

LAB ASSIGNMENTS 1: Jenkin

What is Jenkins?

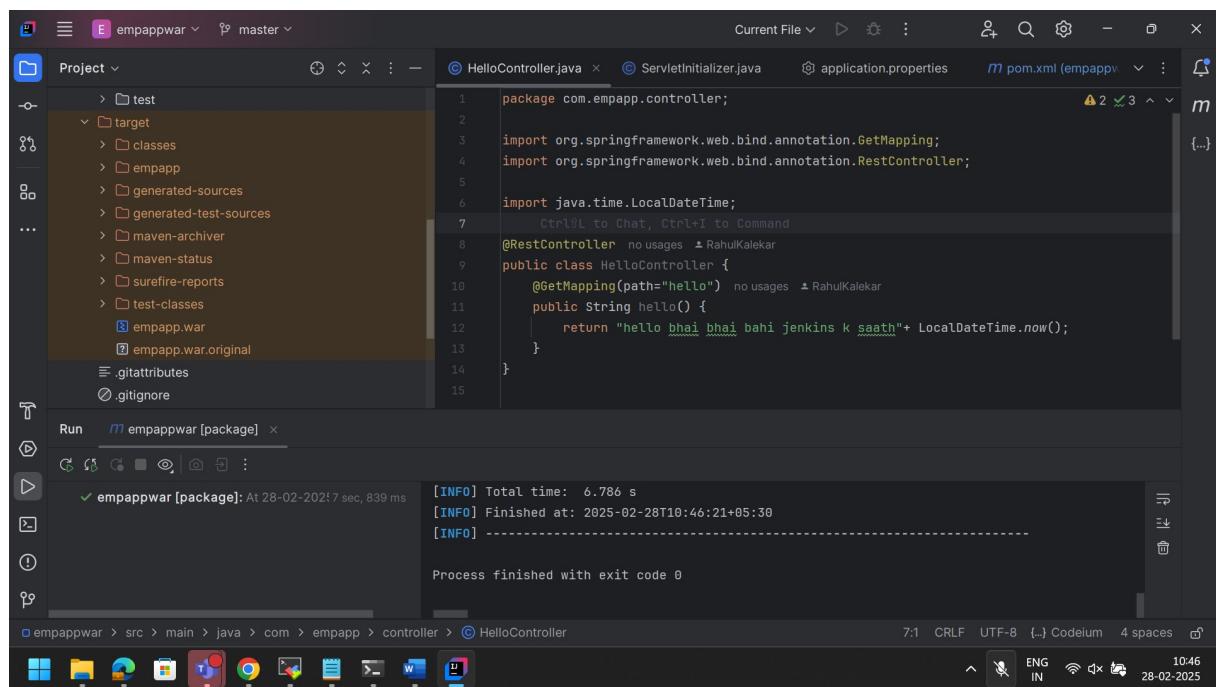
Jenkins is an open-source automation server that helps with the software development process by automating tasks like building, testing, and deploying.
It's a popular tool for continuous integration (CI) and continuous delivery (CD)

Assignment 1:

First create spring mvc project with spring boot and deploy it on local tomcat server now we need to do atomize it using Jenkin

1. Spring MVC with local tomcat server(Without Jenkins)

Created empapp.war



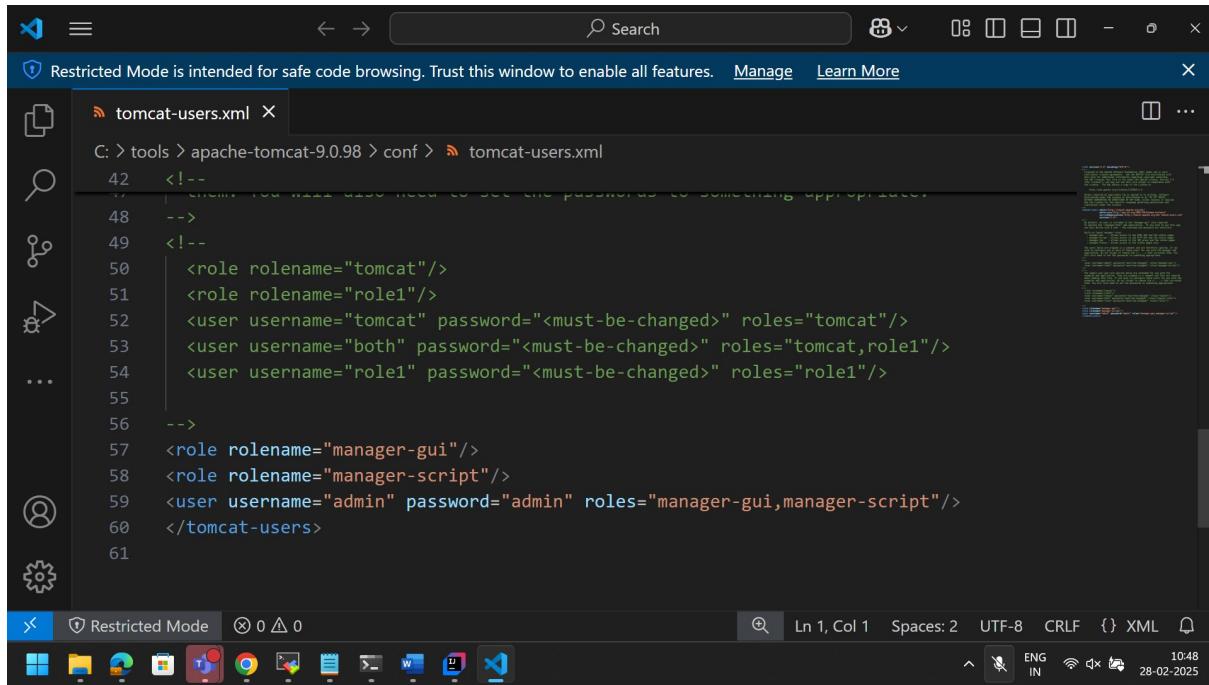
The screenshot shows a Java Spring Boot application named 'empappwar' in the Codeium IDE. The project structure on the left includes 'src', 'target', 'classes', 'empapp', 'generated-sources', 'generated-test-sources', 'maven-archiver', 'maven-status', 'surefire-reports', 'test-classes', 'empapp.war', 'empapp.war.original', '.gitattributes', and '.gitignore'. The main editor window displays 'HelloController.java' with the following code:

```
package com.empapp.controller;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.RestController;
import java.time.LocalDateTime;
@RestController
public class HelloController {
    @GetMapping(path="hello")
    public String hello() {
        return "hello bhai bhai bhai jenkins k saath"+ LocalDateTime.now();
    }
}
```

The 'Run' tab at the bottom shows a successful build: [INFO] Total time: 6.786 s, [INFO] Finished at: 2025-02-28T10:46:21+05:30, [INFO] -----, Process finished with exit code 0.

C:\tools\apache-tomcat-9.0.98\conf

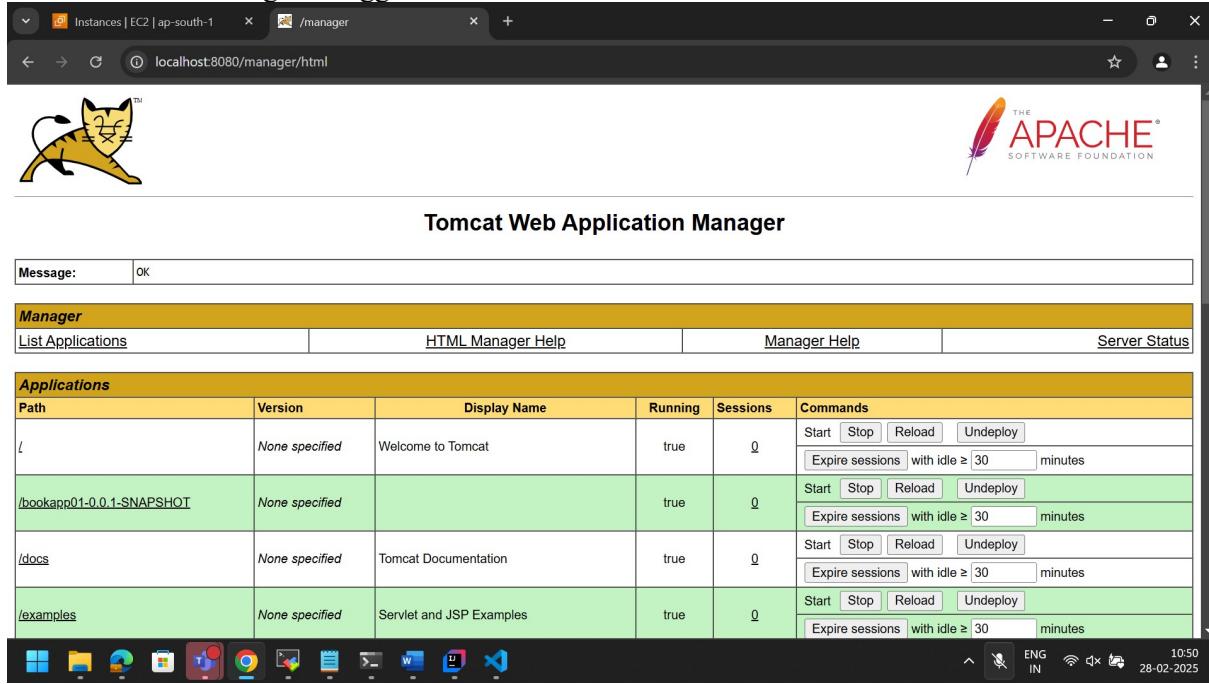
In above location , added roles to access tomcat server manager app



The screenshot shows a code editor window with the file 'tomcat-users.xml' open. The file path is C:\tools>apache-tomcat-9.0.98>conf>tomcat-users.xml. The code defines several user entries:

```
42 <!--
43     You will also need to set the password to something appropriate.
44 -->
45 <!--
46     <role rolename="tomcat"/>
47     <role rolename="role1"/>
48     <user username="tomcat" password=<must-be-changed> roles="tomcat"/>
49     <user username="both" password=<must-be-changed> roles="tomcat,role1"/>
50     <user username="role1" password=<must-be-changed> roles="role1"/>
51
52 -->
53     <role rolename="manager-gui"/>
54     <role rolename="manager-script"/>
55     <user username="admin" password="admin" roles="manager-gui,manager-script"/>
56
57 </tomcat-users>
58
59
60
61
```

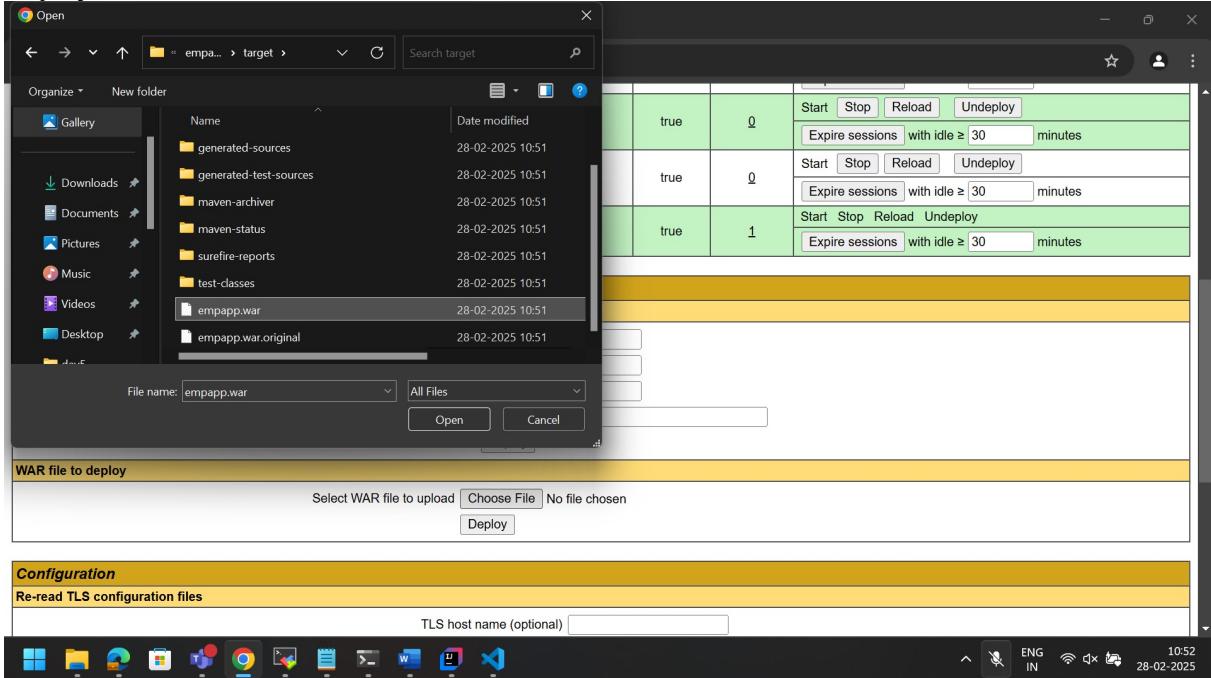
Tomcat server running and logged in



The screenshot shows a web browser window with the URL localhost:8080/manager/html. The page title is 'Tomcat Web Application Manager'. The interface includes a navigation bar with tabs for 'Manager', 'List Applications', 'HTML Manager Help', 'Manager Help', and 'Server Status'. Below the navigation bar is a table titled 'Applications' showing the following data:

Path	Version	Display Name	Running	Sessions	Commands
/	None specified	Welcome to Tomcat	true	0	<button>Start</button> <button>Stop</button> <button>Reload</button> <button>Undeploy</button> <input type="button" value="Expire sessions with idle ≥ 30 minutes"/>
/bookapp01-0.0.1-SNAPSHOT	None specified		true	0	<button>Start</button> <button>Stop</button> <button>Reload</button> <button>Undeploy</button> <input type="button" value="Expire sessions with idle ≥ 30 minutes"/>
/docs	None specified	Tomcat Documentation	true	0	<button>Start</button> <button>Stop</button> <button>Reload</button> <button>Undeploy</button> <input type="button" value="Expire sessions with idle ≥ 30 minutes"/>
/examples	None specified	Servlet and JSP Examples	true	0	<button>Start</button> <button>Stop</button> <button>Reload</button> <button>Undeploy</button> <input type="button" value="Expire sessions with idle ≥ 30 minutes"/>

Deploy that war file



Running

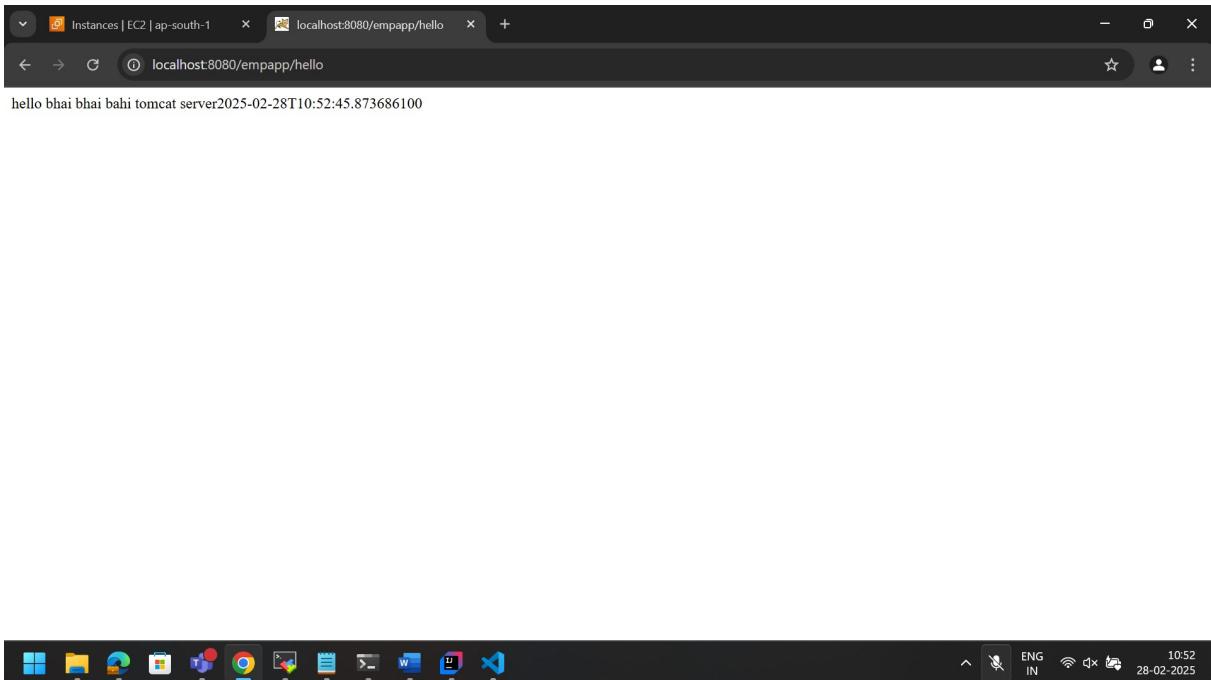
```

Tomcat

Servlet
2025-02-28 10:49:40.693 INFO 39476 ---- [nio-8080-exec-6] o.s.web.servlet.DispatcherServlet      : Completed initialization in 1 ms
28-Feb-2025 10:50:00.122 INFO [http-nio-8080-exec-2] org.apache.catalina.startup.HostConfig.undeploy Undeploying context [/empapp]
28-Feb-2025 10:50:03.641 INFO [http-nio-8080-exec-5] org.apache.catalina.startup.HostConfig.undeploy Undeploying context [/empapp.war]
28-Feb-2025 10:52:35.089 INFO [http-nio-8080-exec-12] org.apache.catalina.startup.HostConfig.deployWAR Deploying web application arch
ive [C:\tools\apache-tomcat-9.0.98\webapps\empapp.war]
28-Feb-2025 10:52:37.428 INFO [http-nio-8080-exec-12] org.apache.jasper.servlet.TldScanner.scanJars At least one JAR was scanned for
TLDs yet contained no TLDs. Enable debug logging for this logger for a complete list of JARs that were scanned but no TLDs were found
in them. Skipping unneeded JARs during scanning can improve startup time and JSP compilation time.

```
:: Spring Boot :: (v2.7.11)
```

2025-02-28 10:52:38.000 INFO 39476 ---- [io-8080-exec-12] com.empapp.ServletInitializer           : Starting ServletInitializer v0.0
.1-SNAPSHOT using Java 21.0.5 on IN-H9X3B54 with PID 39476 (C:\tools\apache-tomcat-9.0.98\webapps\empapp\WEB-INF\classes started by
r ahul.kalekar in C:\tools\apache-tomcat-9.0.98\bin)
2025-02-28 10:52:38.004 INFO 39476 ---- [io-8080-exec-12] com.empapp.ServletInitializer           : No active profile set, falling b
ack to 1 default profile: "default"
2025-02-28 10:52:38.642 INFO 39476 ---- [io-8080-exec-12] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: init
ialization completed in 596 ms
2025-02-28 10:52:39.155 INFO 39476 ---- [io-8080-exec-12] com.empapp.ServletInitializer           : Started ServletInitializer in 1.
574 seconds (JVM running for 694.397)
28-Feb-2025 10:52:39.166 INFO [http-nio-8080-exec-12] org.apache.catalina.startup.HostConfig.deployWAR Deployment of web application
archive [C:\tools\apache-tomcat-9.0.98\webapps\empapp.war] has finished in [4,077] ms
2025-02-28 10:52:42.504 INFO 39476 ---- [io-8080-exec-13] o.s.web.servlet.DispatcherServlet       : Initializing Servlet 'dispatcher
Servlet'
2025-02-28 10:52:42.505 INFO 39476 ---- [io-8080-exec-13] o.s.web.servlet.DispatcherServlet       : Completed initialization in 0 ms
|
```



2. Now automizing using Jenkins(Pipeline)

Start Jenkins

```
C:\Windows\System32\cmd.e > + ^  
Microsoft Windows [Version 10.0.22631.4890]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\tools\jenkins-install>java -jar jenkins.war --httpPort=8090  
Running from: C:\tools\jenkins-install\jenkins.war  
webroot: C:\Users\rahul.kalekar\.jenkins\war  
2025-02-28 05:30:51.903+0000 [id=1] INFO winstone.Logger#logInternal: Beginning extraction from war file  
2025-02-28 05:30:52.000+0000 [id=1] WARNING o.e.j.ee9.nested.ContextHandler#setContextPath: Empty contextPath  
2025-02-28 05:30:52.104+0000 [id=1] INFO org.eclipse.jetty.server.Server#doStart: jetty-12.0.14; built: 2024-09-30T14:22:54.19  
7Z; git: e77516598a07cca826d27fa8a4f7c70e953921a6; jvm 21.0.5+9-LTS-239  
2025-02-28 05:30:52.767+0000 [id=1] INFO o.e.j.e.w.StandardDescriptorProcessor#visitServlet: NO JSP Support for /, did not fin  
d org.eclipse.jetty.jsp.JettyJspServlet  
2025-02-28 05:30:52.823+0000 [id=1] INFO o.e.j.s.DefaultSessionIdManager#doStart: Session workerName=node0  
2025-02-28 05:30:53.309+0000 [id=1] INFO hudson.WebAppMain#contextInitialized: Jenkins home directory: C:\Users\rahul.kalekar\  
.jenkins found at: $user.home/.jenkins  
2025-02-28 05:30:53.446+0000 [id=1] INFO o.e.j.s.handler.ContextHandler#doStart: Started oeje9n.ContextHandler$CoreContextHand  
ler@f325091Jenkins v2.482,/,b=file:///C:/Users/rahul.kalekar/.jenkins/war/,a=AVAILABLE,h=oeje9n.ContextHandler$CoreContextHandler$Co  
reToNestedHandler@437e951d{STARTED}  
2025-02-28 05:30:53.473+0000 [id=1] INFO o.e.j.server.AbstractConnector#doStart: Started ServerConnector@24528a25{HTTP/1.1, (h  
ttp/1.1)}{0.0.0.0:8090}  
2025-02-28 05:30:53.487+0000 [id=1] INFO org.eclipse.jetty.server.Server#doStart: Started oejs.Server@5119fb47{STARTING}[12.0.  
14,sto=0] @2041ms  
2025-02-28 05:30:53.488+0000 [id=63] INFO winstone.Logger#logInternal: Winstone Servlet Engine running: controlPort=disabled  
2025-02-28 05:30:53.620+0000 [id=55] INFO jenkins.model.Jenkins$<init>: Starting version 2.482  
2025-02-28 05:30:53.701+0000 [id=69] INFO jenkins.InitReactorRunner$1#onAttained: Started initialization  
2025-02-28 05:30:53.984+0000 [id=101] INFO jenkins.InitReactorRunner$1#onAttained: Listed all plugins  
2025-02-28 05:30:54.489+0000 [id=111] WARNING h.p.greenballs.GreenBallsPlugin#start: Unable to change BLUE ColorPalette  
java.lang.reflect.InaccessibleObjectException: Unable to make field int java.awt.Color.value accessible: module java.desktop does not  
"opens java.awt" to unnamed module @58b5719e  
at java.base/java.lang.reflect.AccessibleObject.throwInaccessibleObjectException(AccessibleObject.java:391)  
at java.base/java.lang.reflect.AccessibleObject.checkCanSetAccessible(AccessibleObject.java:367)  
at java.base/java.lang.reflect.AccessibleObject.checkCanSetAccessible(AccessibleObject.java:315)  
at java.base/java.lang.reflect.Field.checkCanSetAccessible(Field.java:183)
```

Configure Jenkins, install plugins green balls, maven integration , deploy to container

Configure maven home in tools

The screenshot shows the Jenkins interface for managing tools. Under 'Maven installations', a new Maven configuration is being added with the name 'localmvn' and MAVEN_HOME set to 'C:\tools\apache-maven-3.9.9'. The 'Save' button is highlighted.

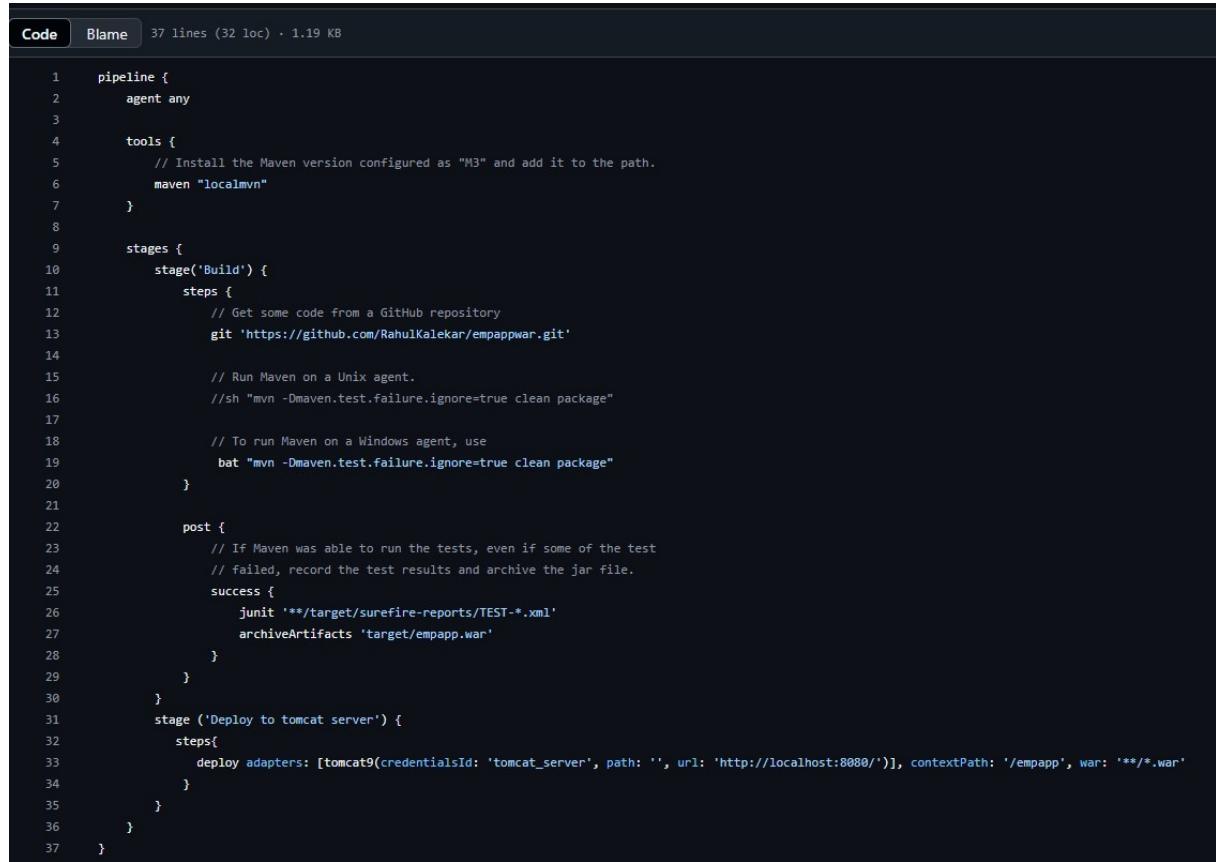
Upload the project on git

The screenshot shows a GitHub repository page for 'RahulKalekar / empappwar'. The 'Code' tab is selected, displaying the project structure under the 'master' branch. The 'empapp' directory contains 'controller', 'EmpappwarApplication.java', and 'ServletInitializer.java' files. The commit history shows two commits from 'RahulKalekar' yesterday, both labeled 'first'.

Name	Last commit message	Last commit date
controller	changes	yesterday
EmpappwarApplication.java	first	2 days ago
ServletInitializer.java	first	2 days ago

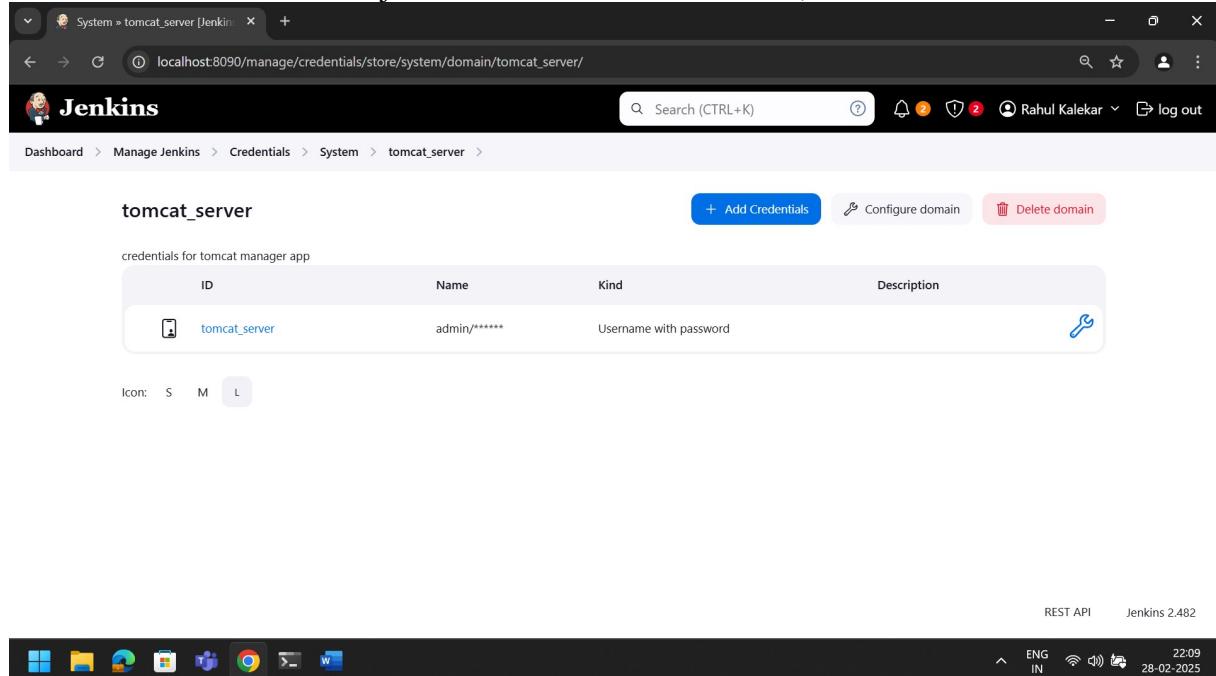
Added Jenkinsfile in root directory of project to use it for pipelining.

Jenkinsfile



```
1 pipeline {
2     agent any
3
4     tools {
5         // Install the Maven version configured as "M3" and add it to the path.
6         maven "localmvn"
7     }
8
9     stages {
10        stage('Build') {
11            steps {
12                // Get some code from a GitHub repository
13                git 'https://github.com/RahulKalekar/empappwar.git'
14
15                // Run Maven on a Unix agent.
16                //sh "mvn -Dmaven.test.failure.ignore=true clean package"
17
18                // To run Maven on a Windows agent, use
19                //bat "mvn -Dmaven.test.failure.ignore=true clean package"
20            }
21
22            post {
23                // If Maven was able to run the tests, even if some of the test
24                // failed, record the test results and archive the jar file.
25                success {
26                    junit '**/target/surefire-reports/TEST-*.xml'
27                    archiveArtifacts 'target/empapp.war'
28                }
29            }
30        }
31        stage ('Deploy to tomcat server') {
32            steps{
33                deploy adapters: [tomcat9(credentialsId: 'tomcat_server', path: '', url: 'http://localhost:8080')], contextPath: '/empapp', war: '**/*.war'
34            }
35        }
36    }
37 }
```

We need to add credentials for jenkins to access our tomcat server, so



The screenshot shows the Jenkins UI at localhost:8090/manage/credentials/store/system/domain/tomcat_server/. The page title is "System > tomcat_server [Jenkins]". The main heading is "tomcat_server". Below it, it says "credentials for tomcat manager app". A table lists one credential:

ID	Name	Kind	Description
tomcat_server	admin/*****	Username with password	

At the bottom, there are icons for S, M, L, REST API, Jenkins 2.482, ENG IN, 22:09, and 28-02-2025.

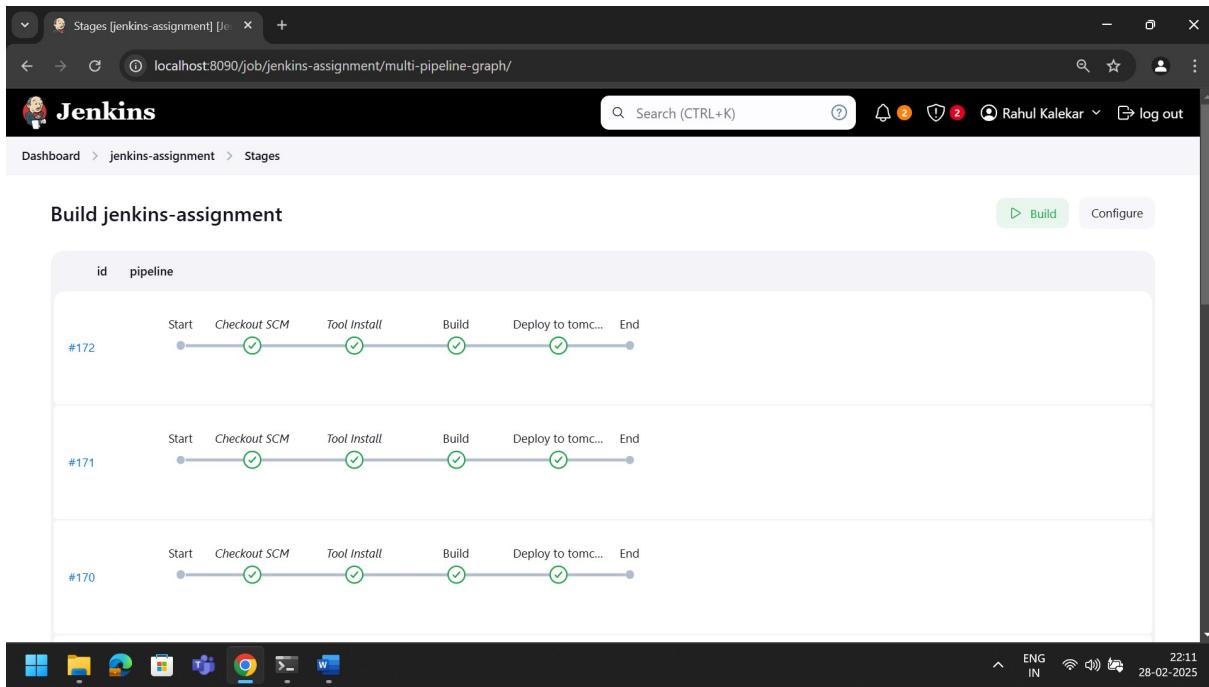
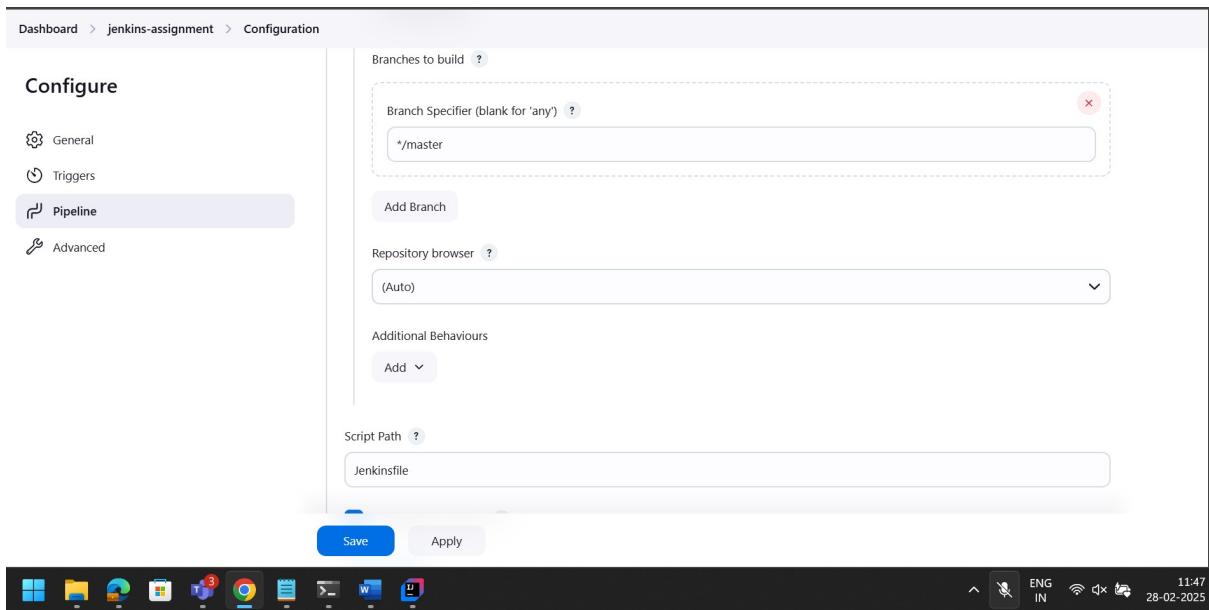
Created tomcat_server credentials which has tomcat server manager app id pass.

Creating pipeline project

The screenshot shows the Jenkins 'New Item' creation interface. At the top, there are tabs for 'Instances | EC2 | ap-south-1' and 'New Item [Jenkins]'. The main title is 'New Item'. A sub-header says 'Enter an item name' with a text input field containing 'jenkins-assignment'. Below this, a section titled 'Select an item type' lists three options: 'Freestyle project', 'Maven project', and 'Pipeline'. The 'Pipeline' option is selected, described as '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.' At the bottom of the form is an 'OK' button. The system status bar at the bottom right shows '11:43 28-02-2025'.

Pipline script from SCM

The screenshot shows the Jenkins Pipeline configuration page for the 'jenkins-assignment' project. The title is 'Configure' under 'jenkins-assignment > Configuration'. It says 'Define your Pipeline using Groovy directly or pull it from source control.' The 'Definition' dropdown is set to 'Pipeline script from SCM'. The 'Pipeline' tab is selected in the sidebar. In the main area, 'SCM' is set to 'Git'. The 'Repositories' section shows a single repository with 'Repository URL' as 'https://github.com/RahulKalekar/empappwar.git' and 'Credentials' as '- none -'. At the bottom are 'Save' and 'Apply' buttons. The system status bar at the bottom right shows '11:46 28-02-2025'.



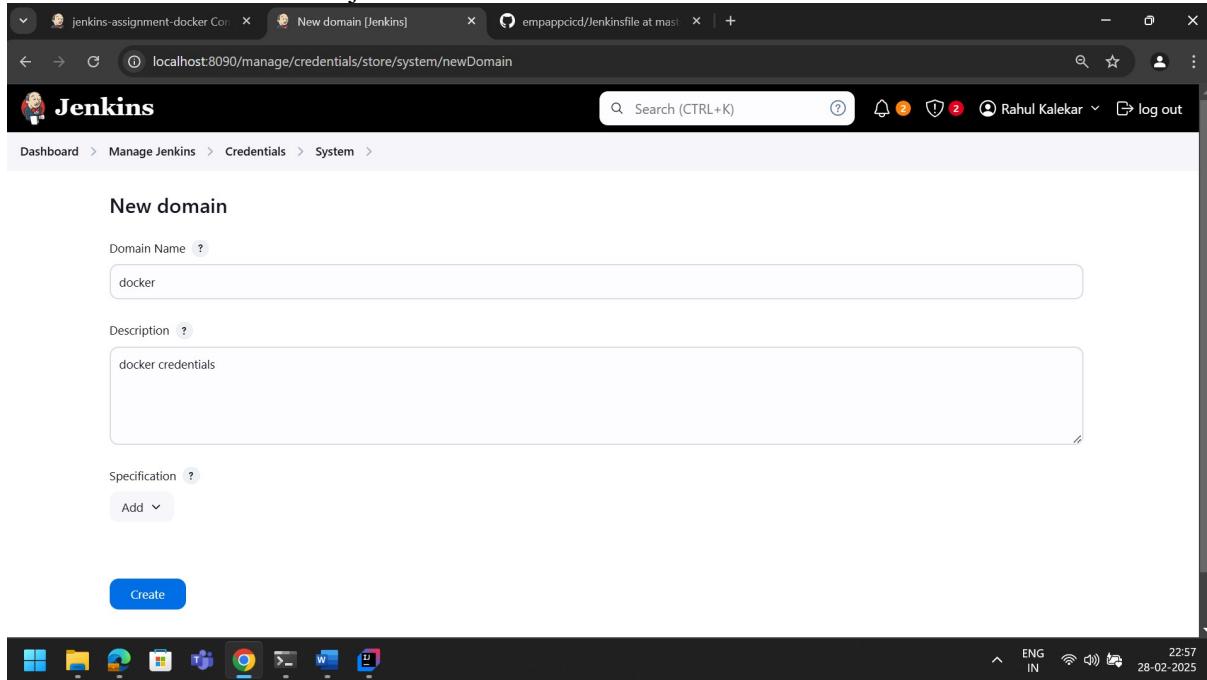
```
jenkins-assignment #172 Consc +  
localhost:8090/job/jenkins-assignment/172/console  
  
Dashboard > jenkins-assignment > #172  
  
Did you forget the 'use' keyword? 'workflowscript' seems to be setting a field named 'reservesStrategy' (to a value of type 'Integer') which could lead to memory leaks or other issues.  
[Pipeline] deploy  
[DeployPublisher][INFO] Attempting to deploy 1 war file(s)  
[DeployPublisher][INFO] Deploying C:\Users\rahul.kalekar\.jenkins\workspace\jenkins-assignment\target\empapp.war to container Tomcat 9.x Remote with context empappwar  
    Redeploying [C:\Users\rahul.kalekar\.jenkins\workspace\jenkins-assignment\target\empapp.war]  
    Undeploying [C:\Users\rahul.kalekar\.jenkins\workspace\jenkins-assignment\target\empapp.war]  
    Deploying [C:\Users\rahul.kalekar\.jenkins\workspace\jenkins-assignment\target\empapp.war]  
[Pipeline] }  
[Pipeline] // withEnv  
[Pipeline] }  
[Pipeline] // stage  
[Pipeline] }  
[Pipeline] // withEnv  
[Pipeline] }  
[Pipeline] // withEnv  
[Pipeline] }  
[Pipeline] // node  
[Pipeline] End of Pipeline  
Finished: SUCCESS  
  
REST API Jenkins 2.482  
ENG IN 22:12 28-02-2025
```

http://localhost:8080/jenkins-assignment#172 Console | localhost:8080/empappwar/hello | +
localhost:8080/empappwar/hello | Jenkins 2.25 - 02.08.2023 12:02:46 265698

Assignment 2:

Create spring rest project and deploy it on docker hub using jenkin

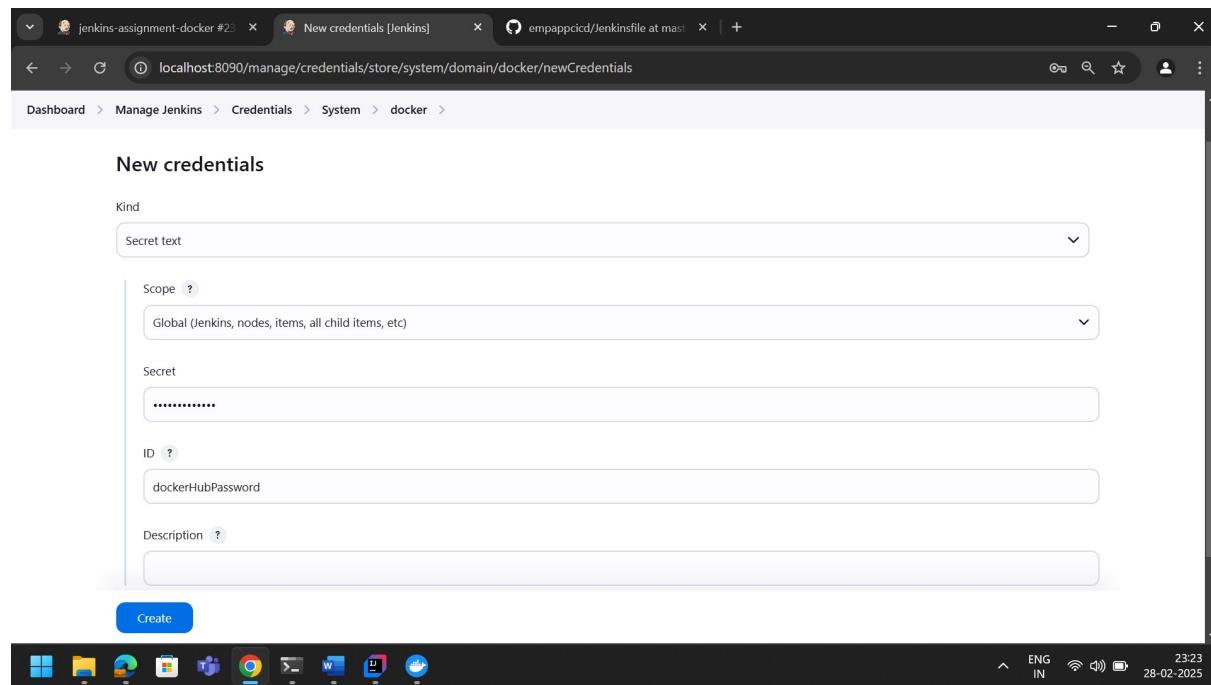
Create docker credentials in jenkins



The screenshot shows the Jenkins interface for creating a new domain. The title bar indicates the URL is `localhost:8090/manage/credentials/store/system/newDomain`. The main form has the following fields:

- Domain Name**: docker
- Description**: docker credentials
- Specification**: Add (button)

A blue **Create** button is at the bottom left. The system tray at the bottom right shows the date as 28-02-2025.



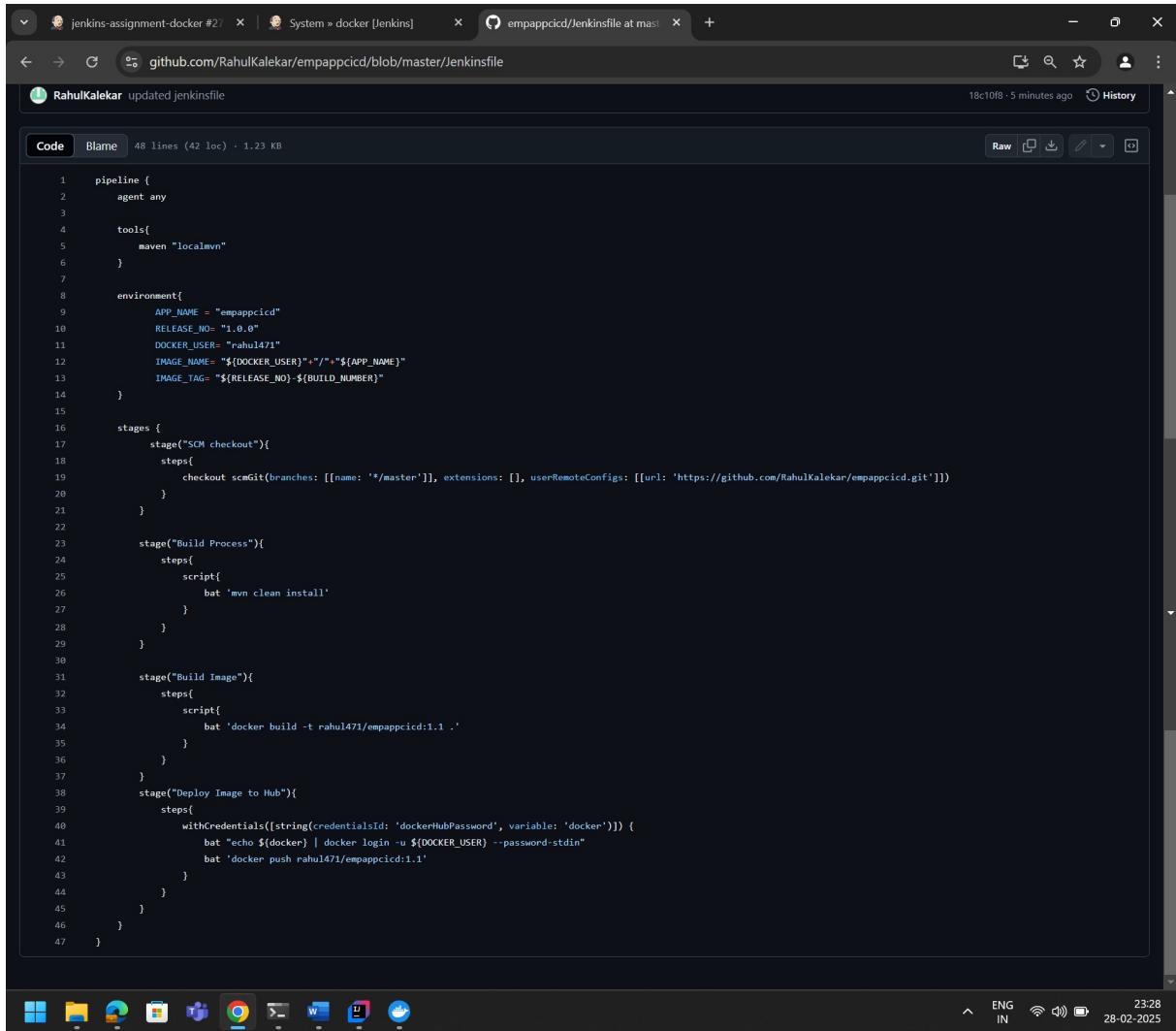
The screenshot shows the Jenkins interface for creating new credentials. The title bar indicates the URL is `localhost:8090/manage/credentials/store/system/domain/docker/newCredentials`. The main form has the following fields:

- Kind**: Secret text
- Scope**: Global (Jenkins, nodes, items, all child items, etc)
- Secret**: (redacted)
- ID**: dockerHubPassword
- Description**: (empty)

A blue **Create** button is at the bottom left. The system tray at the bottom right shows the date as 28-02-2025.

Added Jenkinsfile in root directory of project to use it for pipelining.

Jenkinsfile



```
1 pipeline {
2     agent any
3
4     tools{
5         maven "localmvn"
6     }
7
8     environment{
9         APP_NAME = "empappciid"
10        RELEASE_NO = "1.0.0"
11        DOCKER_USER= "rahul471"
12        IMAGE_NAME= "${DOCKER_USER}"/"${APP_NAME}"
13        IMAGE_TAG= "${RELEASE_NO}-${BUILD_NUMBER}"
14    }
15
16    stages {
17        stage("SCM checkout"){
18            steps{
19                checkout scmGit(branches: [[name: '*/master']], extensions: [], userRemoteConfigs: [[url: 'https://github.com/RahulKalekar/empappciid.git']])
20            }
21        }
22
23        stage("Build Process"){
24            steps{
25                script{
26                    bat 'mvn clean install'
27                }
28            }
29        }
30
31        stage("Build Image"){
32            steps{
33                script{
34                    bat 'docker build -t rahul471/empappciid:1.1 .'
35                }
36            }
37        }
38        stage("Deploy Image to Hub"){
39            steps{
40                withCredentials([string(credentialsId: 'dockerHubPassword', variable: 'docker')) {
41                    bat "echo ${docker} | docker login -u ${DOCKER_USER} --password-stdin"
42                    bat 'docker push rahul471/empappciid:1.1'
43                }
44            }
45        }
46    }
47 }
```

Dockerfile

The screenshot shows a GitHub repository page for 'empappciid'. The repository name is 'Dockerfile'. A user profile picture for 'RahulKalekar' is shown next to the repository name. Below the repository name, there are tabs for 'Code' (selected), 'Blame', and '5 lines (5 loc) · 155 Bytes'. A GitHub Copilot button is also present. The code content is as follows:

```
1 FROM openjdk:17-alpine
2 MAINTAINER email="kalekarrahul12@gmail.com"
3 EXPOSE 8080
4 ADD target/*.jar empappciid.jar
5 ENTRYPOINT ["java","-jar","empappciid.jar"]
```

Creating the pipeline

The screenshot shows the Jenkins 'New Item' creation interface. The URL is 'localhost:8090/view/all/newJob'. The title bar says 'Jenkins'. The main area is titled 'New Item' and has a sub-section 'Enter an item name' with the value 'jenkins-assignment-docker'. Below it, 'Select an item type' is shown with three options: 'Freestyle project', 'Maven project', and 'Pipeline'. The 'Pipeline' option is highlighted with a light gray background. At the bottom, there is an 'OK' button.

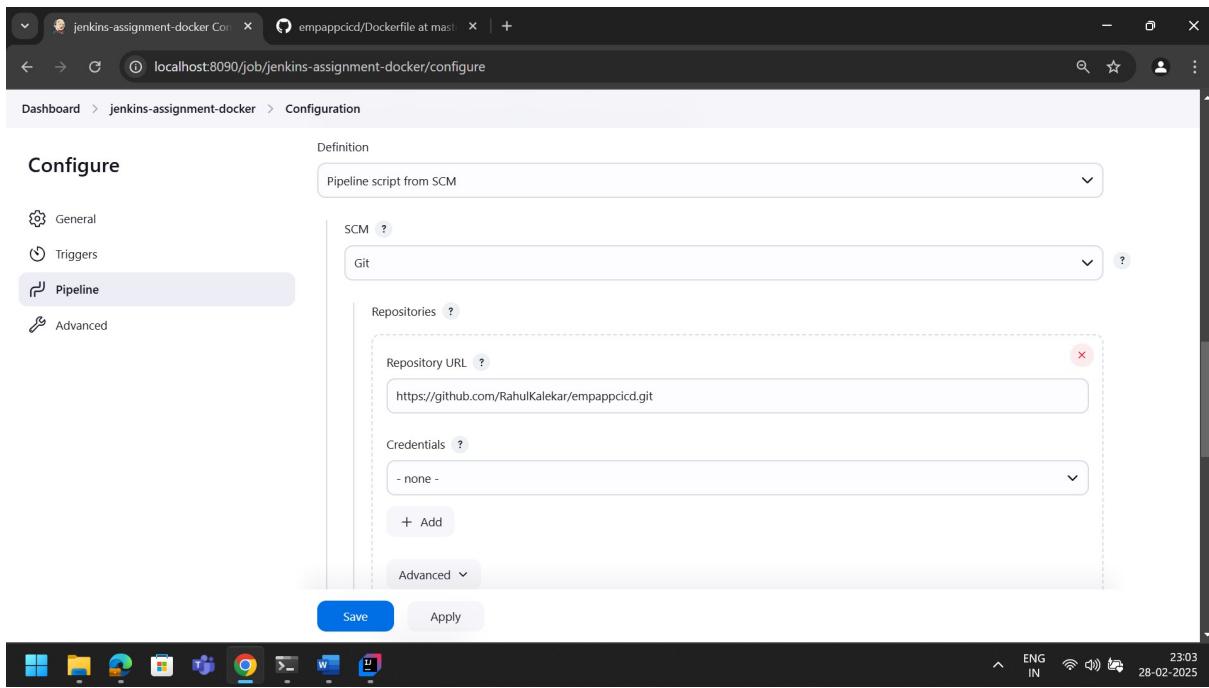


Image push successfully

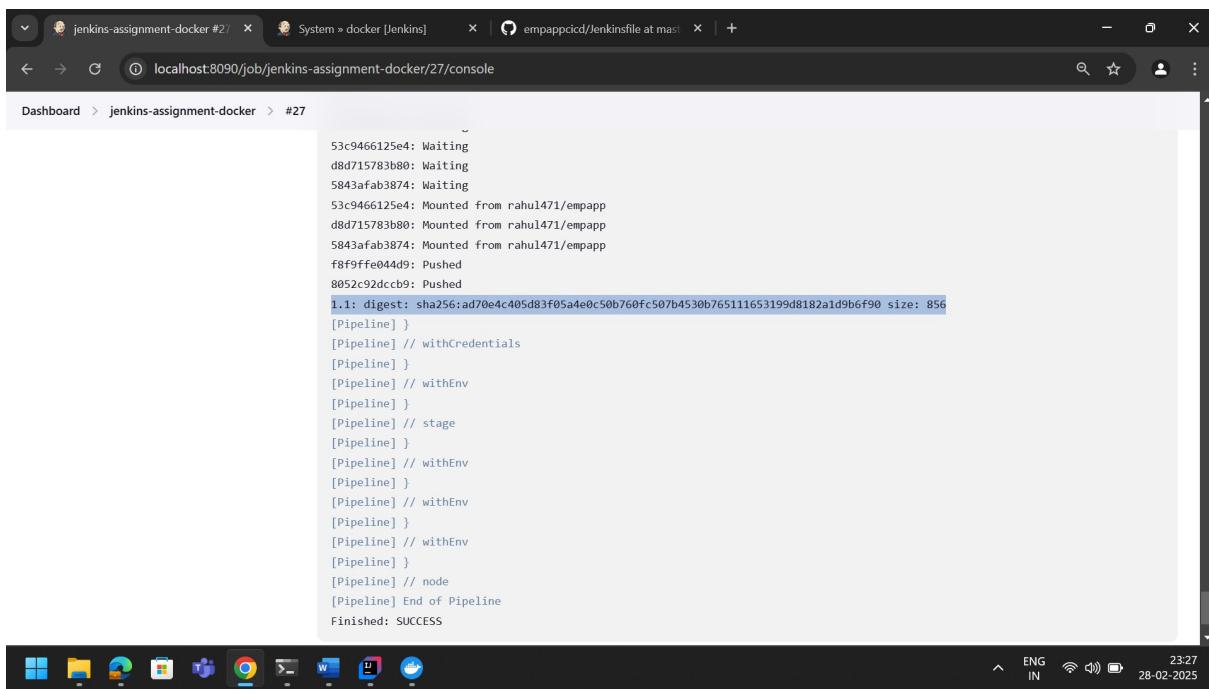


Image on docker hub

The screenshot shows the Docker Hub interface for the repository `rahul471/empappcid`. The repository has 1 tag, `1.1`, which was pushed 1 minute ago. The Docker commands section includes the command `docker push rahul471/empappcid:tagname`. The page also features sections for Tags, Automated builds, and various management options like General, Tags, and Image Management.

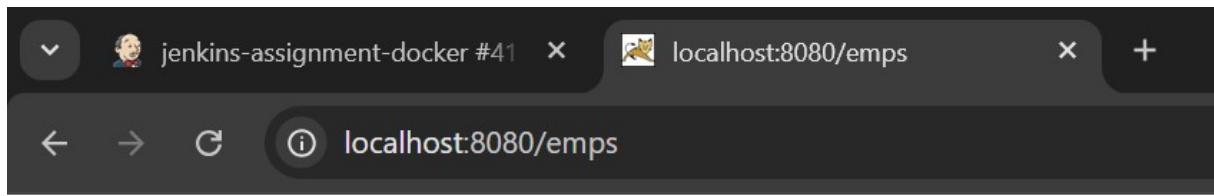
Running and checking the image

```
docker run -p 8080:8080 rahul471/empappcid:1.1
```

```
C:\Users\rahul.kalekar\Desktop\aws_projects\empappcid>docker run -p 8080:8080 rahul471/empappcid:1.1

\ \ / ---' -- - C) -- -- - \ \ \
 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ 
 :: Spring Boot ::      (v3.9)

2025-02-28T18:20:13.117Z INFO 1 --- [empappcid] [           main] com.employee.EmployeeappawsApplication : Starting Employeeappaw
sApplication v0.0.1-SNAPSHOT using Java 17-ea with PID 1 (/empappcid.jar started by root in /)
2025-02-28T18:20:13.121Z INFO 1 --- [empappcid] [           main] com.employee.EmployeeappawsApplication : No active profile set,
falling back to 1 default profile: "default"
2025-02-28T18:20:14.693Z INFO 1 --- [empappcid] [           main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized wit
h port 8080 (http)
2025-02-28T18:20:14.709Z INFO 1 --- [empappcid] [           main] o.apache.catalina.core.StandardService : Starting service [Tomc
at]
2025-02-28T18:20:14.710Z INFO 1 --- [empappcid] [           main] o.apache.catalina.core.StandardEngine : Starting Servlet engin
e: [Apache Tomcat/10.1.36]
2025-02-28T18:20:14.763Z INFO 1 --- [empappcid] [           main] o.a.c.c.C.[Tomcat].[localhost].[] : Initializing Spring em
bedded WebApplicationContext
2025-02-28T18:20:14.768Z INFO 1 --- [empappcid] [           main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationCon
text: initialization completed in 1545 ms
2025-02-28T18:20:15.577Z INFO 1 --- [empappcid] [           main] o.s.b.a.e.web.EndpointLinksResolver : Exposing 14 endpoints
beneath base path '/actuator'
2025-02-28T18:20:15.640Z INFO 1 --- [empappcid] [           main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port
8080 (http) with context path '/'
2025-02-28T18:20:15.655Z INFO 1 --- [empappcid] [           main] com.employee.EmployeeappawsApplication : Started Employeeappaws
Application in 3.222 seconds (process running for 4.043)
2025-02-28T18:20:22.206Z INFO 1 --- [empappcid] [nio-8080-exec-1] o.a.c.c.C.[Tomcat].[localhost].[] : Initializing Spring Di
```



Container runs with the image