/META-INF/MANIFEST.MF
create mode 100644 target/classes/META-INF/maven/devops-b2-cicd-lab1/devops-b2-cicd-lab1/pom.properties
create mode 100644 target/classes/META-INF/maven/devops-b2-cicd-lab1/devops-b2-cicd-lab1/pom.xml
create mode 100644 target/classes/mypkg/MyCalculator.class

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (master)
$ git branch -M main

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git remote add origin https://github.com/dhruvag1978/cicd-Lab1.git

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git push -u origin main
info: please complete authentication in your browser...
Enumerating objects: 23, done.
Counting objects: 100% (23/23), done.
Delta compression using up to 8 threads
compressing objects: 100% (15/15), done.
writing objects: 100% (23/23), 3.57 KiB | 914.00 KiB/s, done.
Total 23 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/dhruvag1978/cicd-Lab1.git
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.
```

3] Add Maven integration and Git plugin in Jenkins, configure repo and make a build Plugins

Name

Enabled

Maven Integration plugin 3.23

This plugin provides a deep integration between Jenkins and Maven. It adds support for automatic triggers between projects depending on SNAPSHOTS as well as the automated configuration of various Jenkins publishers such as Junit.[Report an issue with this plugin](#)

☒

Pipeline Maven Integration Plugin 1322.v9ef317a_3e0a_9

This plugin provides integration with Pipeline, configures maven environment to use within a pipeline job by calling sh mvn or bat mvn. The selected maven installation will be configured and prepended to the path.[Report an issue with this plugin](#)

☒

Git 5.0.0

This plugin integrates Git with Jenkins.[Report an issue with this plugin](#)

☒

Maven

Name

MAVEN_HOME

☒ Install automatically ?

Install from Apache

Version

3.9.2

Add Installer ▾


```

[INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-compr
1.2 MB/s)
[INFO] Building jar: C:\ProgramData\Jenkins\.jenkins\workspace\cicd-b2-lab2\target\devops-b2-cicd-lab
[INFO]
[INFO] --- install:3.1.0:install (default-install) @ devops-b2-cicd-lab2 ---
[INFO] Installing C:\ProgramData\Jenkins\.jenkins\workspace\cicd-b2-lab2\pom.xml to C:\WINDOWS\system
b2-cicd-lab2\devops-b2-cicd-lab2\0.0.1-SNAPSHOT\devops-b2-cicd-lab2-0.0.1-SNAPSHOT.pom
[INFO] Installing C:\ProgramData\Jenkins\.jenkins\workspace\cicd-b2-lab2\target\devops-b2-cicd-lab2-0
C:\WINDOWS\system32\config\systemprofile\.m2\repository\devops-b2-cicd-lab2\devops-b2-cicd-lab2\0.0.1
SNAPSHOT.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 10.193 s
  
```

4] edit the code ,add mul funcion and add poll scm in jenkins configuration then again commit and push it.

☒ Poll SCM ?

Schedule ?



⚠ Do you really mean "every minute" when you say "*****"? Perhaps you meant "H *****" to poll once per hour

Would last have run at Friday, 6 October, 2023 at 7:15:16 am India Standard Time; would next run at Friday, 6 October, 2023 at 7:15:16 am India Standard Time.

[\(show details\)](#)

```

public int mul(int a, int b)
{
    return(a*b);
}
  
```

```

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git add .

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git commit -m "Second Build"
[main 2dc3b5b] Second Build
 2 files changed, 11 insertions(+), 2 deletions(-)

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git push
fatal: The current branch main has no upstream branch.
To push the current branch and set the remote as upstream, use

    git push --set-upstream origin main

To have this happen automatically for branches without a tracking
upstream, see 'push.autoSetupRemote' in 'git help config'.

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git push -u origin main
Enumerating objects: 21, done.
Counting objects: 100% (21/21), done.
Delta compression using up to 8 threads
Compressing objects: 100% (5/5), done.
Writing objects: 100% (11/11), 1.39 KiB | 1.39 MiB/s, done.
Total 11 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/dhruvag1978/CICD-Lab1.git
   d47e980..2dc3b5b  main -> main
branch 'main' set up to track 'origin/main'.

```

✓ #2

[Oct 6, 2023, 7:18 AM](#)

✓ #1

[Oct 6, 2023, 7:10 AM](#)

5] Add Jenkins file then commit and push it , In Jenkins make pipeline add configure it. When you create a pipeline. The pipeline will start.

```

devops-b2-cicd-lab2/pom.xml  MyCalc.java  *Jenkinsfile x
1 pipeline {
2   agent any
3   tools {
4     maven 'MAVEN_HOME'
5   }
6   stages {
7     stage('Stage1: Hello Clean Stage 1') {
8       steps {
9         bat 'mvn clean'
10      }
11    }
12    stage('Stage 2: Test Stage') {
13      steps {
14        bat 'mvn test'
15      }
16    }
17    stage('Stage 3: My Package'){
18      steps {
19        bat 'mvn package'
20      }
21    }
22    stage('Stage 4: My Final Build Stage'){
23      steps {
24        bat 'mvn install'
25      }
26    }
27    stage('Stage Final: Build Success'){
28      steps {
29        echo 'Build Success!'
30      }
31    }
32  }
33 }

```

```
HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git status
On branch master
Your branch is up to date with 'abc/master'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        Jenkinsfile

nothing added to commit but untracked files present (use "git add" to track)


HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git add .


HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git commit -m "jenkinsfile"
[master b098ade] jenkinsfile
1 file changed, 33 insertions(+)
create mode 100644 Jenkinsfile


HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 473 bytes | 473.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/kamdishashwat-17/CICD-Lab2_Jenkinsfile.git
0f79c39..b098ade master -> master
```

Enter an item name

» Required field

 **Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

 **Maven project**
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

 **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.

Pipeline

Definition

Pipeline script from SCM

▼

SCM ?

Git

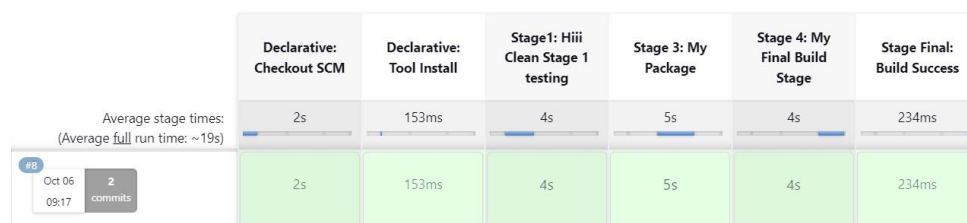
▼

Repositories ?

Repository URL ?

✕

Stage View



LAB EXERCISE – 3

Aim: Maven Build using GitHub Actions

1] Push our file on git repo name as CICD-lab3 which contain class file, dockerfile, pom.xmlfile and so on.

```
HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        .classpath
        .project
        .settings/
        Dockerfile
        pom.xml
        src/
        target/

nothing added to commit but untracked files present (use "git add" to track)

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git add .

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git commit -m "first commit"
[master (root-commit) 39d25f7] first commit
 8 files changed, 104 insertions(+)
 create mode 100644 .classpath
 create mode 100644 .project
 create mode 100644 .settings/org.eclipse.jdt.core.prefs
 create mode 100644 .settings/org.eclipse.m2e.core.prefs
 create mode 100644 Dockerfile
 create mode 100644 pom.xml
 create mode 100644 src/main/java/devops/b2/cicd/lab3/MyClass.java
 create mode 100644 target/classes/devops/b2/cicd/lab3/MyClass.class

HP@Dexter MINGW64 ~/eclipse-workspace/devops-b2-cicd-lab1 (main)
$ git push -u origin main
Enumerating objects: 24, done.
Counting objects: 100% (24/24), done.
Delta compression using up to 12 threads
Compressing objects: 100% (11/11), done.
Writing objects: 100% (24/24), 2.81 KiB | 958.00 KiB/s, done.
Total 24 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/kamdishashwat-17/CICD-LAB3.git
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.
```

Docker file

```
devops-b2-cicd-lab1/pom.xml  MyClass.java  devops-b2-cicd-lab3/pom.xml  Dockerfile X
1 FROM openjdk:11.0
2 COPY target/devops.b3.cicd.lab3-0.0.1-SNAPSHOT.jar devops.b3.cicd.lab3-0.0.1-SNAPSHOT.jar
```

MyClass.java file:

```
devops-b2-cicd-lab1/pom.xml  MyClass.java  devops-b2-cicd-lab3/pom.xml  Dockerfile
1 package devops.b2.cicd.lab3;
2
3 public class MyClass {
4     public void greeting()
5     {
6         System.out.println("Hello GitHub Actions");
7     }
8     public void testMsg()
9     {
10        System.out.println("This is Test Message");
11    }
12
13    public static void main(String[] args) {
14        MyClass ob = new MyClass();
15        ob.greeting();
16    }
17
18 }
19
```

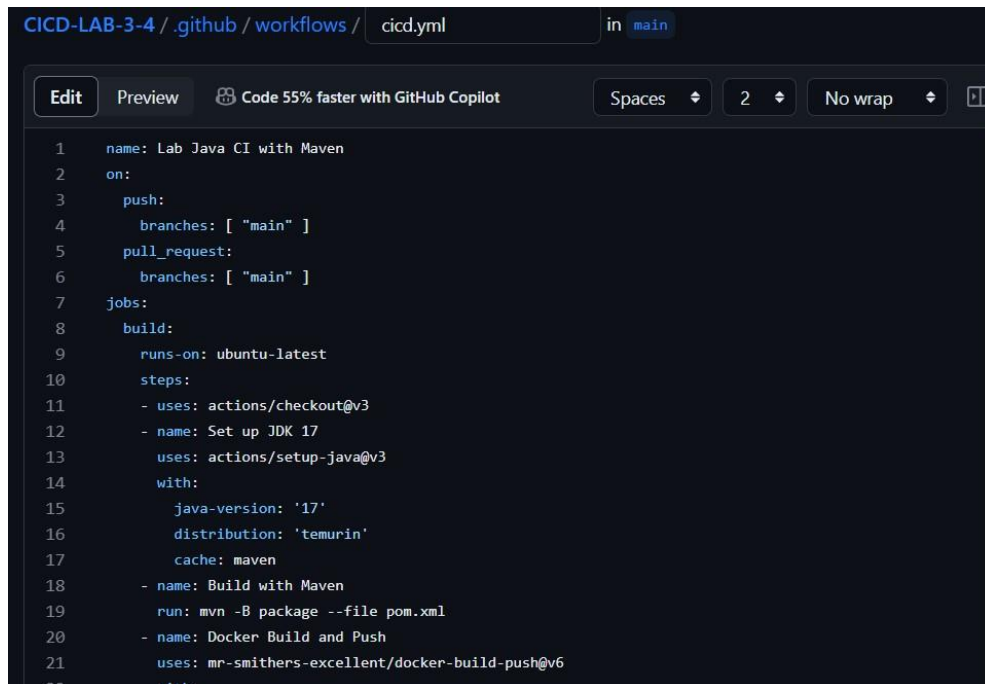
Pom.xml file:

```
devops-b2-cicd-lab1/pom.xml  MyClass.java  devops-b2-cicd-lab3/pom.xml  Dockerfile
1 <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/
2     <modelVersion>4.0.0</modelVersion>
3     <groupId>devops.b2.cicd.lab3</groupId>
4     <artifactId>devops.b3.cicd.lab3</artifactId>
5     <version>0.0.1-SNAPSHOT</version>
6
7     <properties>
8         <maven.compiler.source>1.8</maven.compiler.source>
9         <maven.compiler.target>1.8</maven.compiler.target>
10    </properties>
11 </project>
```

The screenshot shows the GitHub interface for a repository named 'CICD-LAB-3-4', which is forked from 'hkshitesh/CICD-LAB-3-4'. The repository is public and has 1 branch (main) and 0 tags. The main branch is up to date with the upstream. The file list shows the following files and their commit history:

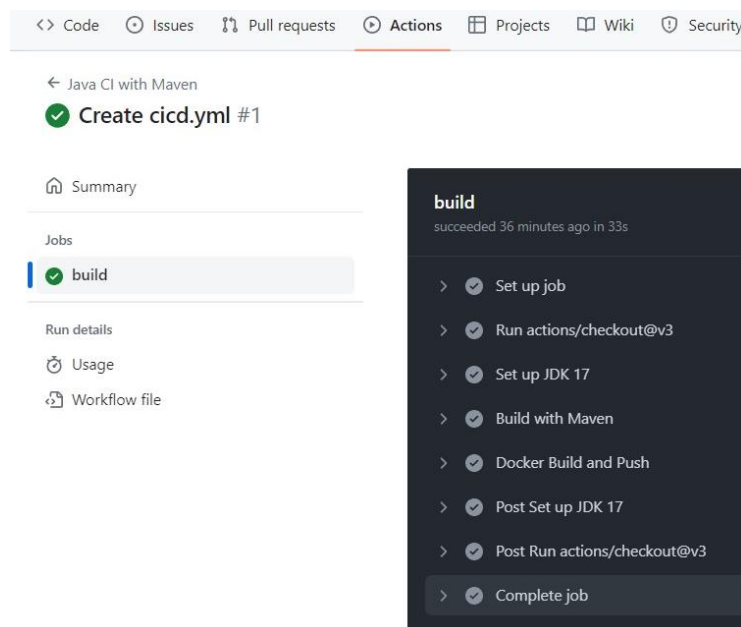
File	Commit	Time
unknown	unknown Merge branch 'main' of https://github.com/hkshitesh/CICD-LAB-3-4	9a86bf8 last week
.github/workflows	Update cicd.yml	last week
.settings	GitHub Actions	last week
src/main/java/devops/b3/cicd/lab3	second commit	last week
.classpath	GitHub Actions	last week
.gitignore	GitHub Actions	last week
.project	GitHub Actions	last week
Dockerfile	dockerfile added	last week
pom.xml	GitHub Actions	last week

2] Create a GitHub Actions Workflow name as cicd.yml and click on commit and push changes.



```
1 name: Lab Java CI with Maven
2 on:
3   push:
4     branches: [ "main" ]
5   pull_request:
6     branches: [ "main" ]
7 jobs:
8   build:
9     runs-on: ubuntu-latest
10    steps:
11      - uses: actions/checkout@v3
12      - name: Set up JDK 17
13        uses: actions/setup-java@v3
14        with:
15          java-version: '17'
16          distribution: 'temurin'
17          cache: maven
18      - name: Build with Maven
19        run: mvn -B package --file pom.xml
20      - name: Docker Build and Push
21        uses: mr-smithers-excellent/docker-build-push@v6
22        with:
```

3] Check the Workflow Status in that you will notices that our build has been completed and build images has been visible in our docker hub.





The screenshot shows the GitHub Actions interface for a workflow named "Java CI with Maven". The workflow is in a "Completed" state, indicated by a green checkmark and the text "Create cicd.yml #1". The "Summary" tab is selected, showing a list of jobs. The "build" job is highlighted, and its details are expanded on the right. The build log shows the following steps:


- Set up job
- Run actions/checkout@v3
- Set up JDK 17
- Build with Maven
- Docker Build and Push
- Post Set up JDK 17
- Post Run actions/checkout@v3
- Complete job

The build succeeded 36 minutes ago in 33s.



4] Build image in docker hub

 dhruvag2619 / cicd

Description
This repository does not have a description 

 Last pushed: 2 minutes ago

Tags
This repository contains 1 tag(s).

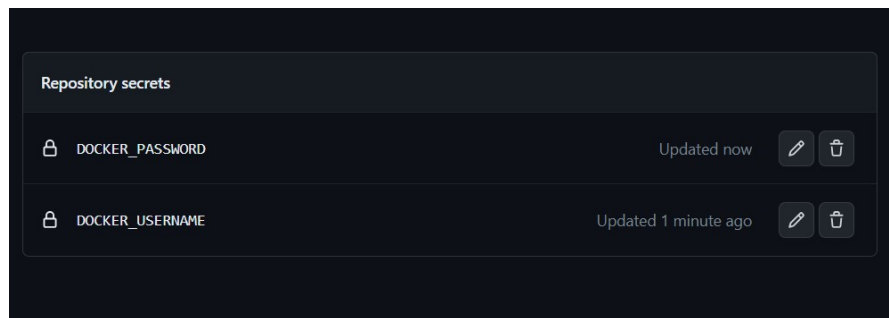
Tag	OS	Type	Pulled	Pushed
 main-dec1c37		Image	---	2 minutes ago

[See all](#) [Go to Advanced Image Management](#)

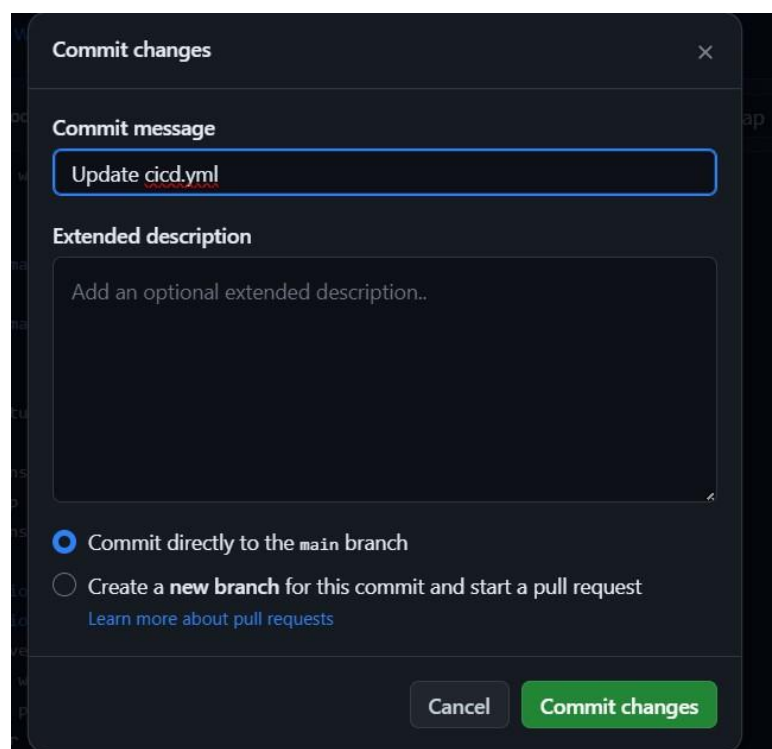
EXPERIMENT – 4

Aim: - Docker build and push using Github actions.

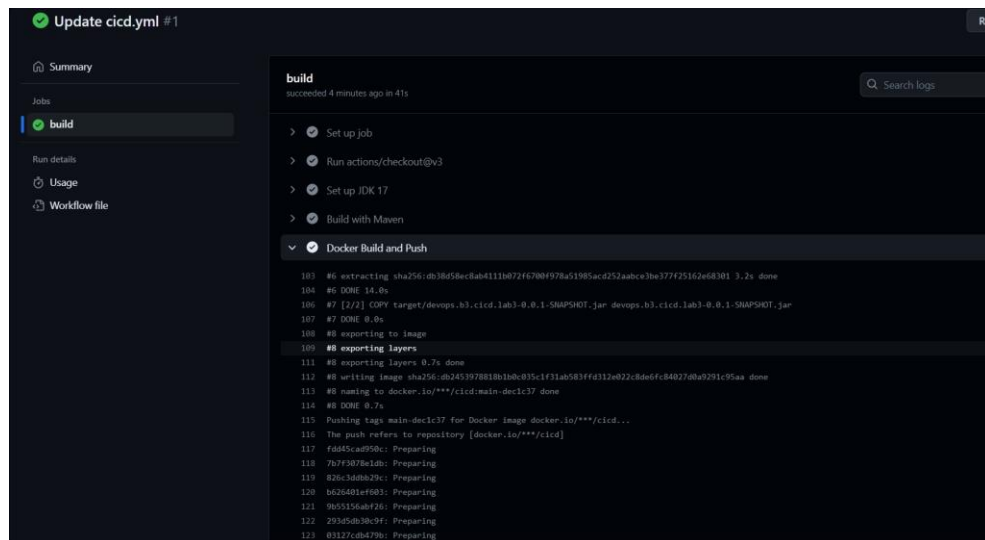
1] Add Docker Hub Credentials to GitHub Secrets




2] Commit and Push Changes




3] Check the Workflow Status in that you will notices that our build has been completed and build images has been visible in our docker hub.




4] Build image in docker hub and docker command in a public view.

 dhruvag2619 / cicd

Description

This repository does not have a description 

 Last pushed: 2 months ago

Public View

Docker commands

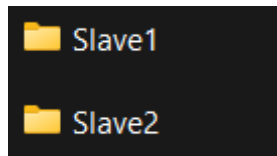
To push a new tag to this repository:

```
docker push dhruvag2619/cicd:tagname
```

EXPERIMENT – 5

Aim: Master/Slave concept in Jenkins

1] Create Slave1 and Slave2 folder in your Local drive.



2] Create a New Node and assign node name as Slave1.

New node

Node name

Type


☒ Permanent Agent

Adds a plain, permanent agent to Jenkins. This is called "permanent" because Jenkins doesn't provide higher level of integration with these agents, such as dynamic provisioning. Select this type if no other agent types apply — for example such as when you are adding a physical computer, virtual machines managed outside Jenkins, etc.

Create

3] Run Agent slave1 command on our command line windows.

Agent Slave1

Run from agent command line: (Unix) 

```
curl -sO http://localhost:8080/jnlpJars/agent.jar
java -jar agent.jar -jnlpUrl http://localhost:8080/computer/Slave1/jenkins-agent.jnlp -secret
aa3331df0dc29f823eee97b67fff48d27ea9bf9663486b007359eab3cd51dd42 -workDir "D:\Slave1"
```

Run from agent command line: (Windows) 

```
curl.exe -sO http://localhost:8080/jnlpJars/agent.jar
java -jar agent.jar -jnlpUrl http://localhost:8080/computer/Slave1/jenkins-agent.jnlp -secret
aa3331df0dc29f823eee97b67fff48d27ea9bf9663486b007359eab3cd51dd42 -workDir "D:\Slave1"
```

```

PS D:\Slave1> curl.exe -s0 http://localhost:8080/jnlpJars/agent.jar
PS D:\Slave1> java -jar agent.jar -jnlpUrl http://localhost:8080/computer/Slave1/jenkins-agent.jnlp -secret aa331df0dc29f823eee97b67ffff48d27ea9bf9663486b007359eab3cd51dd42 -workDir "D:\Slave1"
Oct 06, 2023 9:31:50 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using D:\Slave1\remoting as a remoting work directory
Oct 06, 2023 9:31:50 AM org.jenkinsci.remoting.engine.WorkDirManager setupLogging
INFO: Both error and output logs will be printed to D:\Slave1\remoting
Oct 06, 2023 9:31:50 AM hudson.remoting.jnlp.Main createEngine
INFO: Setting up agent: Slave1
Oct 06, 2023 9:31:50 AM hudson.remoting.Engine startEngine
INFO: Using Remoting version: 3107.v665000b_51092
Oct 06, 2023 9:31:50 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using D:\Slave1\remoting as a remoting work directory
Oct 06, 2023 9:31:50 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Locating server among [http://localhost:8080/]
Oct 06, 2023 9:31:50 AM org.jenkinsci.remoting.engine.JnlpAgentEndpointResolver resolve
INFO: Remoting server accepts the following protocols: [JNLP4-connect, Ping]
Oct 06, 2023 9:31:50 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Agent discovery successful
Agent address: localhost
Agent port: 59518
Identity: 6e:66:90:26:af:aa:dd:47:81:d8:96:a7:7b:a9:27:be
Oct 06, 2023 9:31:50 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Handshaking
Oct 06, 2023 9:31:50 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Connecting to localhost:59518
Oct 06, 2023 9:31:50 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Trying protocol: JNLP4-connect
Oct 06, 2023 9:31:50 AM org.jenkinsci.remoting.protocol.impl.BIONetworkLayer$Reader run
INFO: Waiting for ProtocolStack to start.
Oct 06, 2023 9:31:51 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Remote identity confirmed: 6e:66:90:26:af:aa:dd:47:81:d8:96:a7:7b:a9:27:be
Oct 06, 2023 9:31:51 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Connected

```

4] On your Jenkins create a new maven project name as cicd-lab5.

Enter an item name

» Required field



Freestyle project

This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.



Maven project

Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

5] Configure it.

Name ?

Slave1

Description ?

[Plain text] [Preview](#)

Number of executors ?

1

Remote root directory ?

D:\Slave1

Labels ?

Slave1

Usage ?

Use this node as much as possible

Launch method ?

Launch agent by connecting it to the controller

☐ Disable WorkDir ?

Custom WorkDir path ?

D:\Slave1

Internal data directory ?

remoting

☐ Fail if workspace is missing ?

☐ Use WebSocket ?

Advanced ▾

Availability ?

Keep this agent online as much as possible

Node Properties

☐ Disable deferred wipeout on this node ?

☒ Environment variables

List of variables ?

Name

MAVEN_OPTS

Value

6] Make a build and check the output and Node.

```
[INFO] skip non existing resourceDirectory D:\Slave1\workspace\cicd-lab5\src\test\resources
[INFO]
[INFO] --- compiler:3.10.1:testCompile (default-testCompile) @ devops.b3.cicd.lab3 ---
[INFO] No sources to compile
[INFO]
[INFO] --- surefire:3.0.0:test (default-test) @ devops.b3.cicd.lab3 ---
[INFO] No tests to run.
[JENKINS] Recording test results
[INFO]
[INFO] --- jar:3.3.0:jar (default-jar) @ devops.b3.cicd.lab3 ---
[INFO] Building jar: D:\Slave1\workspace\cicd-lab5\target\devops.b3.cicd.lab3-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- install:3.1.0:install (default-install) @ devops.b3.cicd.lab3 ---
[INFO] Installing D:\Slave1\workspace\cicd-lab5\pom.xml to C:\Users\kamdi\.m2\repository\devops\b2\cicd\lab3\devops.b3.cicd.lab3\0.0.1-SNAPSHOT\devops.b3.cicd.lab3-0.0.1-SNAPSHOT.pom
[INFO] Installing D:\Slave1\workspace\cicd-lab5\target\devops.b3.cicd.lab3-0.0.1-SNAPSHOT.jar to
C:\Users\kamdi\.m2\repository\devops\b2\cicd\lab3\devops.b3.cicd.lab3\0.0.1-SNAPSHOT\devops.b3.cicd.lab3-0.0.1-SNAPSHOT.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 3.344 s
```

Agent Slave1

Mark this node temporarily offline



Add description

Agent is connected.

Projects tied to Slave1

S	W	Name ↓	Last Success	Last Failure	Last Duration	Fav
		cicd-lab5	20 min #2	N/A	9.6 sec	

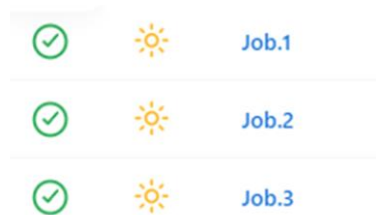
Nodes

S	Name ↓	Architecture	Clock Difference
	Built-In Node	Windows 11 (amd64)	In sync
	Slave1	Windows 11 (amd64)	In sync
Data obtained		29 min	29 min

EXPERIMENT – 6

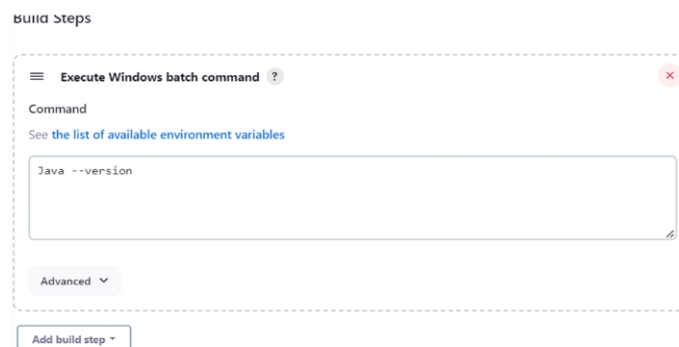
Aim: Job Chaining in Jenkins

1] Creating Jobs, such as Job1, Job2, Job3 to stimulate job chaining and sequential execution.

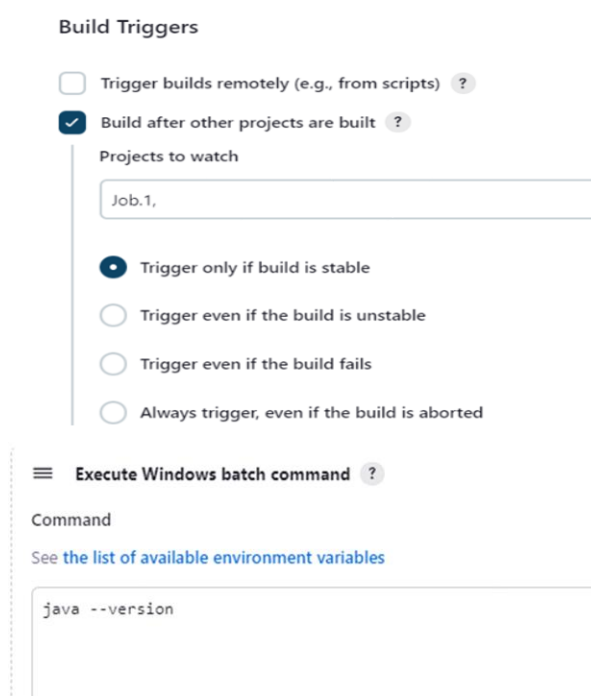


2] Configure Job Dependencies.

Job.1 Configuration:



Job.2 Configuration:



Post-build Actions

Build other projects ?

Projects to build

Job.3

☒ Trigger only if build is stable

☐ Trigger even if the build is unstable

☐ Trigger even if the build fails

Job.3 Configuration:

Source Code Management

☐ None

☐ Gerrit Repo ?

☒ Git ?

Repositories ?

Repository URL ?

https://github.com/kamdishashwat-17/CICD-LAB3.git

Credentials ?

- none -

+ Add

Build Steps

Execute Windows batch command ?

Command

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

java --version

Advanced ▾

Add build step ▾

3] Setting Up Build Triggers and make the Build.

Job.1:

Project Job.1

Downstream Projects

✔ Job.2

Permalinks

- Last build (#5), 25 min ago
- Last stable build (#5), 25 min ago
- Last successful build (#5), 25 min ago
- Last completed build (#5), 25 min ago

Job.2 :

Project Job.2

Upstream Projects

✔ Job.1

Downstream Projects

✔ Job.3

Permalinks

- Last build (#2), 25 min ago
- Last stable build (#2), 25 min ago
- Last successful build (#2), 25 min ago
- Last completed build (#2), 25 min ago

Job.3:

Project Job.3

Upstream Projects

✔ Job.2

Permalinks

- Last build (#1), 24 min ago
- Last stable build (#1), 24 min ago
- Last successful build (#1), 24 min ago
- Last completed build (#1), 24 min ago

4] Viewing Console Output and Logs.

✔	☀	Job.1
✔	☀	Job.2
✔	☀	Job.3

EXPERIMENT – 7

Aim: Email Notification in Jenkins

1] Create a “App Password” from our google account setting.

← App passwords

App passwords help you sign into your Google Account on older apps and services that don't support modern security standards.

App passwords are less secure than using up-to-date apps and services that use modern security standards. Before you create an app password, you should check to see if your app needs this in order to sign in.

[Learn more](#)

You don't have any app passwords.

To create a new app specific password, type a name for it below...

App name
Jenkins

Create

2] Installing Email Notification plugin.

plugins

mail

Name

Enabled

Email Extension 2.93

This plugin is a replacement for Jenkins's email publisher. It allows to configure every aspect of email notifications: when an email is sent, who should receive it and what the email says

[Report an issue with this plugin](#)

Warning: The currently installed plugin version may not be safe to use. Please review the following security notices:

- [Stored XSS vulnerability in custom email templates](#)
- [XSS vulnerability in bundled email templates](#)
- [Script Security sandbox bypass vulnerability](#)
- [CSRF vulnerability](#)
- [Missing permission check](#)



Email Extension Template Plugin 1.5

This plugin allows administrators to create global templates for the Extended Email Publisher.

[Report an issue with this plugin](#)

This plugin is up for adoption! We are looking for new maintainers. Visit our [Adopt a Plugin](#) initiative for more information.



3] Configure SMTP Server by going to Dashboard > manage Jenkins > System > Email notification.

E-mail Notification

SMTP server

smtp.gmail.com

Default user e-mail suffix ?

Advanced ^ Edited

☒ Use SMTP Authentication ?

User Name

dhruvagarwal1453@gmail.com

Password

.....

☒ Use SSL ?

4] Create a maven project, configure it and make a build. safdgfhjh

Source Code Management

☐ None

☐ Gerrit Repo ?

☒ Git ?

Repositories ?

Repository URL ?

https://github.com/kamdishashwat-17/Cicd-Lab1.git

Credentials ?

- none -

+ Add

☒ Poll SCM ?

Schedule ?

* * * * *

⚠ Do you really mean "every minute" when you say "* * * * *"? Perhaps you Would last have run at Friday, 8 December, 2023 at 7:09:50 PM India Standard T Standard Time.

☐ Ignore post-commit hooks ?

Build

Root POM ?

pom.xml

Goals and options ?

install

Advanced ▼

Post Steps

- ☐ Run only if build succeeds
- ☐ Run only if build succeeds or is unstable
- ☒ Run regardless of build result

Build Settings

☒ E-mail Notification

Recipients

dhruvagarwal1453@gmail.com

- ☒ Send e-mail for every unstable build
- ☒ Send separate e-mails to individuals who broke the build
- ☒ Send e-mail for each failed module ?

4] Check the Build and test the mail by intentionally failing a build.

Build #3 (Dec 8, 2023, 7:09:13 PM)



Changes

1. pom.xml ([details](#) / [githubweb](#))



[Started by an SCM change](#)



This run spent:

- 9.6 sec waiting;
- 2.1 sec build duration;
- 11 sec total from scheduled to completion.

address not · dhruvagarwal1453@gmail.com · ail.com>

to me ▾

See <<http://localhost:8080/job/CICD-Lab-07-E-mail-SK17/2/display/redirect?page=changes>>

Changes:

[noreply] Update pom.xml

EXPERIMENT – 8

Aim: Remote Triggering of a Parameterized Build

1] Open manage Jenkins and install “Build with parameters” Plugin.


Plugins


Name	Enabled
Build With Parameters 76.v9382db_f78962 Allows the user to provide parameters for a build in the url (similar to /job/JOBNAME/buildWithParameters), prompting for confirmation before triggering the job. Report an issue with this plugin	<input checked="" type="checkbox"/>


2] Select the **Freestyle project** as the build job type.


Enter an item name


» Required field

**Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

**Maven project**
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

**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.

**External Job**
This type of job allows you to record the execution of a process run outside Jenkins, even on a remote machine. This is designed so that you can use Jenkins as a dashboard of your existing automation system.

**Multi-configuration project**
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific etc.

3] Configure as per Remote Triggering of a Parameterized Build.

☒ This project is parameterized ?

≡ **String Parameter** ?

Name ?

My_Param

Default Value ?

Devops

Build Triggers

☒ Trigger builds remotely (e.g., from scripts) ?

Authentication Token

sdk

Use the following URL to trigger build remotely: JENKINS_URL/job/CICD-Lab-08/build?token=TOKEN_NAME or /buildWithParameters?token=TOKEN_NAME
Optionally append &cause=Cause+Text to provide text that will be included in the recorded build cause.

Build Steps

≡ **Execute Windows batch command** ?

Command

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

```
java --version|
```

1] Configure Global Security.

Security Realm

Jenkins' own user database

☒ Allow users to sign up ?

⚠ With signup enabled, anyone on your network can become an authentic

Authorization

Anyone can do anything

2] “curl -X GET <YourJenkinsJobUrl>/buildWithParameters?token=Sam”.Configure as per your URL and run it on Command Line.

```
C:\Users\kamdi>curl -X GET http://localhost:8080/job/CICD-Lab-08/buildWithParameters?token=sdk
```

1] Check the Console Output.

Console Output

```
Started by remote host [0:0:0:0:0:0:1]
Running as SYSTEM
Building on the built-in node in workspace C:\ProgramData\Jenkins\.jenkins\workspace\CICD-Lab-08
[GitCheckoutListener] SCM 'hudson.scm.NullSCM' is not of type GitSCM
[CICD-Lab-08] $ cmd /c call C:\WINDOWS\TEMP\jenkins7700665781173499474.bat

C:\ProgramData\Jenkins\.jenkins\workspace\CICD-Lab-08>java --version
java 17.0.4 2022-07-19 LTS
Java(TM) SE Runtime Environment (build 17.0.4+11-LTS-179)
Java HotSpot(TM) 64-Bit Server VM (build 17.0.4+11-LTS-179, mixed mode, sharing)

C:\ProgramData\Jenkins\.jenkins\workspace\CICD-Lab-08>exit 0
Finished: SUCCESS
```