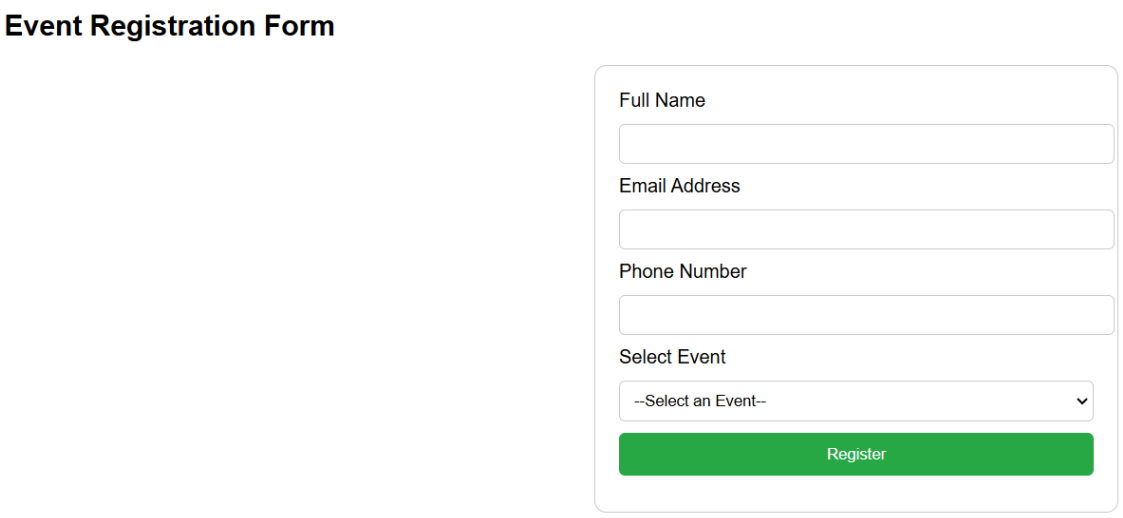
Registration form:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Event Registration Form</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            margin: 50px;
        }
        form {
            max-width: 400px;
            margin: auto;
            padding: 20px;
            border: 1px solid #ccc;
            border-radius: 10px;
        }
        label, input, select, button {
            display: block;
            width: 100%;
            margin-bottom: 10px;
        }
        input, select {
            padding: 8px;
            border: 1px solid #ccc;
            border-radius: 5px;
        }
```

```
        button {
            padding: 10px;
            background-color: #28a745;
            color: #fff;
            border: none;
            border-radius: 5px;
            cursor: pointer;
        }
        button:hover {
            background-color: #218838;
        }
    </style>
</head>
<body>
    <h2>Event Registration Form</h2>
    <form id="registrationForm" onsubmit="return validateForm()">
        <label for="name">Full Name</label>
        <input type="text" id="name" name="name" required>

        <label for="email">Email Address</label>
        <input type="email" id="email" name="email" required>

        <label for="phone">Phone Number</label>
        <input type="tel" id="phone" name="phone" required pattern="[0-9]{10}">

        <label for="event">Select Event</label>
        <select id="event" name="event" required>
            <option value="">--Select an Event--</option>
            <option value="workshop">Workshop</option>
            <option value="seminar">Seminar</option>
```

```
        <option value="conference">Conference</option>
      </select>

      <button type="submit">Register</button>
    </form>

    <script>
      function validateForm() {
        const form = document.getElementById('registrationForm');
        const name = form.name.value.trim();
        const email = form.email.value.trim();
        const phone = form.phone.value.trim();
        const event = form.event.value;

        if (!name || !email || !phone || !event) {
          alert('Please fill out all fields.');
          return false;
        }

        if (!/^[0-9]{10}$/.test(phone)) {
          alert('Please enter a valid 10-digit phone number.');
          return false;
        }

        alert('Registration Successful!');
        return true;
      }
    </script>
  </body>
</html>
```

Output:


Event Registration Form
Full Name
Email Address
Phone Number
Select Event
--Select an Event--
Register

GIT AND GITHUB

GIT

- Git is a **free and open source** *distributed version control system* designed to handle everything from small to very large projects with speed and efficiency.

- Git is used to **track changes in the source code**, enabling multiple developers to work together on non-linear development.

- Linus Torvalds created Git in 2005 for the development of the Linux kernel.

GIT

- Git is a tool that helps you manage changes to your code over time.
- It keeps track of every little change or update you make, you can always look back at previous versions or undo mistakes if needed.
- GIT is a CLI (Command Line Interface) based tool which is used for taking snapshots of each and every version of your code.

VERSION CONTROL SYSTEM

- A **version control system (VCS**) is like a smart tool that helps people work together on projects, especially computer programs.

- It keeps track of changes made to files, kind of like saving different versions of a document.

WHAT DOES GIT DO

- Manage projects with **Repositories**
- **Clone** a project to work on a local copy
- Control and track changes with **Staging** and **Committing**
- **Branch** and **Merge** to allow for work on different parts and versions of a project
- **Pull** the latest version of the project to a local copy
- **Push** local updates to the main project

Features of Git

Version Control System:

•Git keeps track of every change you make to your project files.

•You can go back to previous versions is any requirement arises.

•Repositories:

•A Git repository (or repo) is like a project's central hub where everything related to your work is stored and managed. There are two main types:

•Local Repository:

•This is a copy of the repository which is stored in your computer.

•You can work on your project and make changes here.

•Remote Repository:

•This is stored on a server, like GitHub, where you and others can share and work on a project.

Features of Git

Commits: Every time you make changes and save them in Git, these are called commits. The repository keeps track of all the commits you have made.

Branches: A repository allows you to create Branches and work on new features and fixes. For example, you can have a “main” branch for stable code and a “feature” branch for new features you’re developing.

Features of Git

Merging: Once you are done with the branches you have made, you can merge those branches into main branch. This adds the changes you have made in the rest of the project.

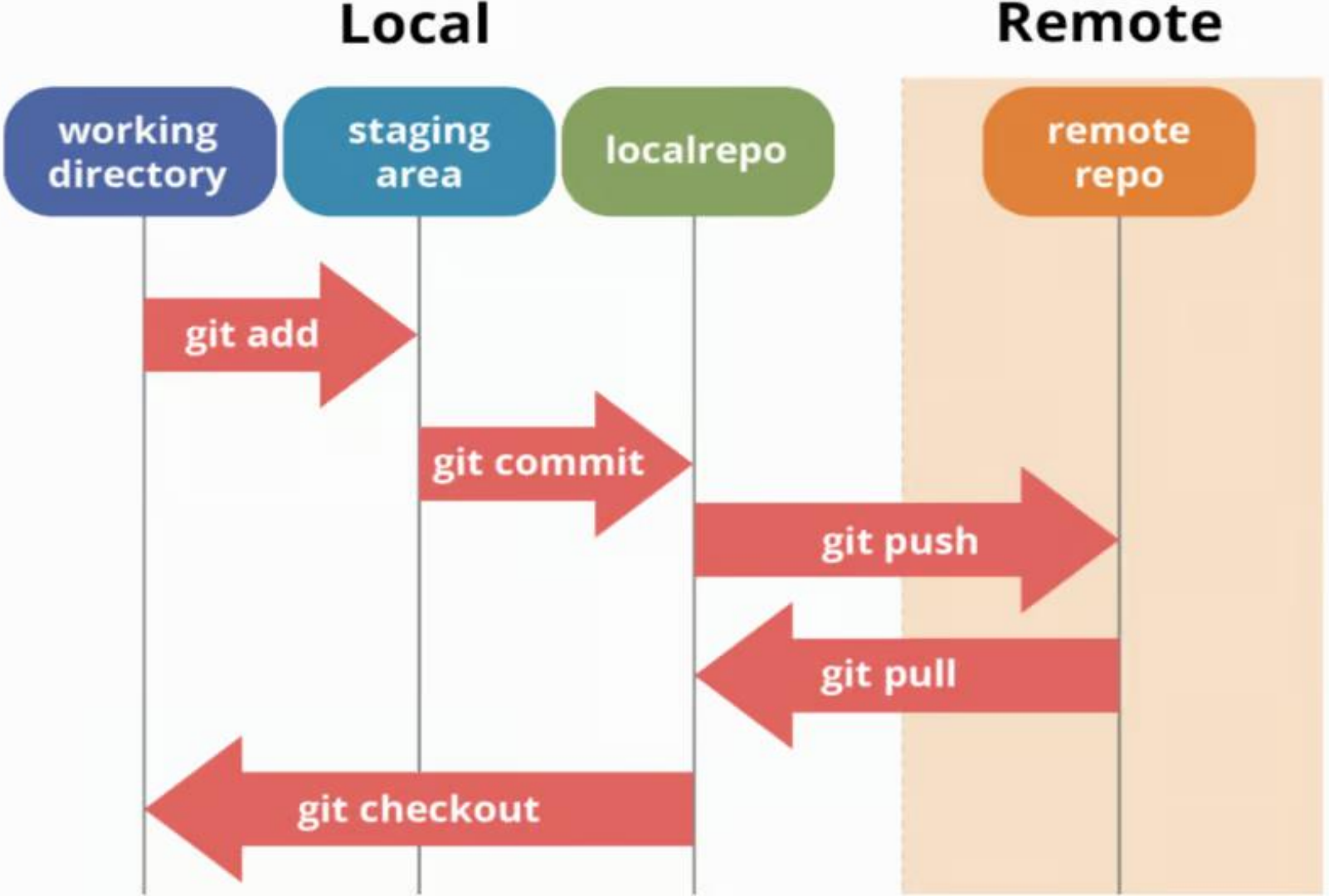
Cloning: Cloning is a process of making a complete copy of Git repository.

• It’s like copying the entire project from central location (like website) to your own computer.

GITHUB

GitHub is a developer platform that allows developers to create, store, manage and share their code.

It uses Git software, providing the distributed version control of Git plus access control, bug tracking, software feature requests, task management, continuous integration


Local
Remote
working directory
staging area
localrepo
remote repo
git add
git commit
git push
git pull
git checkout

Git working directory is the directory on your local filesystem where your project files are located.

It contains all the files and folders in your project, including those that are tracked by Git and those that are not.

Git’s staging area, also known as the index or cache, is an intermediate area that stores changes to tracked files before they are committed to the repository.

It serves as a way to organize and review the changes you have made to your project before creating a new commit

Downloading and Installing Git

For windows version

https://git-scm.com/download/win

Week -2

Second Half

1) version

command : git --version

2) config

Configuring user information used across all local repositories

git config --global user.name “[firstname lastname]”

git config --global user.email “[valid-email]”

3) init

The command is used to create an empty Git repository.

git init

initialize an existing directory as a Git repository

git init myworkspace

4) add

This command is used to add one or more files to staging (Index) area.

git add Filename

git add*

5) commit

The commit command makes sure that the changes are saved to the local repository.

git commit -m “commit message”

6)status

The status command is used to display the state of the working directory and the staging area.

It allows you to see which changes have been staged, which haven't, and which files aren?t being tracked by Git

```
git status
```

7)log---Checking the commit history:

```
git log
```

8) clone

The git clone command is used to create a local working copy of an existing remote repository.

The command downloads the remote repository to the computer.

```
git clone <remote_URL>
```

9) Creating a new branch:

```
git branch <branch-name>
```

10) Switching to a different branch:

```
git checkout <branch-name>
```

11) Merging two branches:

```
git merge <branch-name>
```

12) push

The command git push is used to transfer the commits or pushing the content from the local repository to the remote repository.

```
git push -u origin <branchname>
```

13) pull

The git pull command is used to fetch and merge changes from the remote repository to the local repository.

git pull <branch_name> <remote URL>

Jenkins

Jenkins – *an* ***open source automation server*** which enables developers around the world to **reliably build, test, and deploy** their software.

Jenkins provides **hundreds of plugins** to support building, deploying and automating any project

Jenkins

Jenkins is an **open source continuous integration (CI) server.**

It manages and controls several stages of the software delivery process, including build, documentation, automated testing, packaging, and static code analysis.

Jenkins is a highly popular DevOps tool used by thousands of development teams.

Jenkins

Jenkins automation is commonly triggered by code changes in repositories like GitHub, Bitbucket, and GitLab, and integrates with build tools like Maven and Gradle.

Jenkins supports the use of container technologies like Docker and Kubernetes for testing and packaging of software releases

Jenkins

- Continuous Integration and Continuous Delivery
- Easy installation
- Easy configuration
- Plugins
- Extensible
- Distributed

Installing Jenkins

Prerequisites

Recommended hardware configuration for a small team:

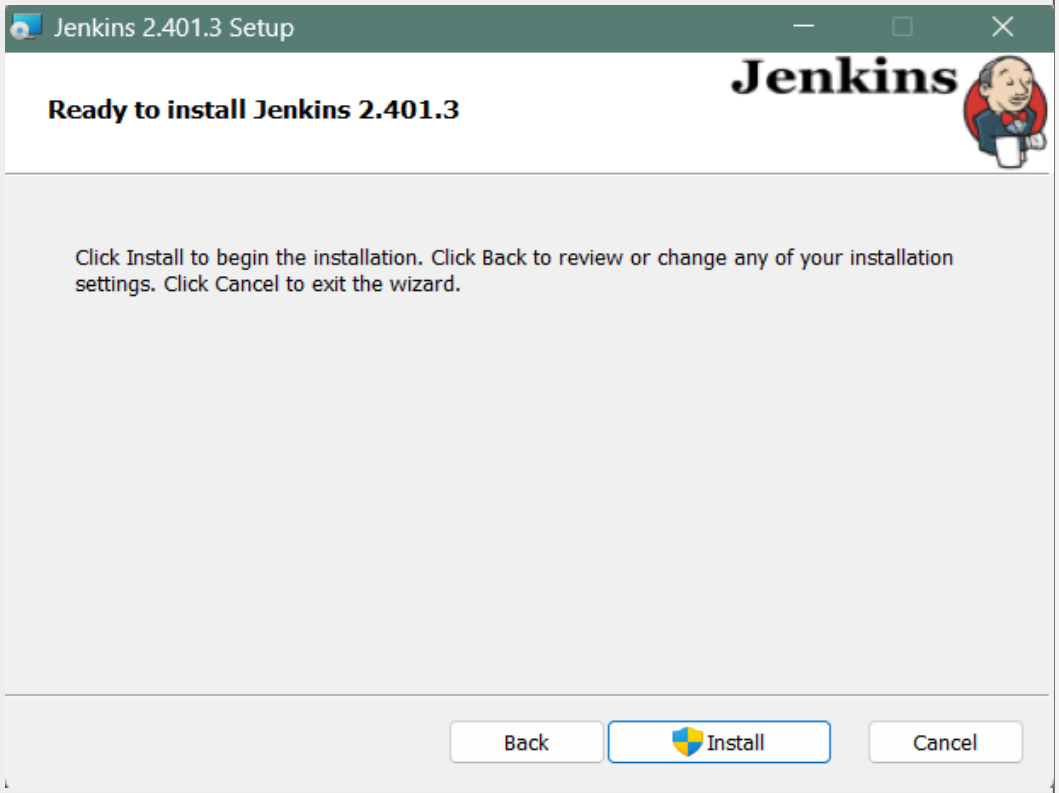
- 4 GB+ of RAM
- 50 GB+ of drive space

Installing Jenkins

- **Installation steps using Windows MSI installer**
- **https://www.jenkins.io/download/#downloading-jenkins**
- **After the download completes, open the Windows installer and follow the steps below to install Jenkins.**

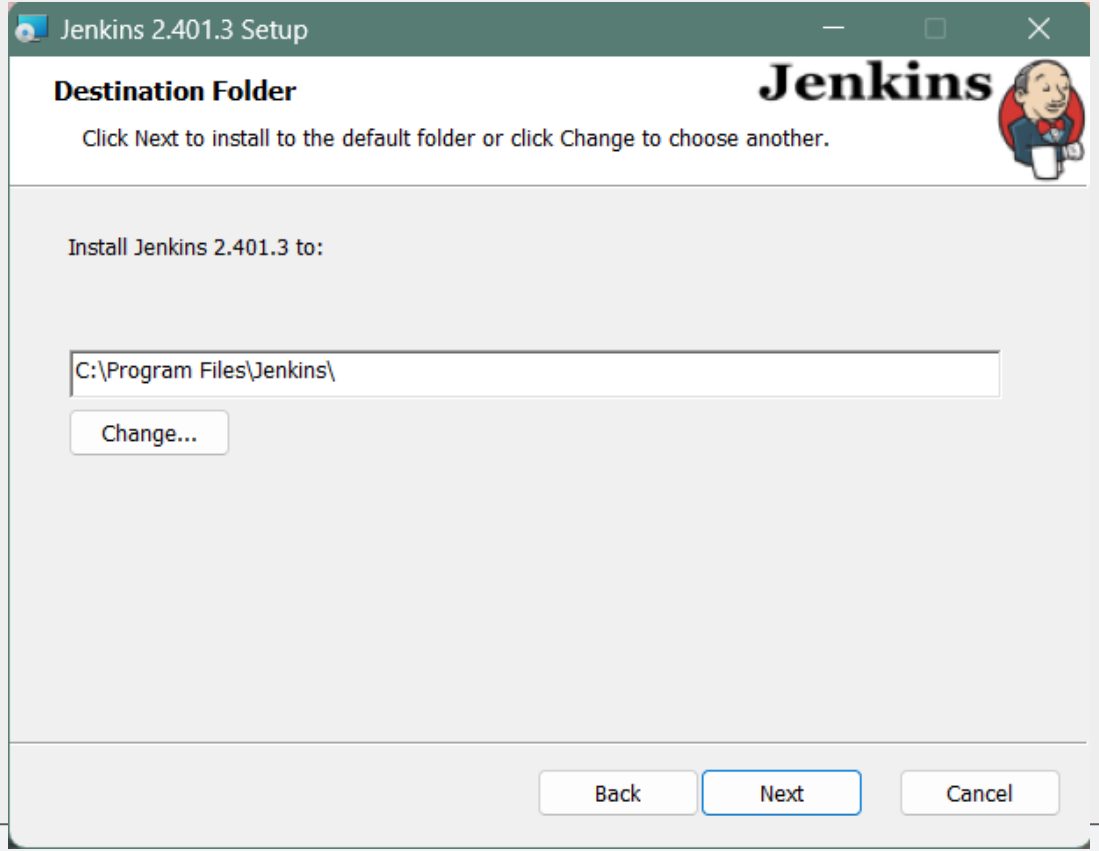
Installing Jenkins

- Step 1:
- Setup wizard



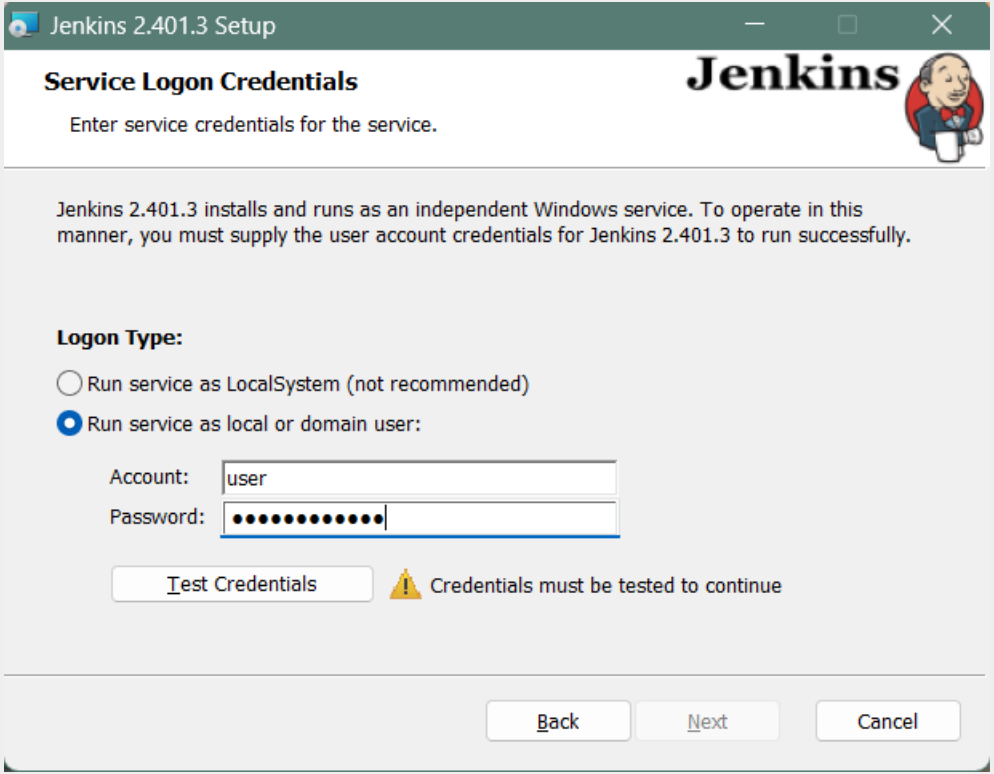
Installing Jenkins

Select destination folder



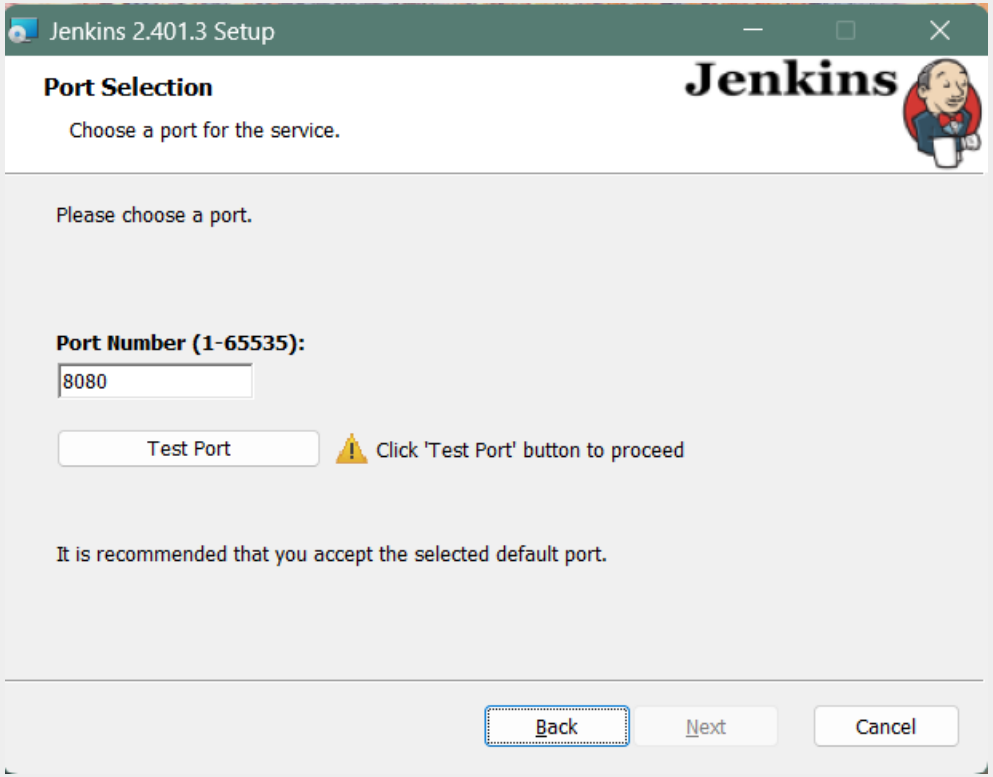
Installing Jenkins

Step 3:
Service logon credentials



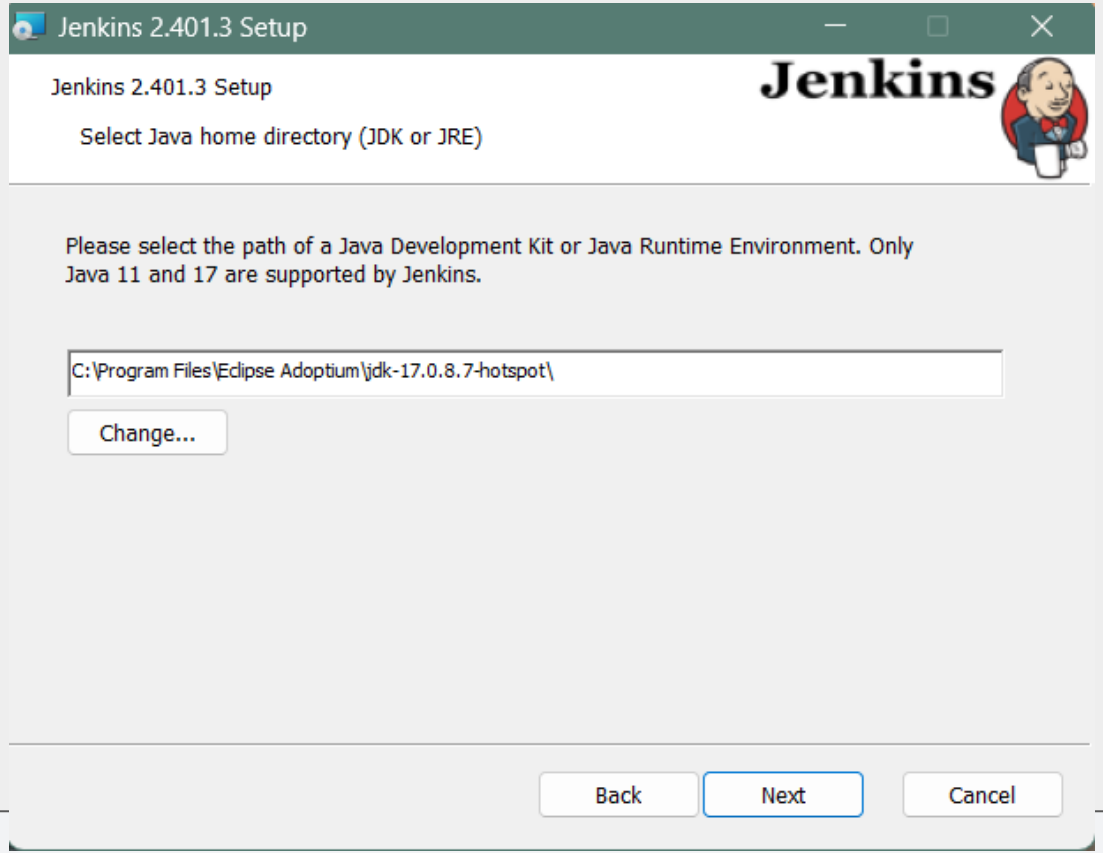
Installing Jenkins

Step 4: Port selection



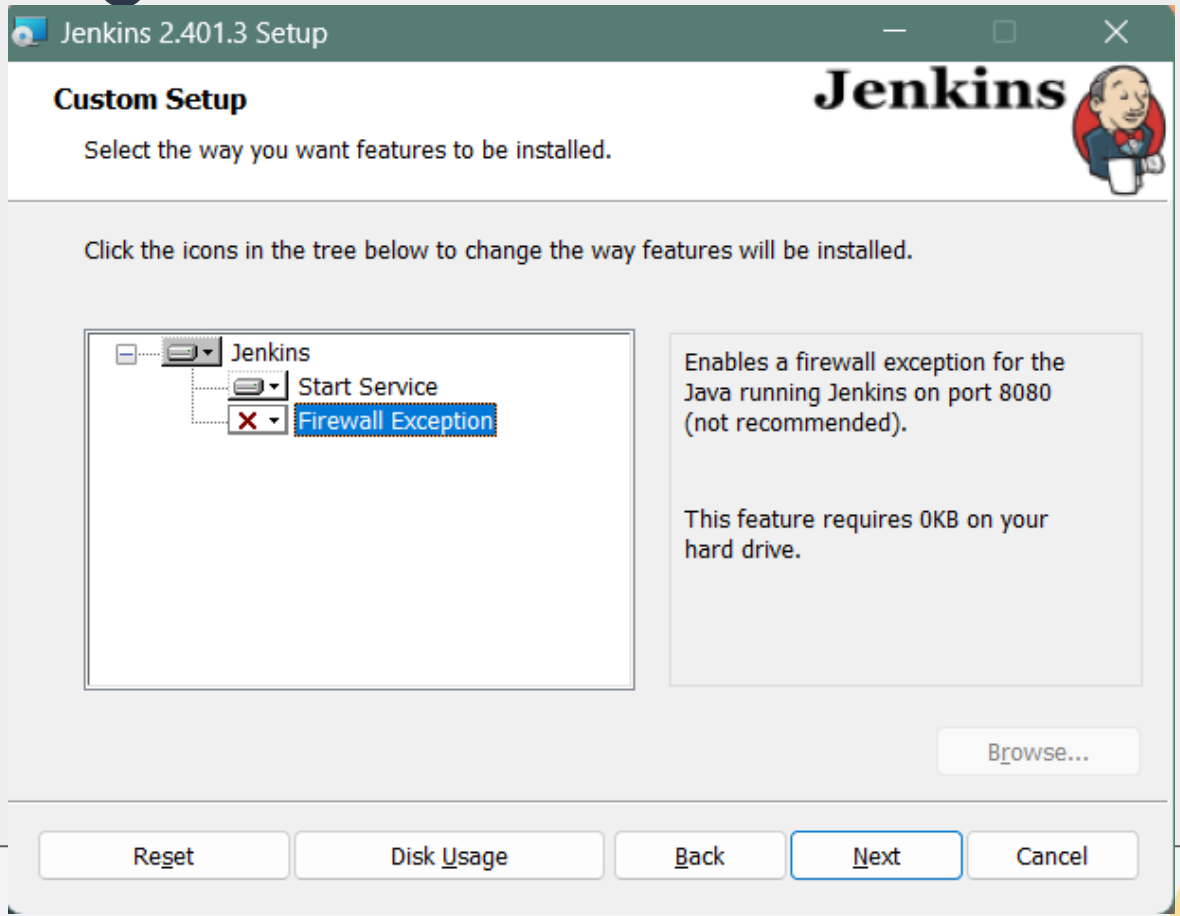
Installing Jenkins

Step 5: Select Java home directory:



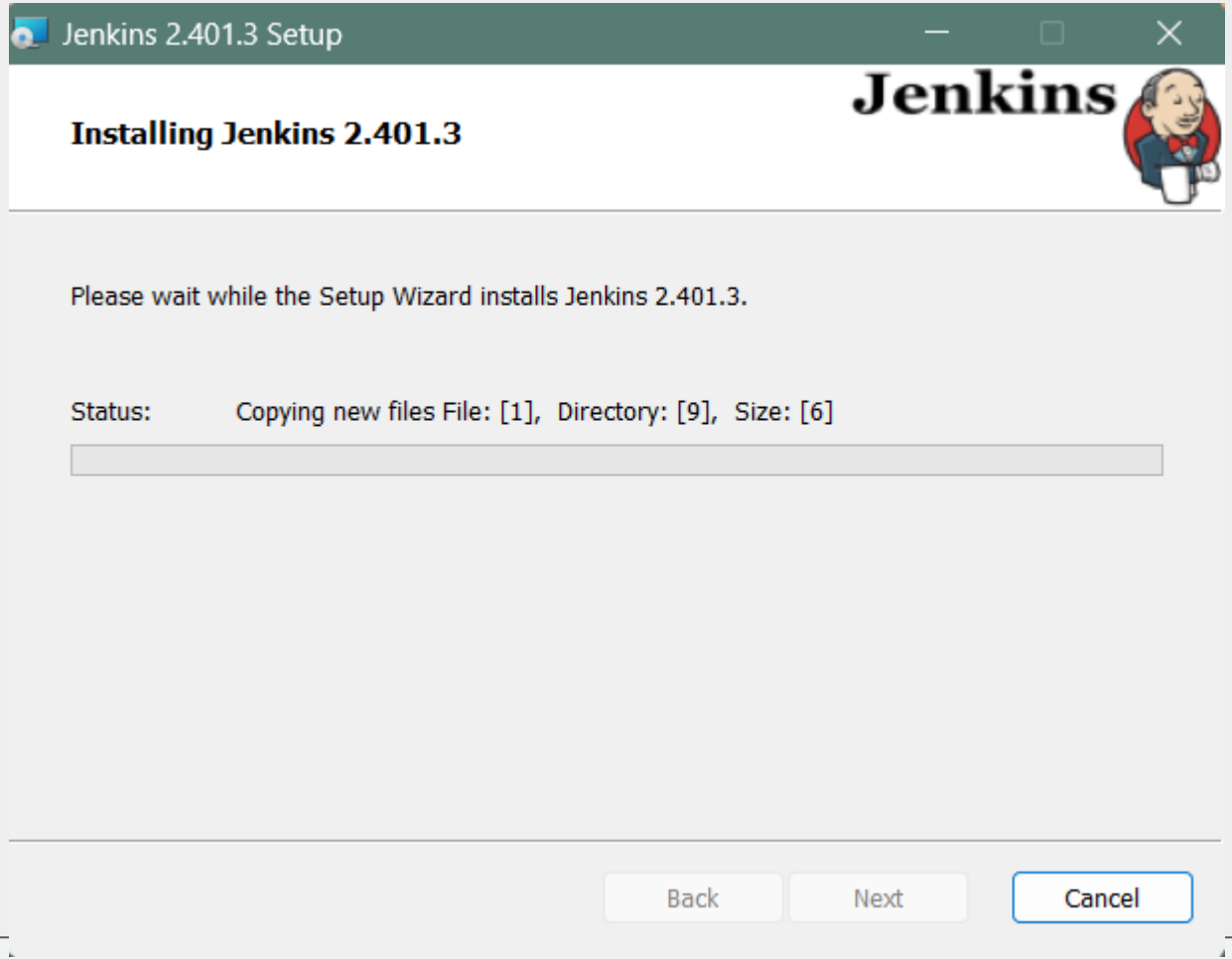
Installing Jenkins

Step 6: Custom setup



Installing Jenkins

Step 7: Install Jenkins


Jenkins 2.401.3 Setup
Installing Jenkins 2.401.3
Jenkins
Please wait while the Setup Wizard installs Jenkins 2.401.3.
Status: Copying new files File: [1], Directory: [9], Size: [6]
Back
Next
Cancel

Installing Jenkins

Step 8: Finish Jenkins installation

Installing Jenkins

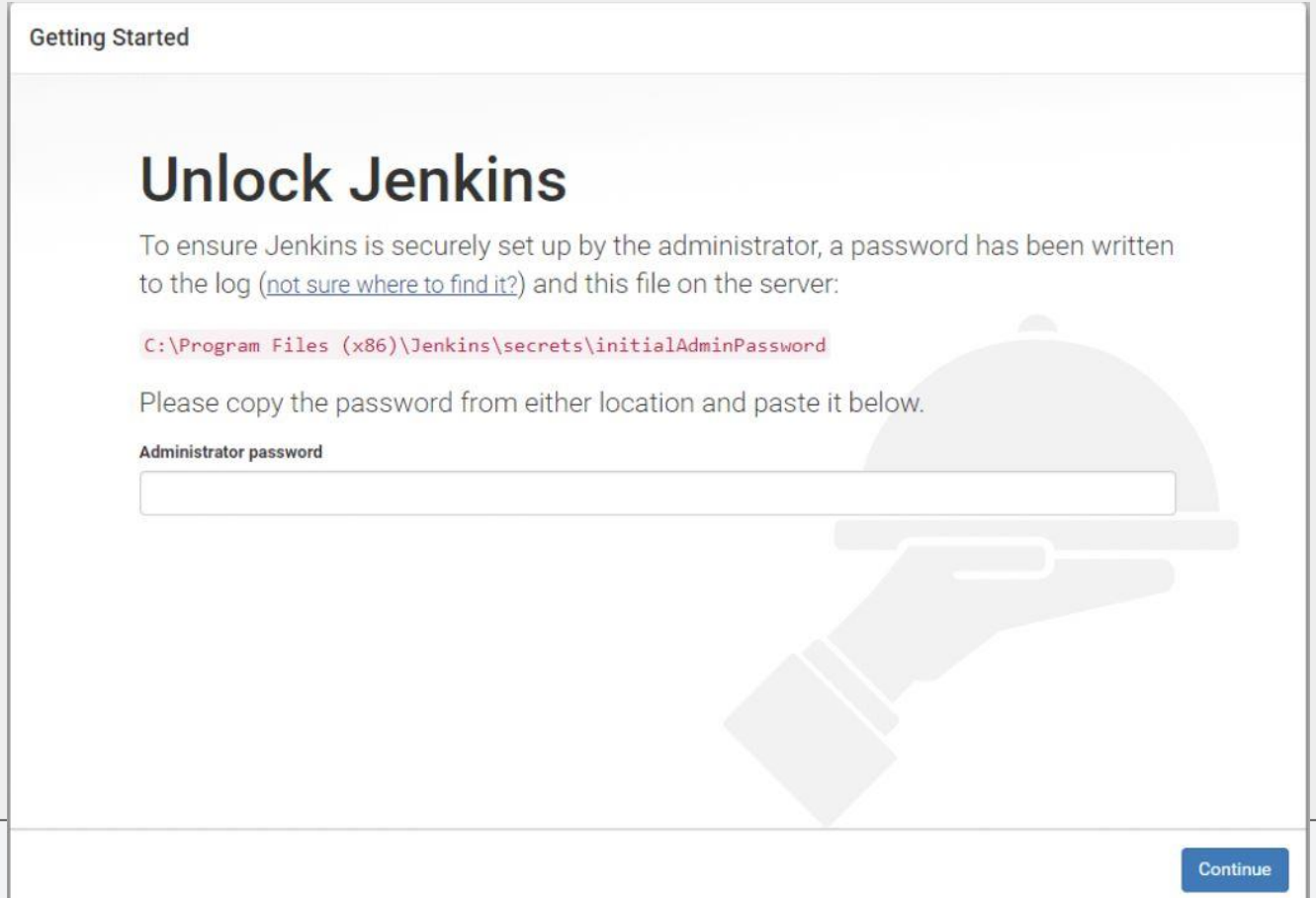
Post Setup wizard

Unlocking Jenkins

Step 1

Browse to http://localhost:8080and wait until the Unlock Jenkins page appears.

Installing Jenkins



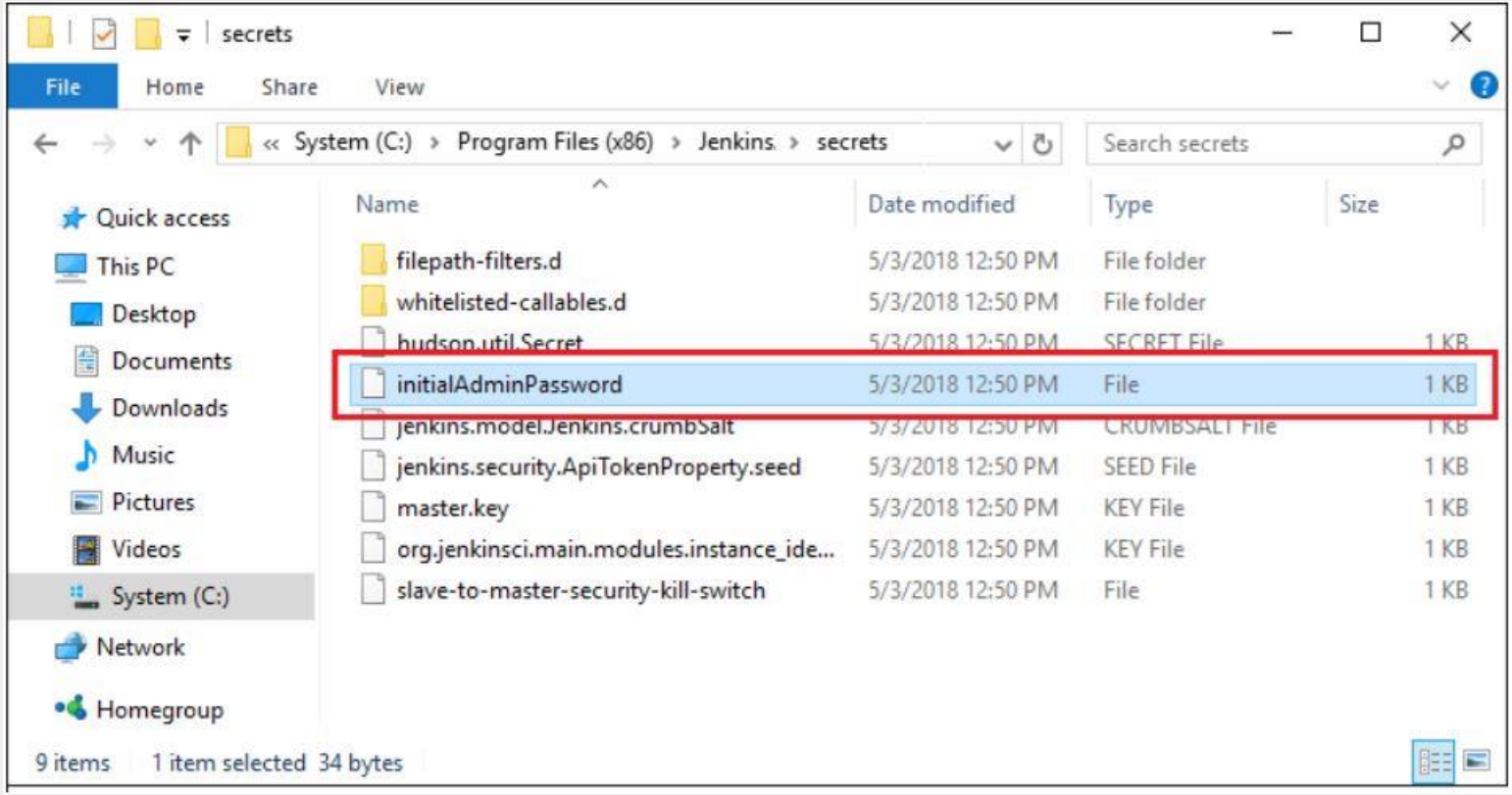
Installing Jenkins

Step 2

The initial Administrator password
should be found under the Jenkins installation path

If a custom path for Jenkins installation was selected,
then you should check that location for initialAdminPassword file.

Installing Jenkins



Installing Jenkins

Step 3

Open the highlighted file and copy the content of the **initialAdminPassword** file.

Installing Jenkins

Step 4

On the **Unlock Jenkins** page,
paste this password into the **Administrator password** field and click **Continue**.

Exploring Jenkins Environment

1. Search Bar: The search bar allows users to quickly find specific items within Jenkins, such as **jobs, nodes, users, or plugins**. It facilitates navigation and helps locate items efficiently, especially in larger Jenkins installations.

2. Navigation Bar: The navigation bar provides access to various sections and functionalities within Jenkins. It typically includes links to items like "New Item" (to create new jobs), "People" (to view user accounts), "Build History" (to track previous builds), "Manage Jenkins" (to configure Jenkins settings), and more.

3. New Item: This option allows users **to create new items or projects within Jenkins**. Users can create different types of items, such as **freestyle projects, pipeline projects, multi-configuration projects**, and more, depending on their requirements.

4. **Build History**: The Build History section lists the **recent builds of jobs within Jenkins**. Users can view details about **each build, including build status, duration, and any associated changes or comments**

5. Manage Jenkins: It provides access to **Jenkins administration and management functionalities**. Users can configure global Jenkins settings, manage plugins, view system information, and perform other administrative tasks from this section.

6. My View: My View allows users to customize their Jenkins dashboard to display relevant information based on their preferences. Users can **create custom views to filter and organize Jenkins jobs, builds, or other items according to specific criteria**.

7. Build Queue: The Build Queue section displays the list of jobs waiting to be executed in Jenkins. It provides information about queued jobs, including their priority, estimated waiting time, and any associated parameters.

8. Build Execution Status: This section displays the real-time status of ongoing builds in Jenkins. Users can monitor the progress of builds, view console output, and troubleshoot any issues that may arise during th**e build process.**

9. Create Job: The Create Job option allows users to create new jobs or projects within Jenkins. ***Users can define job configurations, specify source code repositories, configure build triggers, define build steps, and set post-build actions using this feature.***

Build Job

A Jenkins build job contains the **configuration for automating a specific task or step in the application building process**

These tasks include **gathering dependencies, compiling, archiving, or transforming code, and testing and deploying code in different environments**.

Jenkins supports several **types of build jobs, such as freestyle projects, pipelines, multi-configuration projects, folders, multibranch pipelines, and organization folders.**

Jenkins Freestyle Project

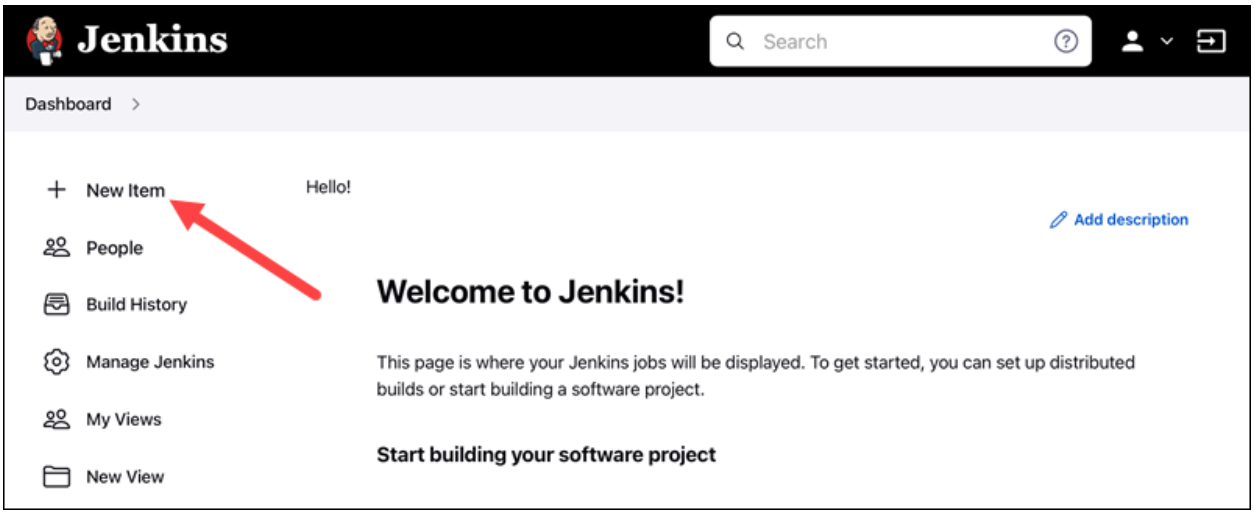
Jenkins freestyle projects allow users to automate simple jobs, such as running tests, creating and packaging applications, producing reports, or executing commands.

Set up a Build Job in Jenkins

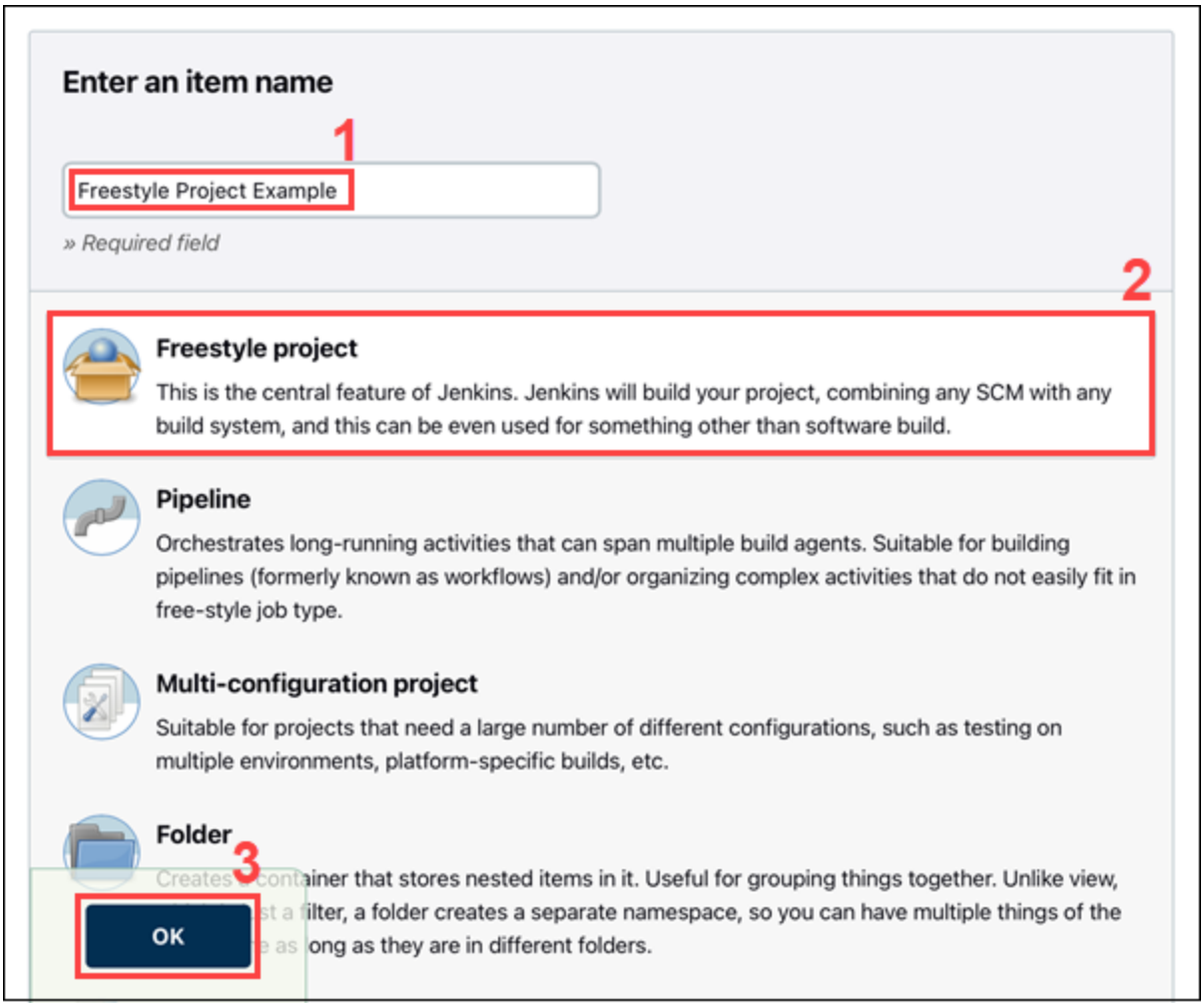
Follow the steps outlined below to set up and run a new Jenkins freestyle project.

Step 1: Create a New Freestyle Project

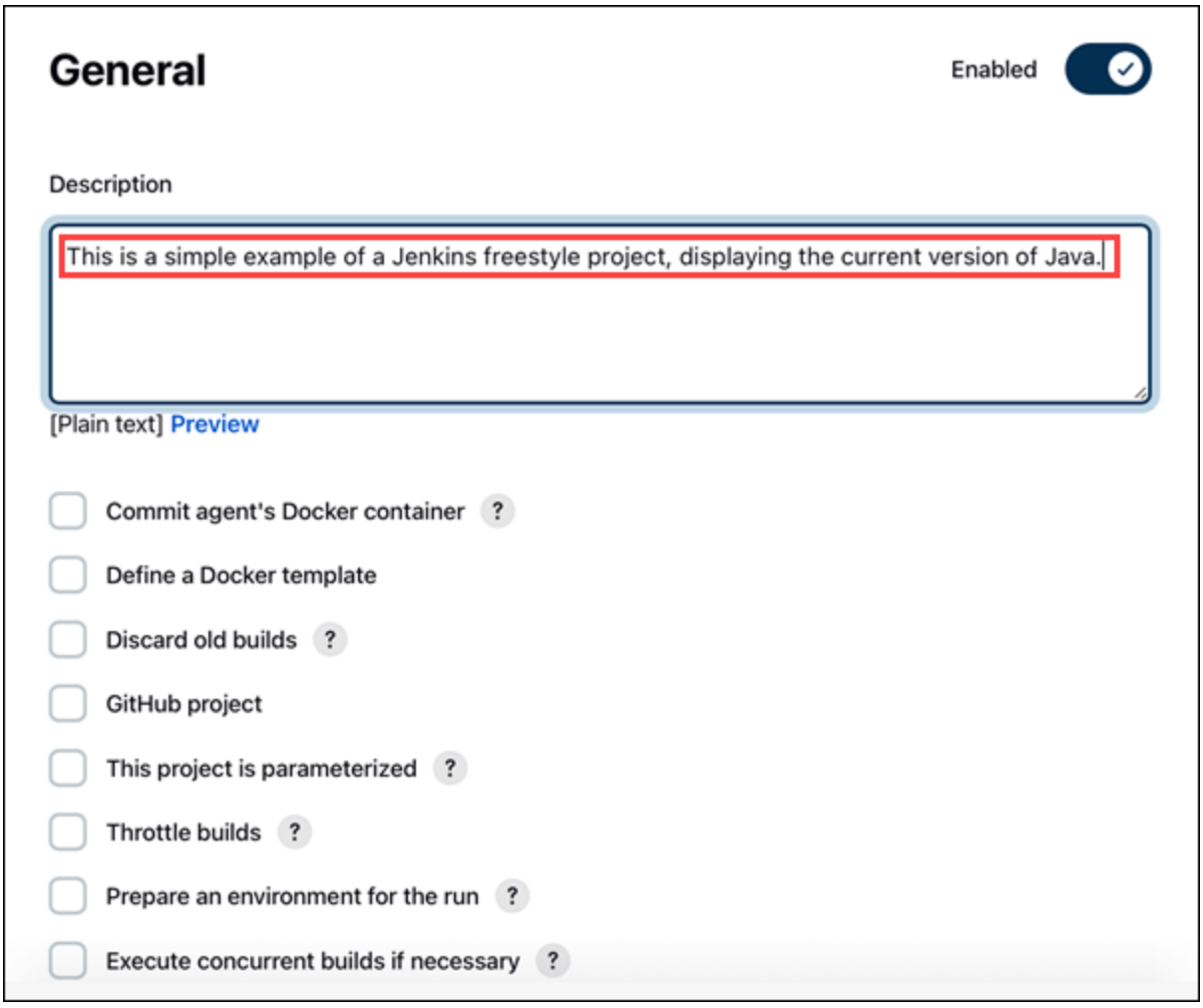
1. Click the New Item link on the left-hand side of the Jenkins dashboard.



2. Enter the new project's name in the Enter an item name field and select the Freestyle project type. Click OK to continue.



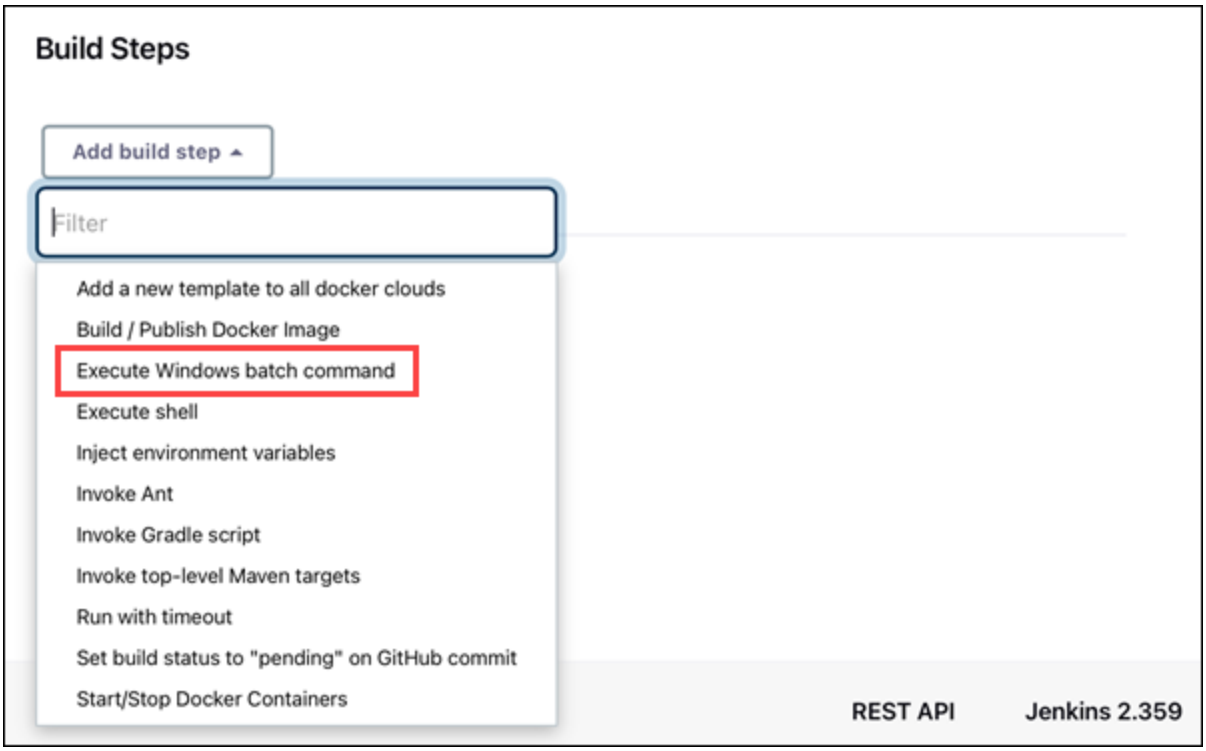
3. Under the *General* tab, add a project description in the Description field.



Step 2: Add a Build Step

1. Scroll down to the *Build* section.

2. Open the Add build step drop-down menu and select Execute Windows batch command.

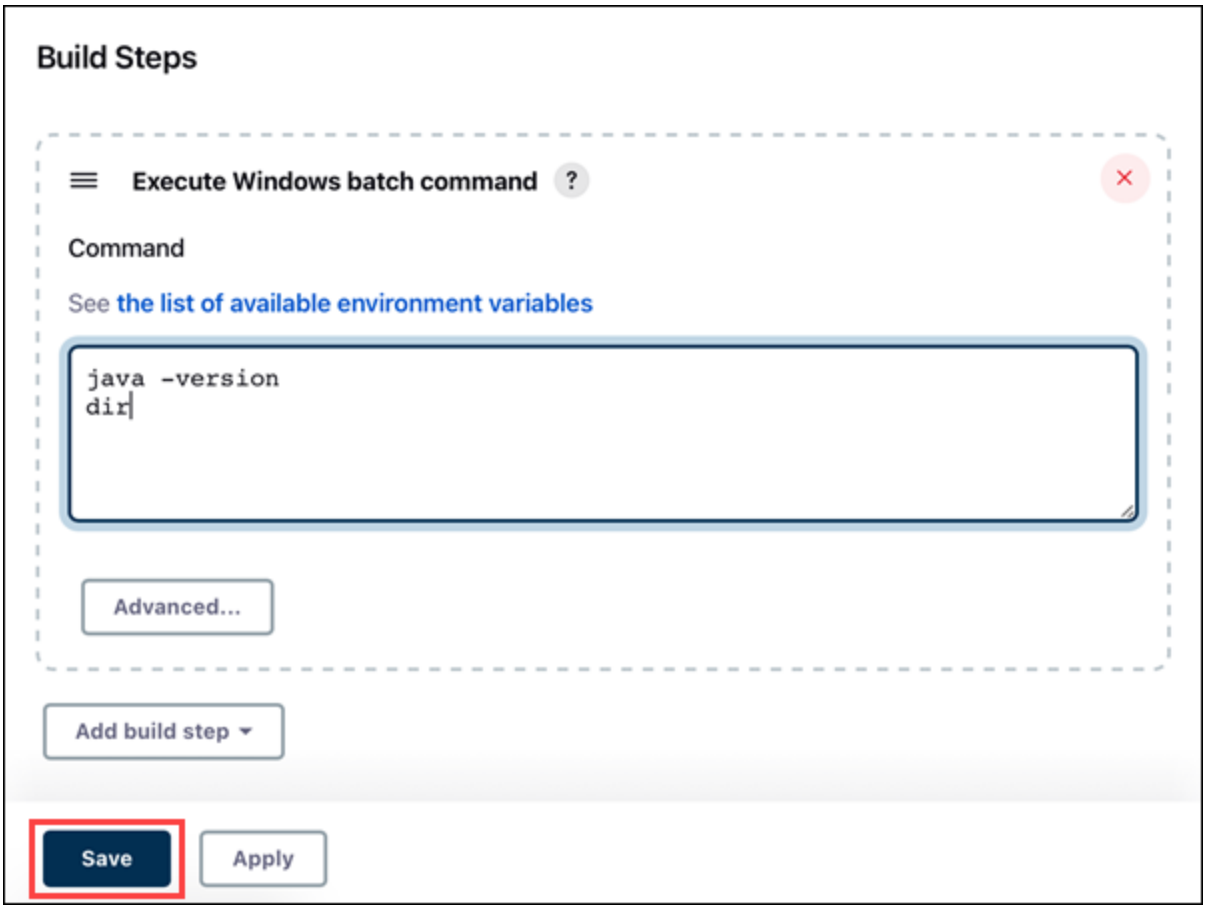


3. Enter the commands you want to execute in the Command field.

java -version

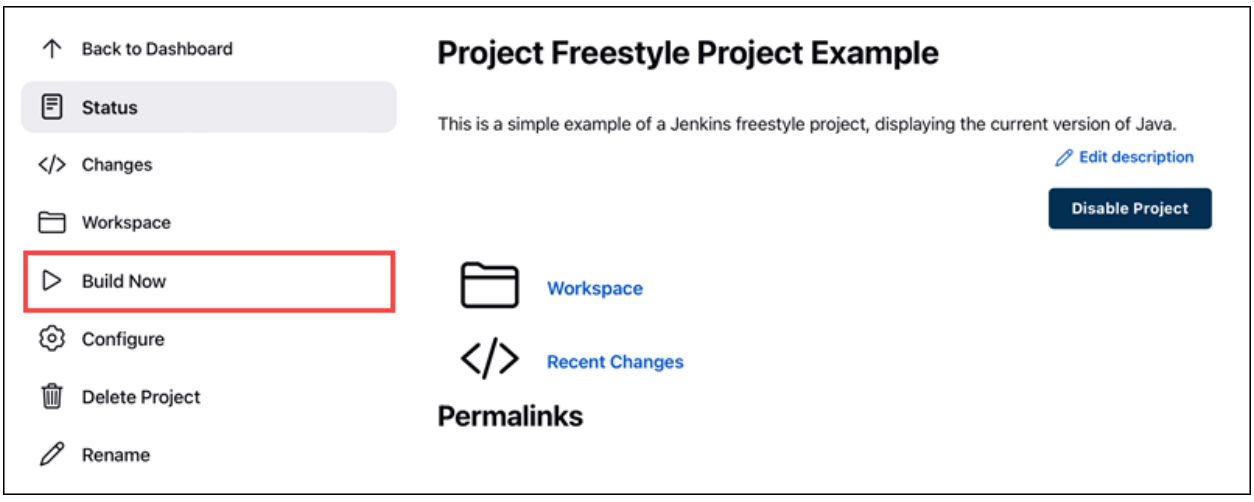
dir

4. Click the Save button to save changes to the project.



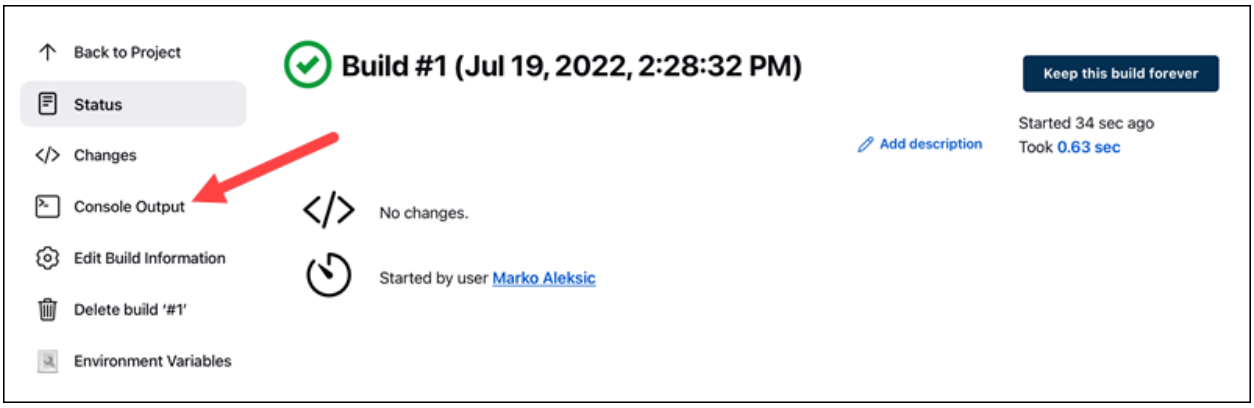
Step 3: Build the Project

1. Click the Build Now link on the left-hand side of the new project page.



2. Click the link to the latest project build in the *Build History* section.

3. Click the Console Output link on the left-hand side to display the output for the commands you entered.



4. The console output indicates that Jenkins is successfully executing the commands, displaying the current version of Java and Jenkins working directory.

Console Output

```
Started by user unknown or anonymous
Running as SYSTEM
[EnvInject] - Loading node environment variables.
Building in workspace C:\ProgramData\Jenkins\.jenkins\workspace\Freestyle Project Example
[Freestyle Project Example] $ cmd /c call C:\WINDOWS\TEMP\jenkins8981346236355107413.bat

C:\ProgramData\Jenkins\.jenkins\workspace\Freestyle Project Example>java -version
java version "1.8.0_321"
Java(TM) SE Runtime Environment (build 1.8.0_321-b07)
Java HotSpot(TM) Client VM (build 25.321-b07, mixed mode, sharing)

C:\ProgramData\Jenkins\.jenkins\workspace\Freestyle Project Example>dir
 Volume in drive C has no label.
 Volume Serial Number is 3AB4-672E

 Directory of C:\ProgramData\Jenkins\.jenkins\workspace\Freestyle Project Example

01/25/2022  10:23 AM    <DIR>          .
01/25/2022  10:23 AM    <DIR>          ..
               0 File(s)              0 bytes
               2 Dir(s)  25,359,540,224 bytes free

C:\ProgramData\Jenkins\.jenkins\workspace\Freestyle Project Example>exit 0
Finished: SUCCESS
```

Week 5 :

Create a simple Java application that you want **to integrate with Jenkins**.

- The application should have some basic functionality, such as printing "Hello World" or performing simple calculations.

Example; Create a simple java program with file name as Demo.java and save it in a folder on desktop

```
public class Demo {

public static void main (String args[])
{
System.out.println("hello world");
}
}
```

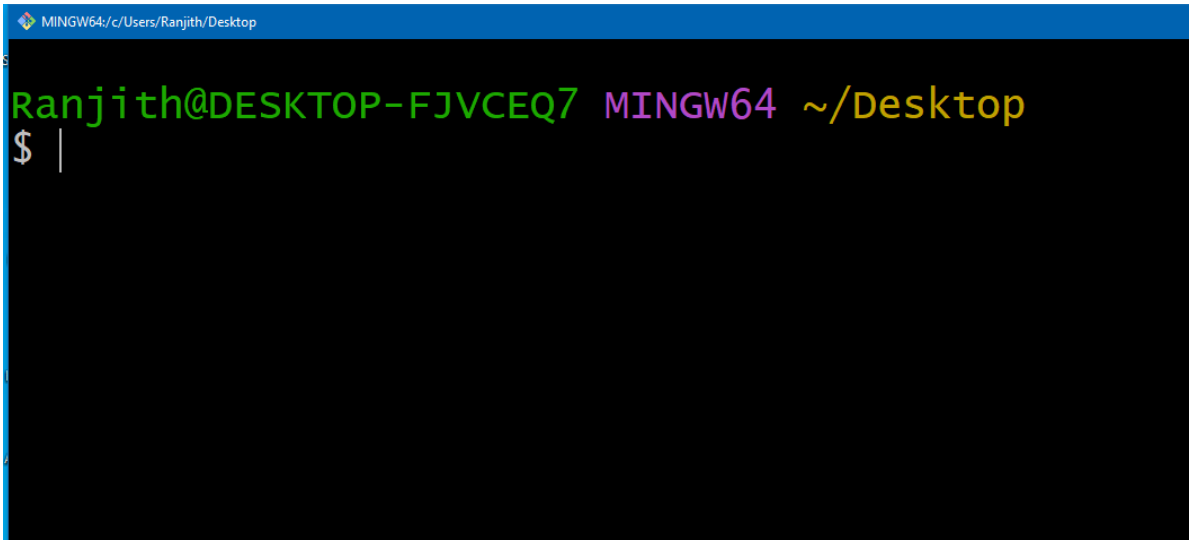
Commit the code to a Git repository:

- Create a Git repository for the application and commit the code to the repository.

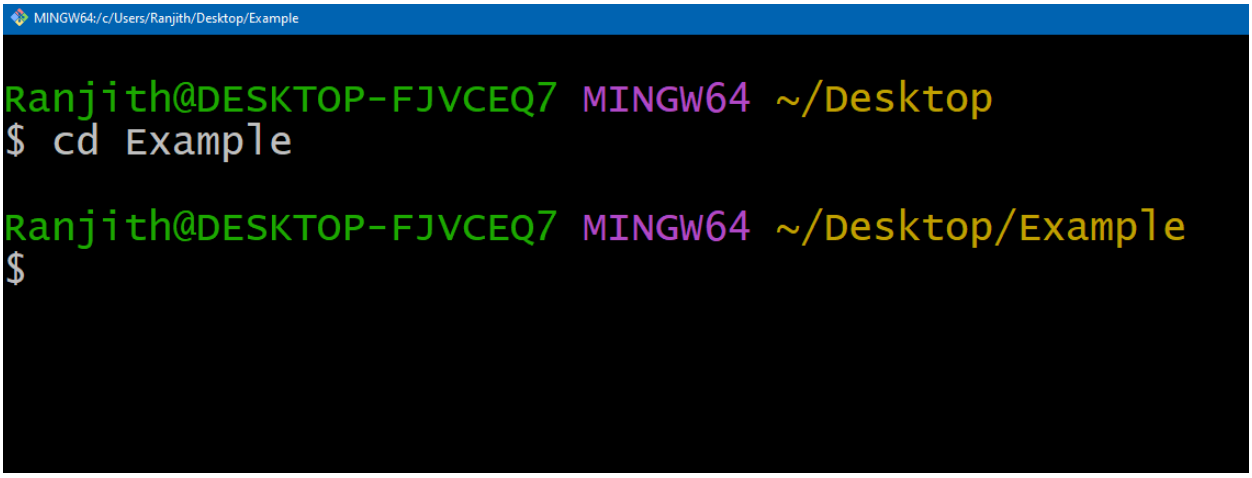
  Preform the following steps

  1. Login into GitHub account and create a new public repository
  2. After login, click on repositories and click on New button to create the repository
  3. Right click on the desktop and select open Gitbash here

     Gitbash window opens

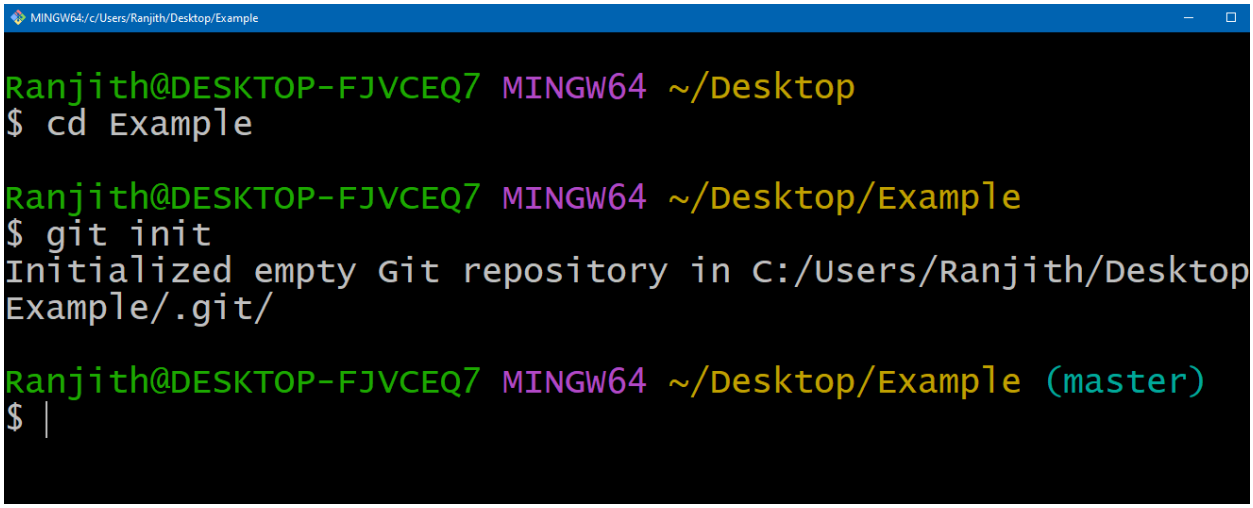


Now type the command **cd folder_name** in the above terminal and press enter



Execute the following commands to create a local repository and push it on to the GitHub remote repository

i) git init

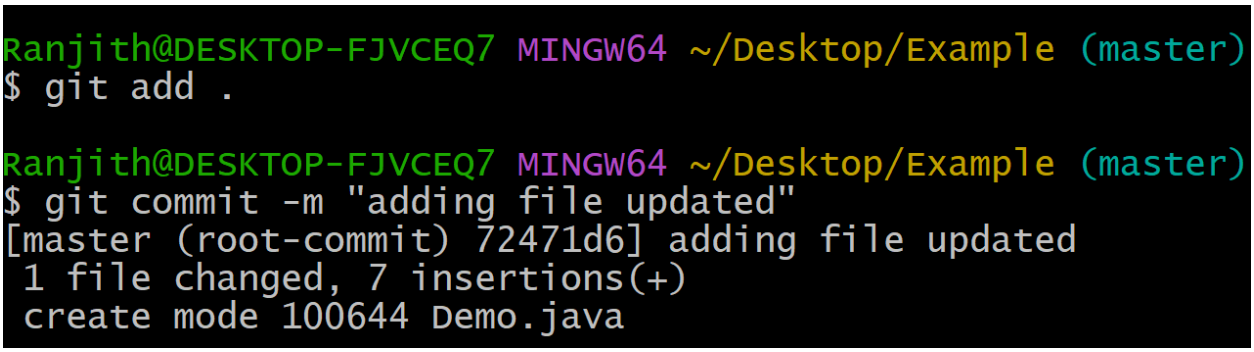


ii) git config --global user.name "username of githhub account"

iii) git config --global user.email "email id provided github account"

iv) git add .

v) git commit -m "adding files updated"



vi) **git remote add origin *url address of the git hub repository***

Ex: git remote add origin https://github.com/username/repository.git

Copy the url address of the git repository from git hub and paste in the above command

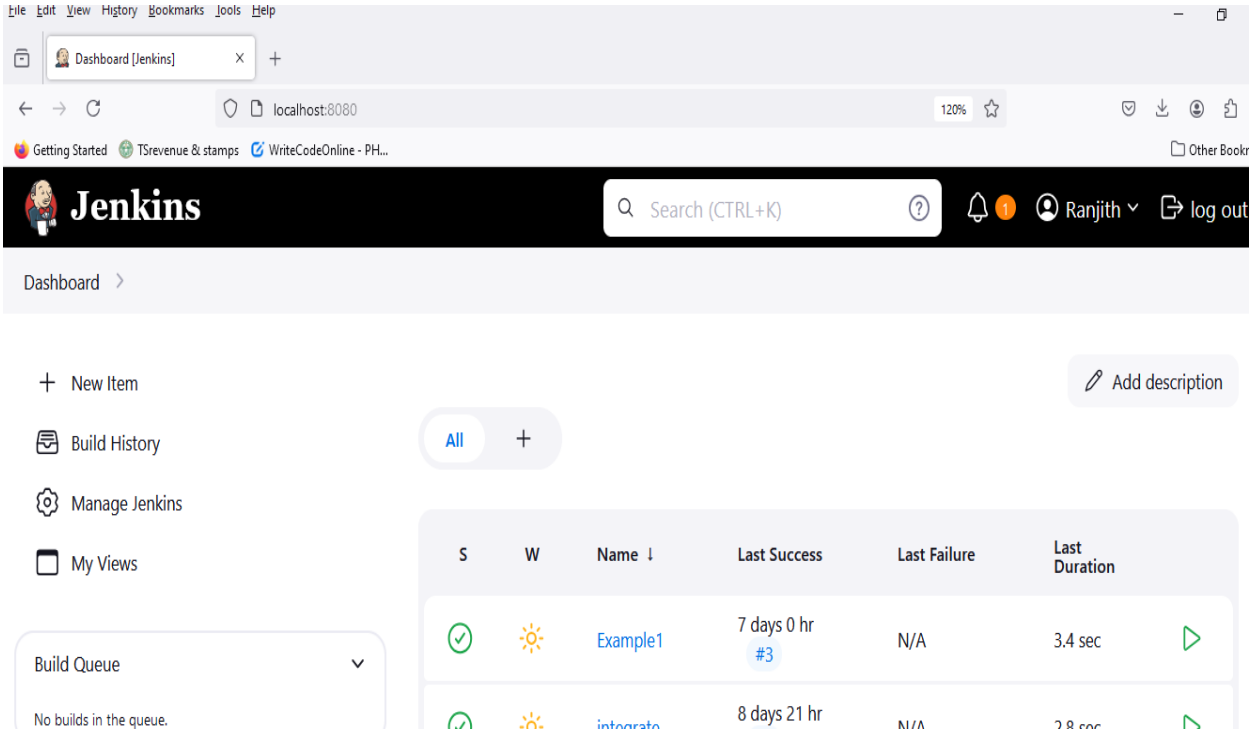
vii) git push -u origin master

Refresh the git repository in GitHub and check that files on local machine are pushed on to git remote repository

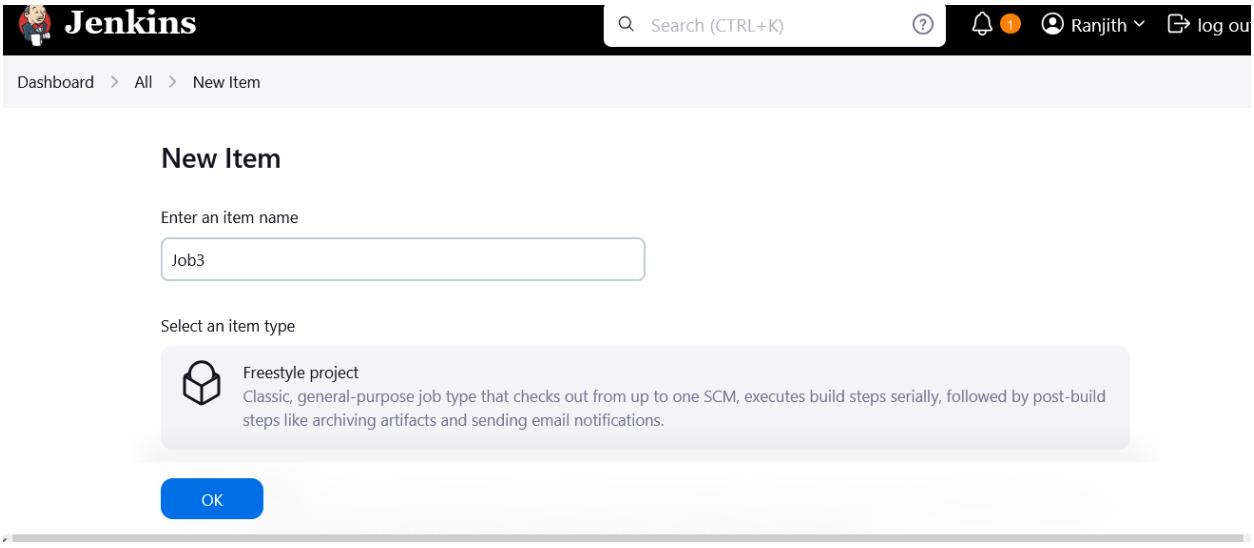
- Make sure that the Git repository is accessible from the Jenkins server.

Create a Jenkins job:

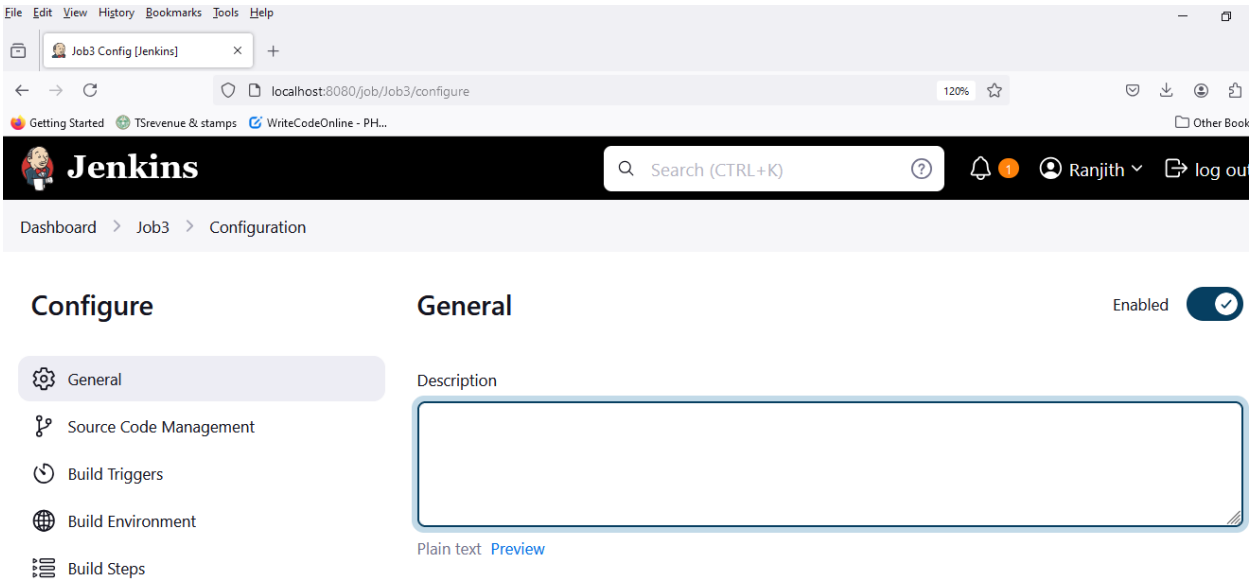
- ***Log in to the Jenkins web interface and create a new job.***
- ***Configure the job to build the Java application from the Git repository.***
- ***Specify the build triggers, such as building after every commit to the repository.***



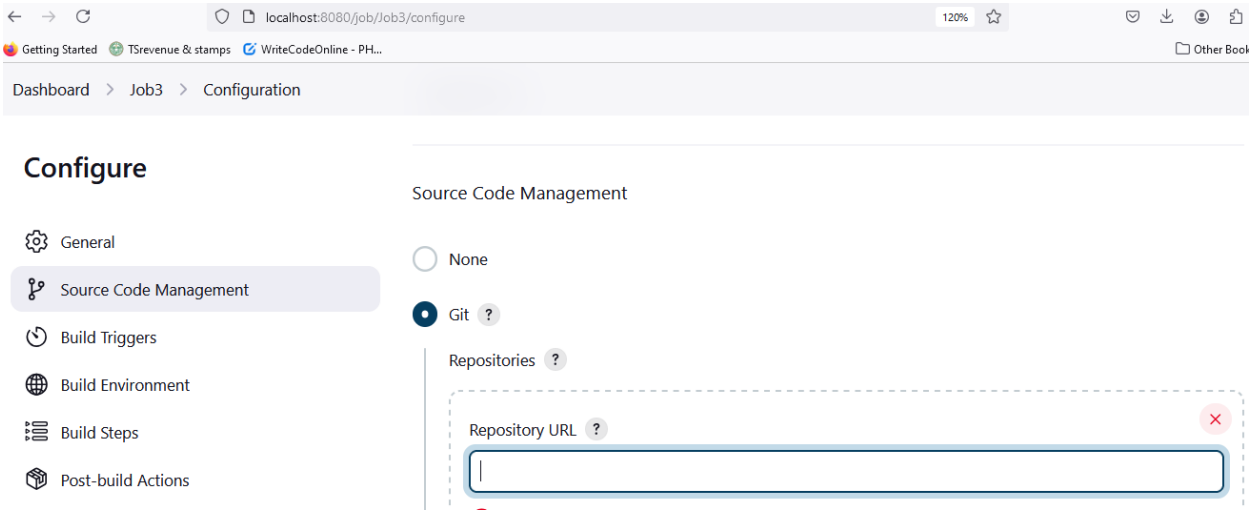
Click on New Item to create a new job



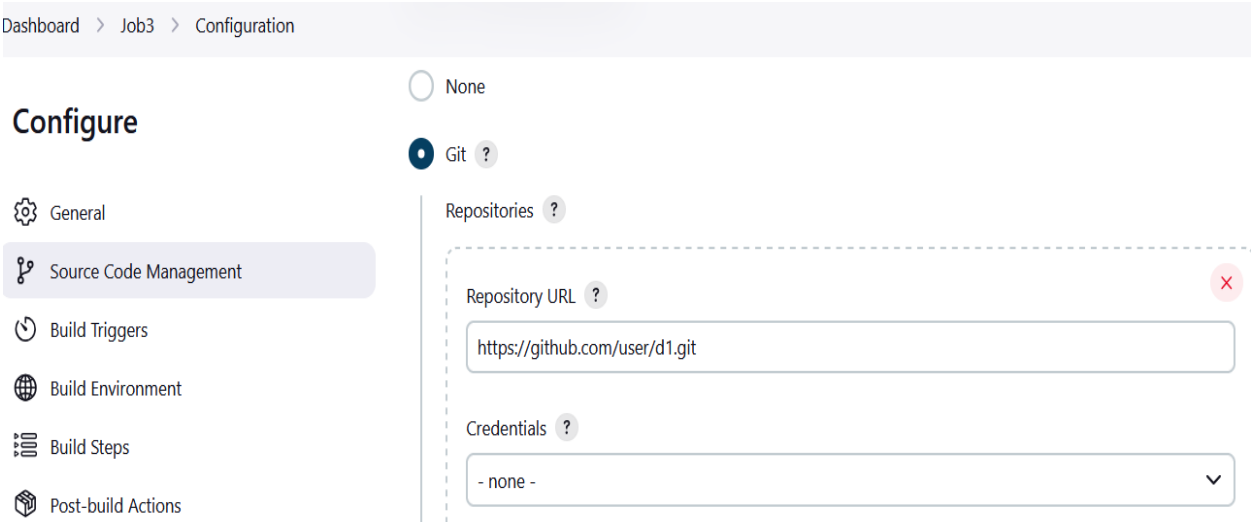
Give the **Item name**, select the item type as ***Freestyle project*** and click **OK button**



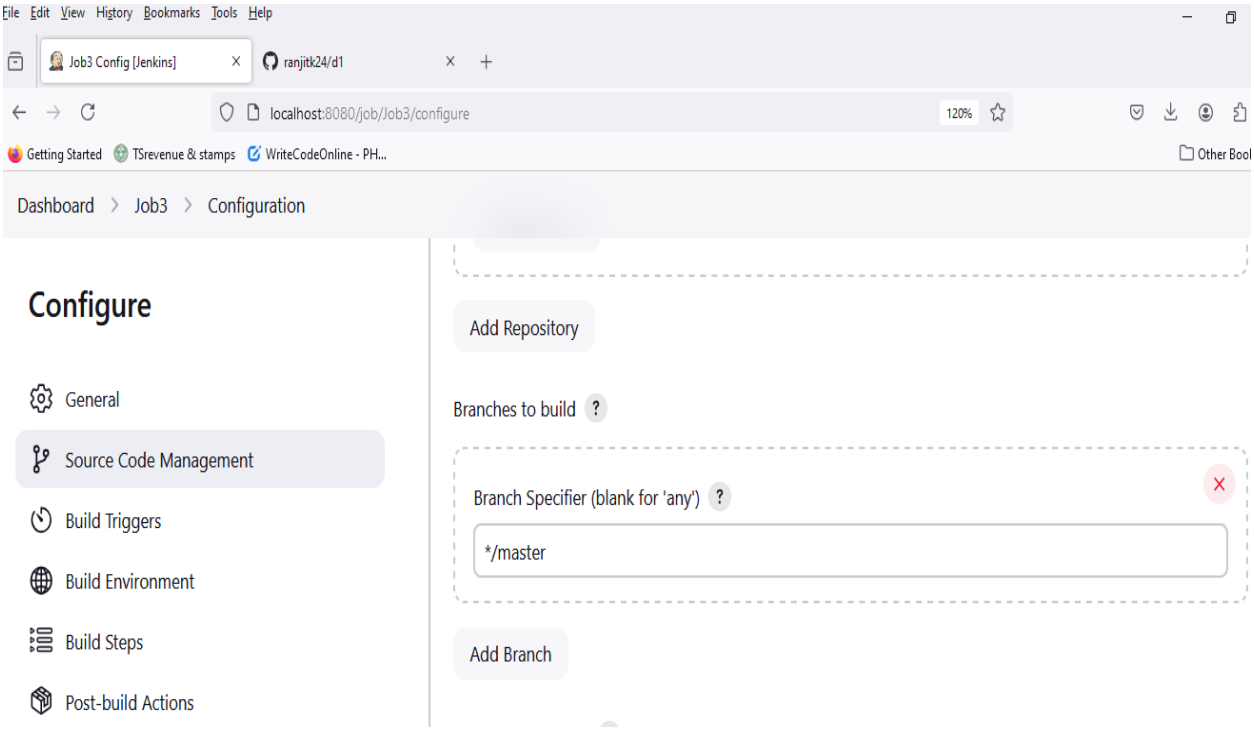
Give the Description of the project or program

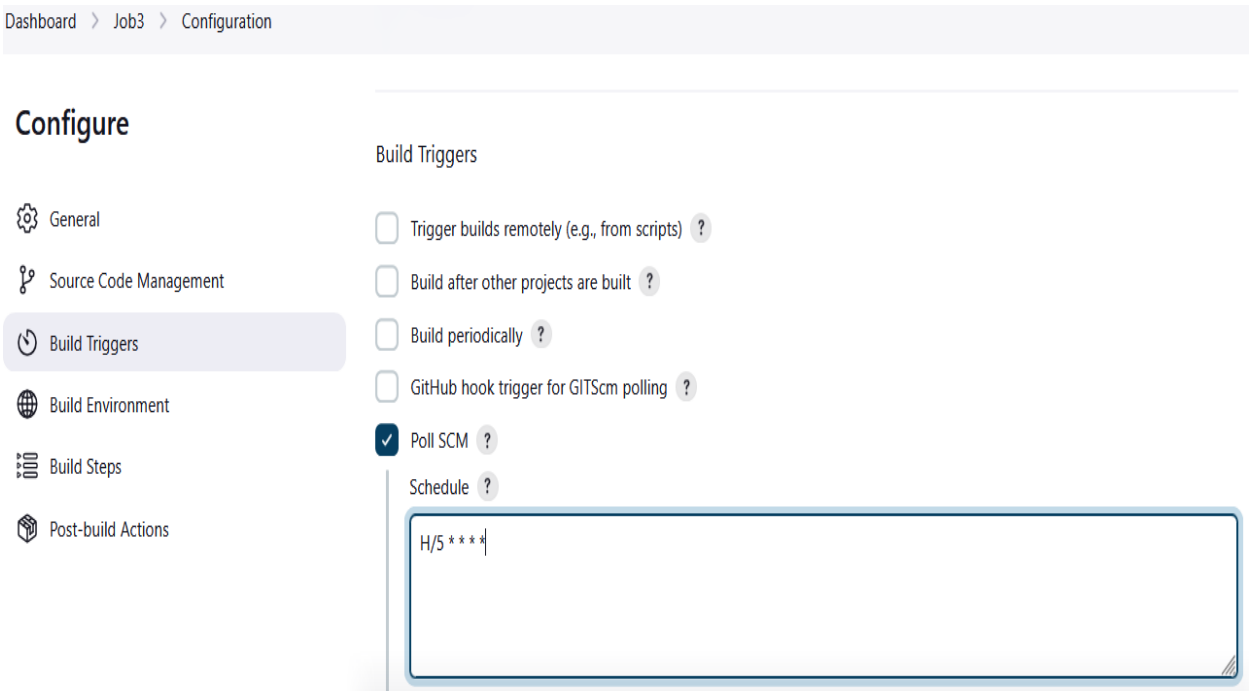


In the source code management, select the option as Git and copy the URL address of the Git repository and paste in Repository URL field

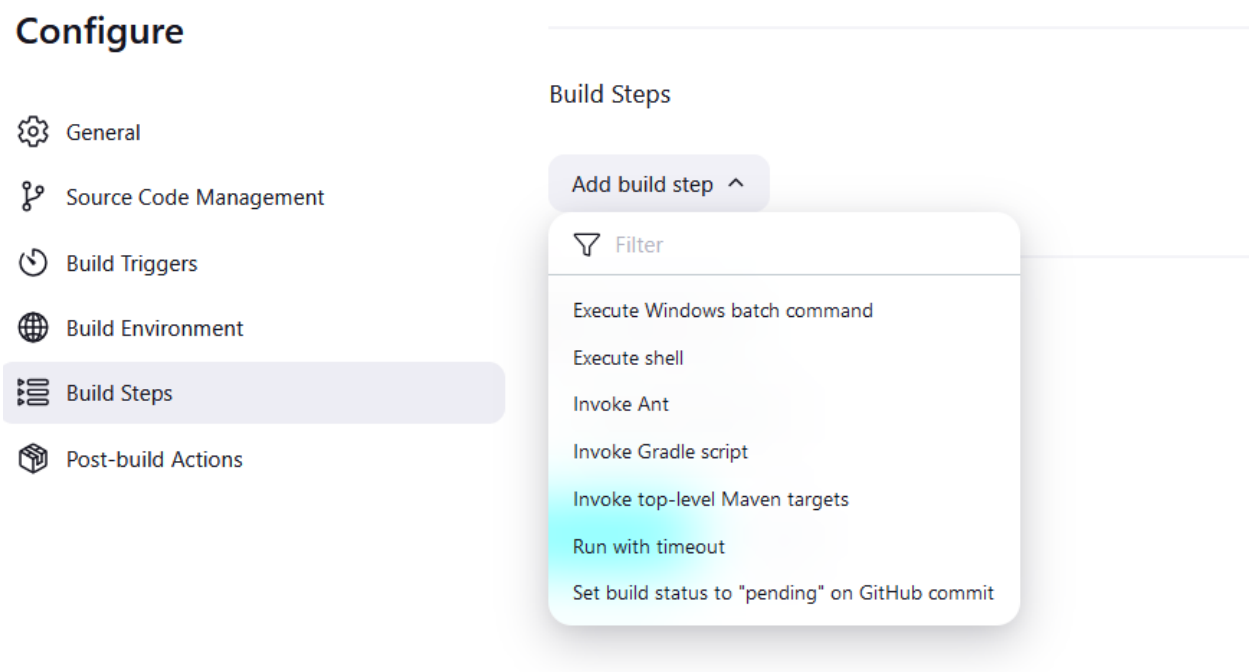


In branches to build option, mention branch specifier as master

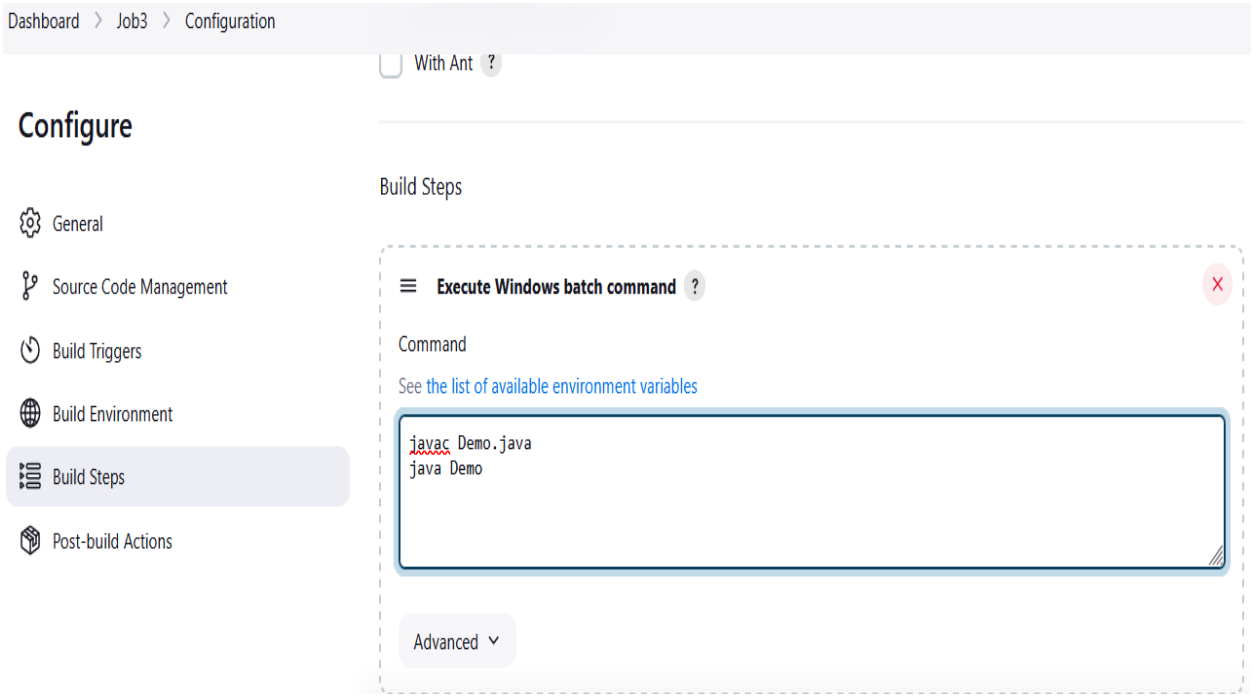




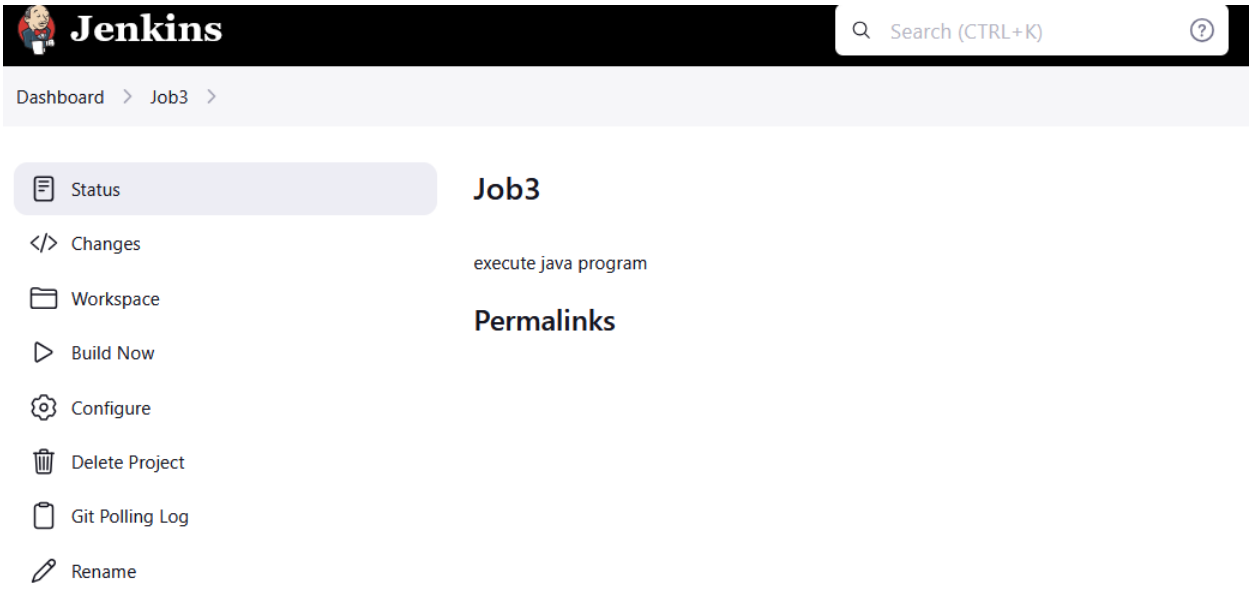
In build triggers option, select POLL SCM and schedule it as H/5 * * * *



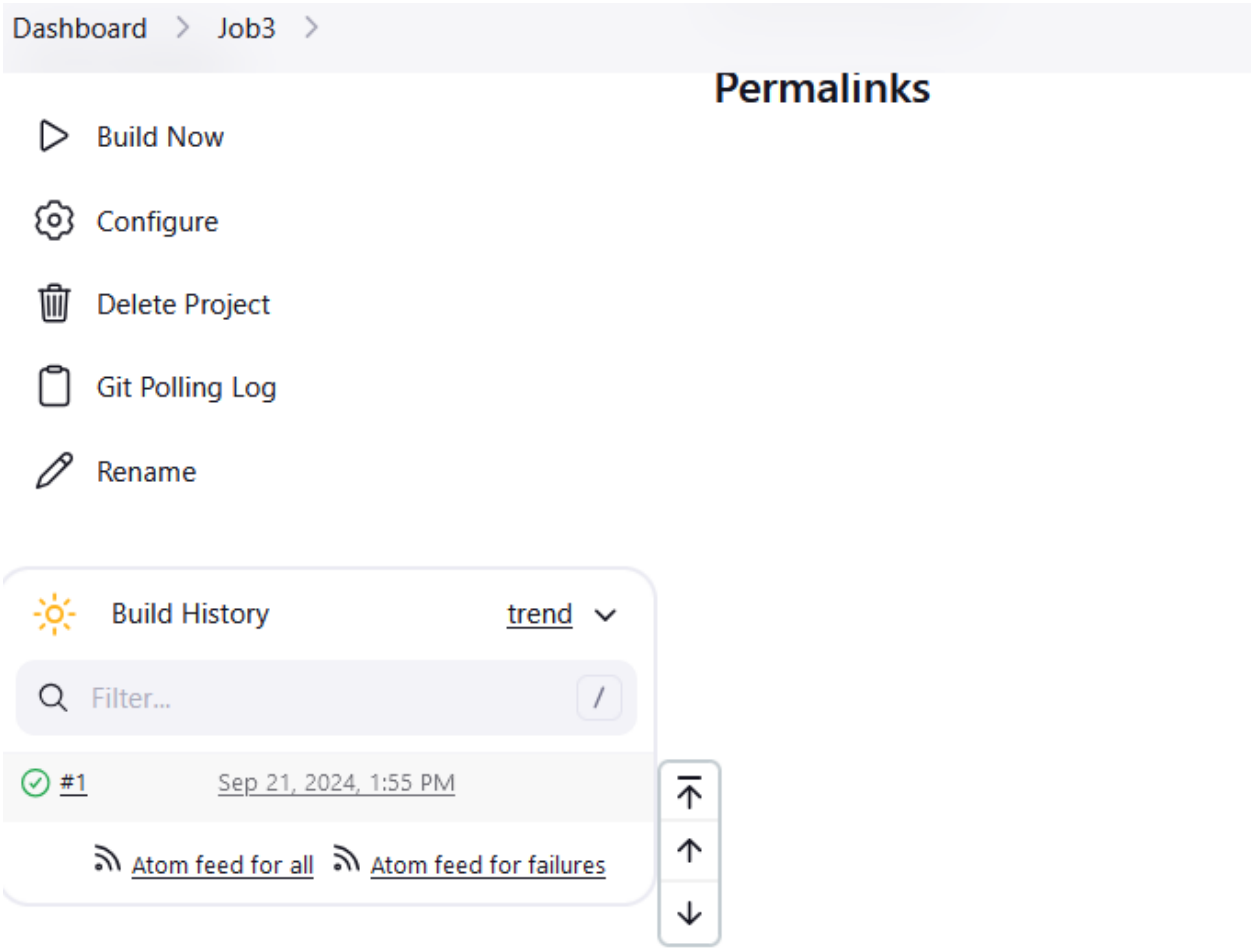
In the build steps, select Add build step and select Execute windows batch command and type the following commands to run java program



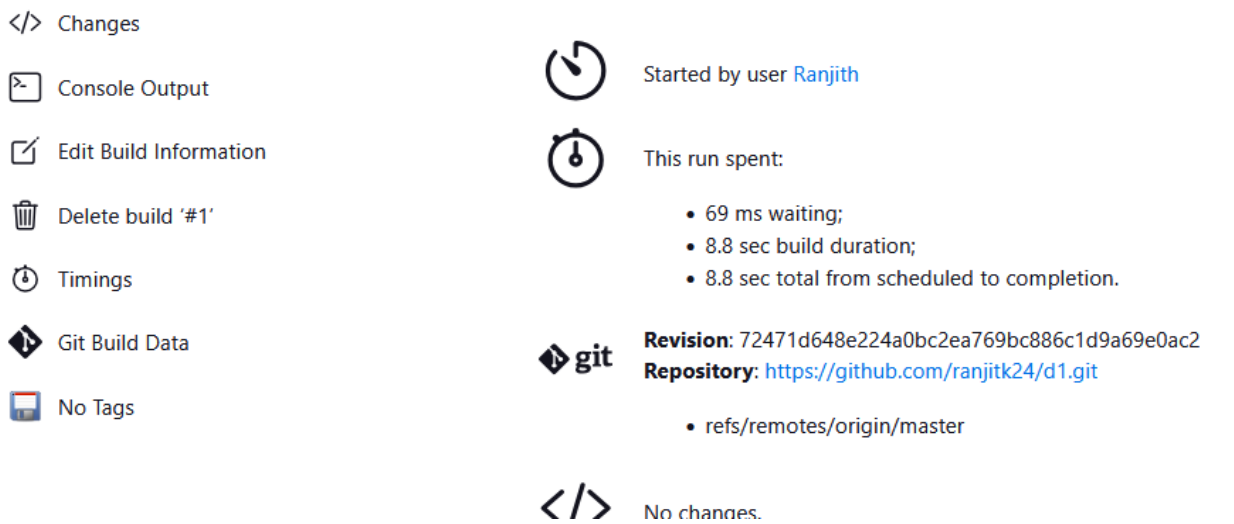
Click on Save to save the job



Now click on Build Now to build the job'



Click on the Job number from the Build History



Click on the console output to view the output of Job

Week 6 Explore Docker commands for content management

Docker is the containerization platform that is used to package your application and all its dependencies together in the form of containers to make sure that your application works seamlessly in any environment which can be developed or tested or in production

Docker is a tool designed to make it easier **to create, deploy, and run applications by using containers.**

Containerization is a **software deployment process** that bundles an application's code with all the files and libraries it needs to run on any infrastructure.

Key Components of Docker

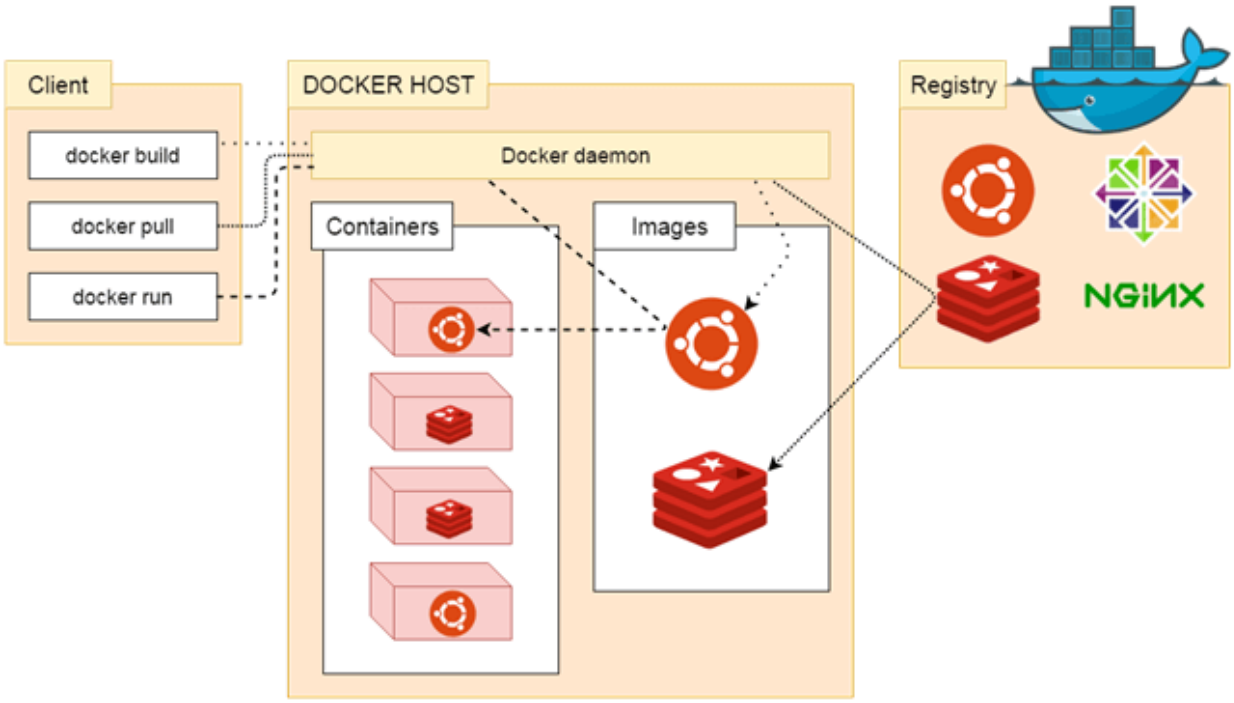
- **Docker Engine:** It is a core part of docker, that handles the creation and management of containers.
- **Container:** A container is a standard unit of software that packages up code and all its dependencies so the application runs quickly and reliably from one computing environment to another
- **Docker Image:** It is a read-only template that is used for creating containers, containing the application code and dependencies. It includes everything needed to run an application: ***code, runtime, system tools, system libraries and settings***.
- **Docker Hub:** It is a cloud-based repository that is used for finding and sharing the container images.
- **Docker file**: It is a script that containing instructions to build a docker image.
- **Docker Registry**: It is a storage distribution system for docker images, where you can store the images in both public and private modes

Docker daemon

Docker daemon runs on the host operating system. It is responsible for **running containers to manage docker services**. It offers various Docker objects such as **images, containers, networking, and storage**

Docker architecture

Docker follows Client-Server architecture, which includes the three main components that are **Docker Client, Docker Host, and Docker Registry.**



1. Docker Client

Docker client uses commands and REST APIs to communicate with the Docker Daemon (Server).

2. Docker Host

Docker Host is used to provide an environment to execute and run applications. It contains the docker daemon, images, containers, networks, and storage.

3. Docker Registry

Docker Registry manages and stores the Docker images.

There are two types of registries in the Docker -

Pubic Registry - Public Registry is also called as **Docker hub**.

Private Registry - It is used to share images within the enterprise.

Basic Docker Commands

1 **docker --version**

docker -v

This command is used to get the current version of the docker

```
PS C:\> docker -v
Docker version 20.10.17, build 100c701
PS C:\> docker --version
Docker version 20.10.17, build 100c701
```

2 docker pull: Pull an image or a repository from a registry

Syntax: **docker pull [OPTIONS] NAME [: TAG|@DIGEST]**

To download an image or set of images (i.e. A Repository)

Ex: **docker pull hello-world**

```
PS C:\> docker pull hello-world
Using default tag: latest
latest: Pulling from library/hello-world
c1ec31eb5944: Pull complete
Digest: sha256:d211f485f2dd1dee407a80973c8f129f00d54604d2c90732e8e320e5038a0348
Status: Downloaded newer image for hello-world:latest
docker.io/library/hello-world:latest
```

3 docker run: This command is used to create a container from an image

Syntax : docker run [OPTIONS] IMAGE [COMMAND] [ARG...]

Example : docker run hello-world

```
PS C:\> docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
c1ec31eb5944: Pull complete
Digest: sha256:d211f485f2dd1dee407a80973c8f129f00d54604d2c90732e8e320e5038a0348
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.
```

4. **docker ps** This command is used to list all the containers

Syntax : **docker ps [OPTIONS]**

Example : **docker ps (lists currently running containers)**

```
PS C:\> docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
```

Command : docker ps -a -a or -all : Lists all containers that are running & stopped

```
PS C:\> docker ps -a
CONTAINER ID   IMAGE         COMMAND    CREATED         STATUS                     PORTS     NAMES
e966ebcc530a   hello-world   "/hello"   4 minutes ago   Exited (0) 4 minutes ago             unruf
fled_spence
```

5. **docker restart**

This command is used to restart one or more containers.

Syntax: docker restart [OPTIONS] CONTAINER [CONTAINER...]

Example: docker restart my_container

6 docker kill

This command is used to kill one or more containers.

Syntax: docker kill [OPTIONS] CONTAINER [CONTAINER...]

Example: $ docker kill my_container

7 Build an Image from a Dockerfile

docker build -t <image_name>

Ex: docker build -t

8 List local images

docker images

```
PS C:\> docker images
REPOSITORY              TAG       IMAGE ID       CREATED         SIZE
hello-world             latest    d2c94e258dcb   17 months ago   13.3kB
docker/getting-started  latest    3e4394f6b72f   22 months ago   47MB
```

9 docker search To search for an image in Docker Hub.

docker search <image_name>

Ex: **docker search hello-world**

10 Delete an Image

docker rmi <image_name>

Ex: **docker rmi hello-world**

Login into Docker

docker login -u <username>

Publish an image to Docker Hub

docker push <username>/<image_name>

Container commands

Create and run a container from an image, with a custom name:

docker run --name <container_name> <image_name>

Run a container with and publish a container's port(s) to the host.

docker run -p <host_port>:<container_port> <image_name>

Run a container in the background

docker run -d <image_name>

Start or stop an existing container:

docker start|stop <container_name> (or <container-id>)

Remove a stopped container:

docker rm <container_name>

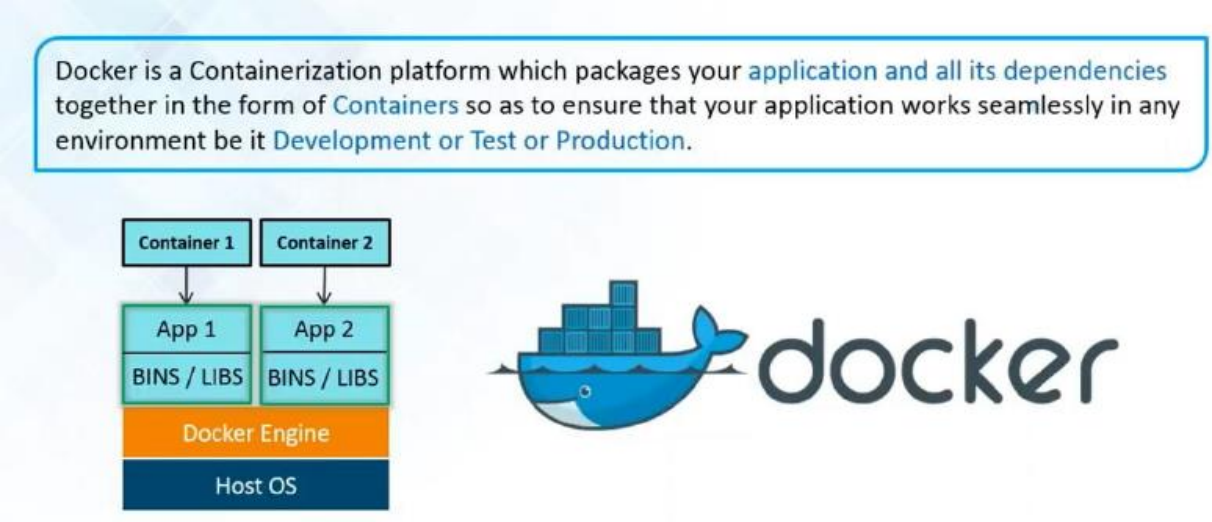
Week 6 Explore Docker commands for content management

Docker is a ***software platform that allows you to build, test, and deploy applications quickly.***

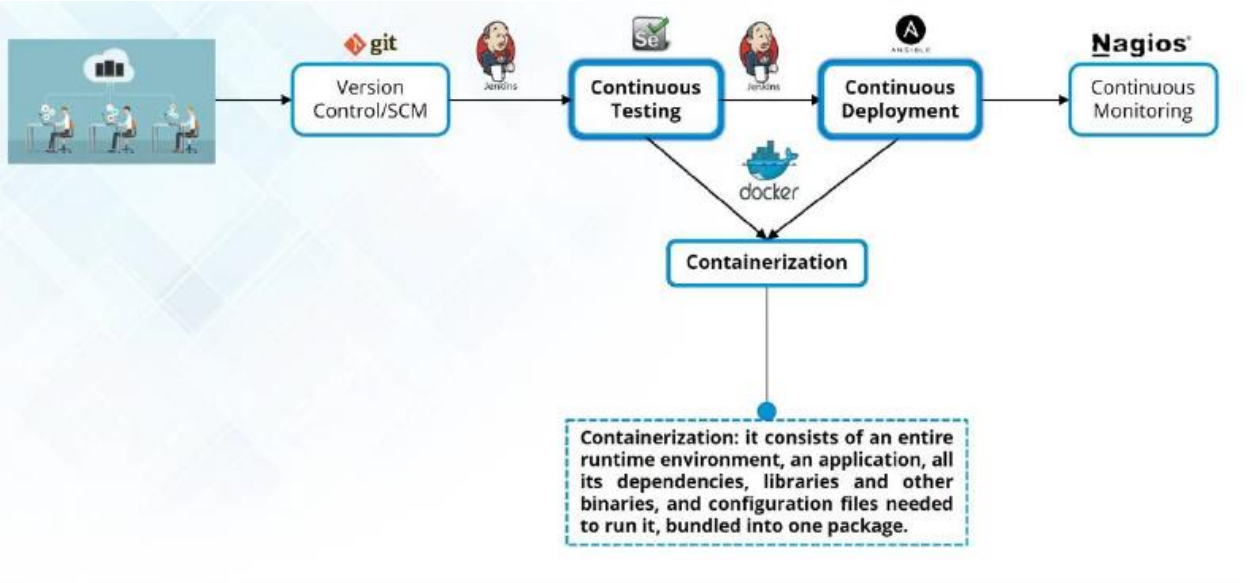
Docker ***packages software into standardized units called containers*** that have everything the software needs to ***run including libraries, system tools, code, and runtime.***

Using Docker, you can ***quickly deploy and scale applications into any environment*** and know your code will run.

Docker helps ***developers build, share, run, and verify applications anywhere*** — without tedious environment configuration or management**.**



How is Docker used in Devops



Docker Commands

Docker Run command

This command is used to run a container from an image. The docker run command is a combination of the docker create and docker start commands. It creates a new container from the image specified and starts that container. if the docker image is not present, then the docker run pulls that.

$ docker run <image_name>

To give name of container

$ docker run --name <container_name> <image_name>

Docker Pull

This command allows you to pull any image which is present in the official registry of docker, Docker hub. By default, it pulls the latest image, but you can also mention the version of the image.

$ docker pull <image_name>

```
C:\Users\mojha>docker pull redis
Using default tag: latest
latest: Pulling from library/redis
31b3f1ad4ce1: Pull complete
ff29a33e56fb: Pull complete
b230e0fd0bf5: Pull complete
9469c4ab3de7: Pull complete
6bd1cefcc7a5: Pull complete
610e362ffa50: Pull complete
Digest: sha256:b4e56cd71c74e379198b66b3db4dc415f42e8151a18da68d1b61f55fcc7af3e0
Status: Downloaded newer image for redis:latest
docker.io/library/redis:latest
```

Docker PS

This command (by default) shows us a list of all the running containers. Various flags with includes

- -a flag: shows us all the containers, stopped or running.
- -l flag: shows us the latest container.
- -q flag: shows only the Id of the containers.

$ docker ps [options..]

```
C:\Users\mojha>docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED        STATUS        P
b7e3fefc202d   ubuntu                 "bash"                   11 hours ago   Up 11 hours
1b470557a372   ubuntu                 "sleep 1000000"          11 hours ago   Up 11 hours
9088b39c68dd   docker/getting-started "/docker-entrypoint.…"   11 hours ago   Up 11 hours   0
```

Docker Stop

This command allows you to stop a container if it has crashed or you want to switch to another one.

$ docker stop <container_ID>

```
C:\Users\mojha>docker stop b7e3fefc202d
b7e3fefc202d
```

Docker Start

To start the stopped container again, with the help of this command.

$ docker start <container_ID>

Docker rm

To delete a container. By default when a container is created, it gets an ID as well as an imaginary name such as confident_boyd, heuristic_villani, etc. You can either mention the container name or its ID.

Some important flags:

- **-f flag: remove the container forcefully.**
- **-v flag: remove the volumes.**
- **-l flag: remove the specific link mentioned.**

$ docker rm {options} <container_name or ID>

```
C:\Users\mojha>docker rm b7e3fefc202d
b7e3fefc202d
```

Docker RMI

To delete the image in docker. You can delete the images which are useless from the docker local storage so you can free up the space

docker rmi <image ID/ image name>

Docker Images

Lists all the pulled images which are present in our system.

$ docker images

```
C:\Users\mojha>docker images
REPOSITORY                TAG       IMAGE ID       CREATED         SIZE
redis                     latest    9da089657551   4 days ago      117MB
docker/getting-started    latest    cb90f98fd791   5 months ago    28.8MB
docker101tutorial         latest    9a419a57dcb8   6 months ago    28.8MB
ubuntu                    latest    2b4cba85892a   6 months ago    72.8MB
alpine/git                latest    c6b70534b534   10 months ago   27.4MB
hello-world               latest    feb5d9fea6a5   12 months ago   13.3kB
```

Docker Push

To store the image in the remote registry which is DockerHub for that you need to push your image

docker push <Image name/Image ID>

Docker Build

The docker build command is used to build the docker images with the help of Dockerfile.

docker build -t image_name:tag .

In the place of image_name use the name of the image you build with and give the tag number and . "dot" represents the current directory

Docker Stop

docker stop container_name_or_id

Docker Basic Command

Following are the some of the docker basic commands

1. **docker images:** Docker images will list all the images which are pulled or build in that docker host.
2. **docker pull:** Docker pull will the docker images from the dockerhub.
3. **docker run:** Docker run will run the docker image as an container.
4. **docker ps:** Docker run will list all the containers which are running in the docker host.
5. **docker stop:** Docker stop will stop the docker container which are already running.
6. **docker rm:** Docker rm command will remove the containers which are in the stop condition.

Docker Commands List

Following are the docker commands which listed form build and Docker image to running it an Docker container and attaching the docker volumes to it.

Docker Image Command

1. **docker build command:** It will build Docker images by using the **Dockerfile.**
2. **docker pull command:** Docker pull command will pull the **Docker image** whcih is avalible in the **dockerhub.**

3. **docker images command:** It will list all the images which are pulled and build in the docker host.
4. **docker inspect command:** It will helps to debug the docker image if any errors occurred while building an image or pulling the image.
5. **docker push command:** Docker command will push the docker image into the Dockerhub.
6. **docker save command:** It will save the docker image in the form of dockerfile.
7. **docker rmi command:** It will remove the docker image.

Docker Container Command

1. **docker attach command:** Connecting to an Existing Container.
2. **docker ps command:** To list the running containers.
3. **docker container inspect infinite Command:** To Inspect the Docker containers.
4. **docker exec command:** To execute the commands in the running containers.
5. **docker cp command:** To copy the file from docker host to the docker containers,

Week 7 Develop a simple containerized application using Docker.

Choose an application:

 Choose a simple application that you want to containerize. For example, a Python script or any Java program

Here we use simple Java program and containerize it using docker

1 Create an application folder

2. Open the Visual Studio Code and select Open Folder from File menu

3. Now select the application folder that is created and open

4. From the explorer bar, click on the application folder

5. Now click on NewFile button to create a file

Now ,Create a simple Java program as below

```
public class Test
{
public static void main(String[] args)
{
int a=20,b=30,c;
c=a*b;
System.out.println("Hello world");
System.out.println("value of c is "+c);
}
}
```

Save it as with .java extension

Now again create another file and name the file as Dockerfile

Create a Dockerfile for the above Java program

In the Dockerfile, **specify the base image, copy the application into the container, and specify the command to run the application**

Dockerfile

FROM openjdk # uses the base image –openjdk with java installed

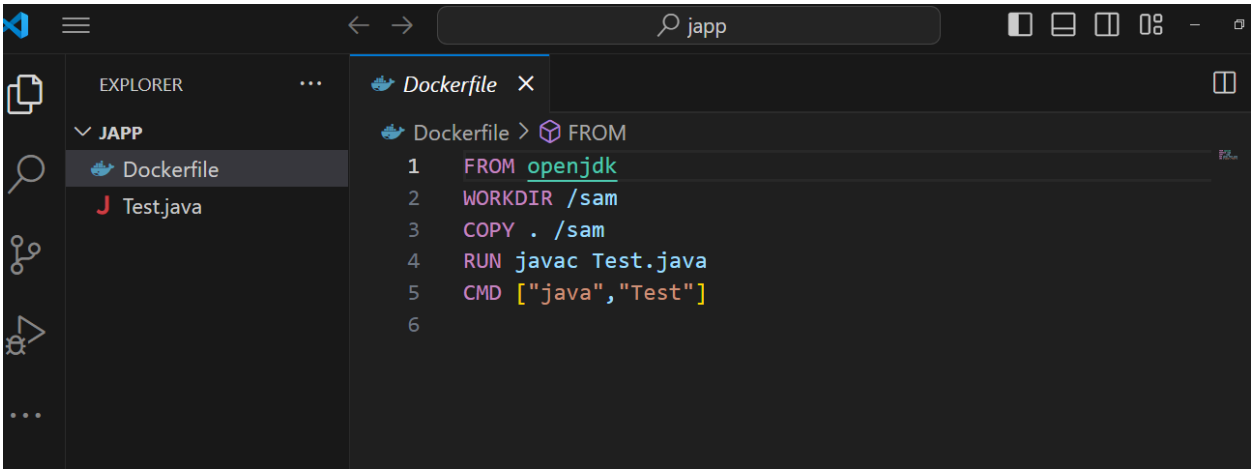
WORKDIR /sam # Set the working directory

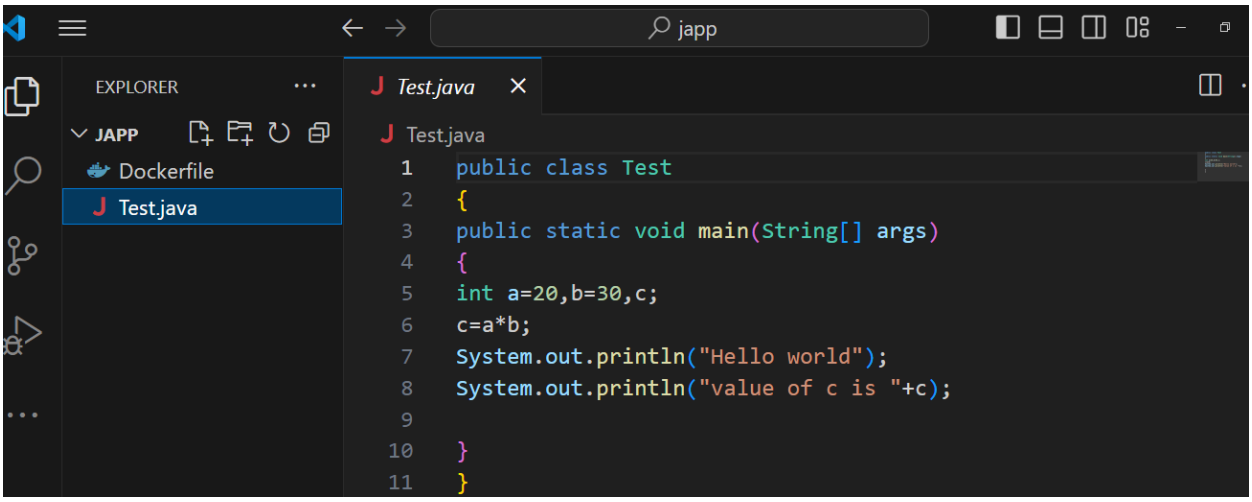
COPY . /sam # Copies all the files to working directory

RUN javac Test.java # Compile the Java program

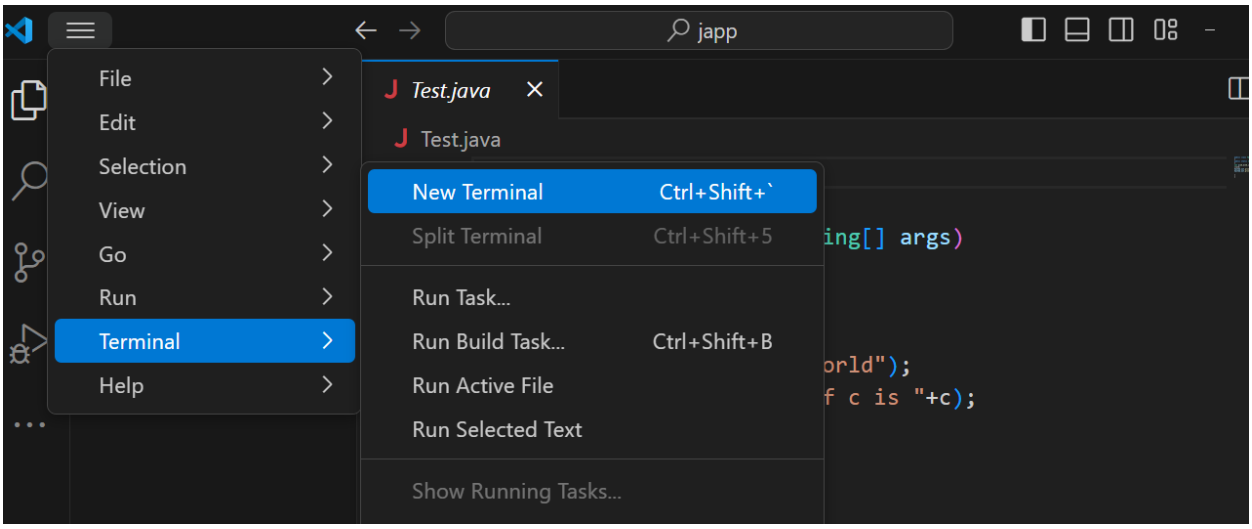
CMD ["java", "Test"] # Set the default command to run the Java program

Save the Java file and Docker file

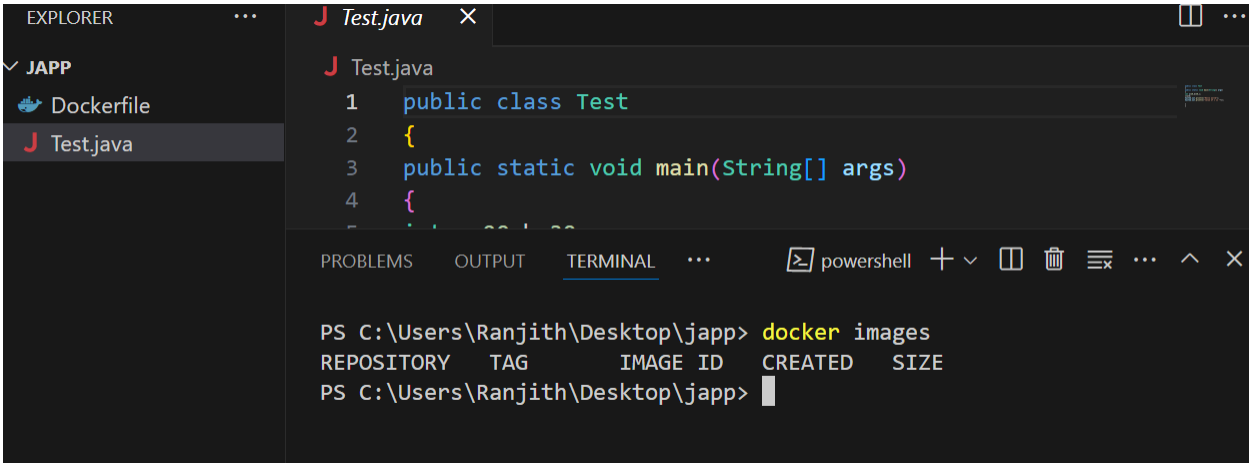




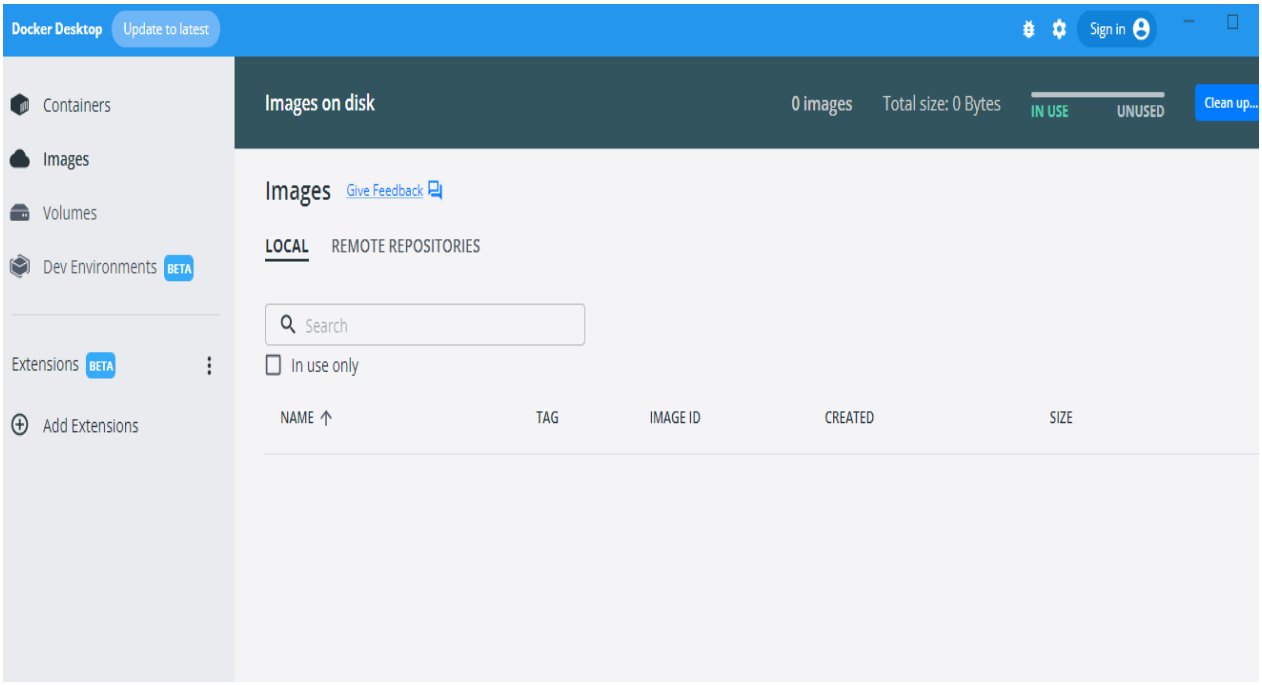
Start the New Terminal from Visual studio



Type the command to list all the images :::: **docker images**



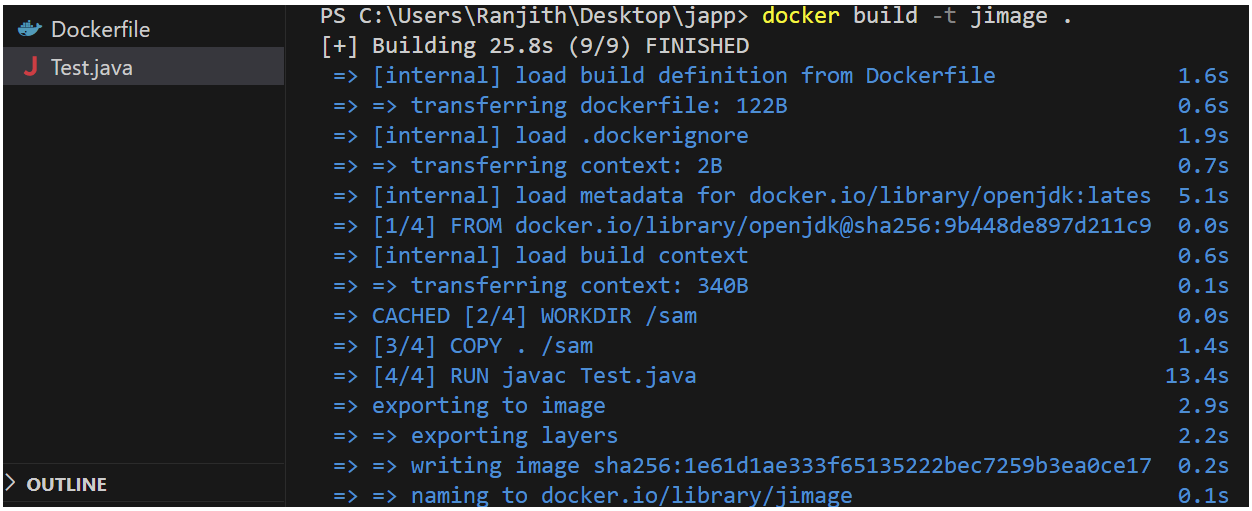
Start the Dockerdesktop



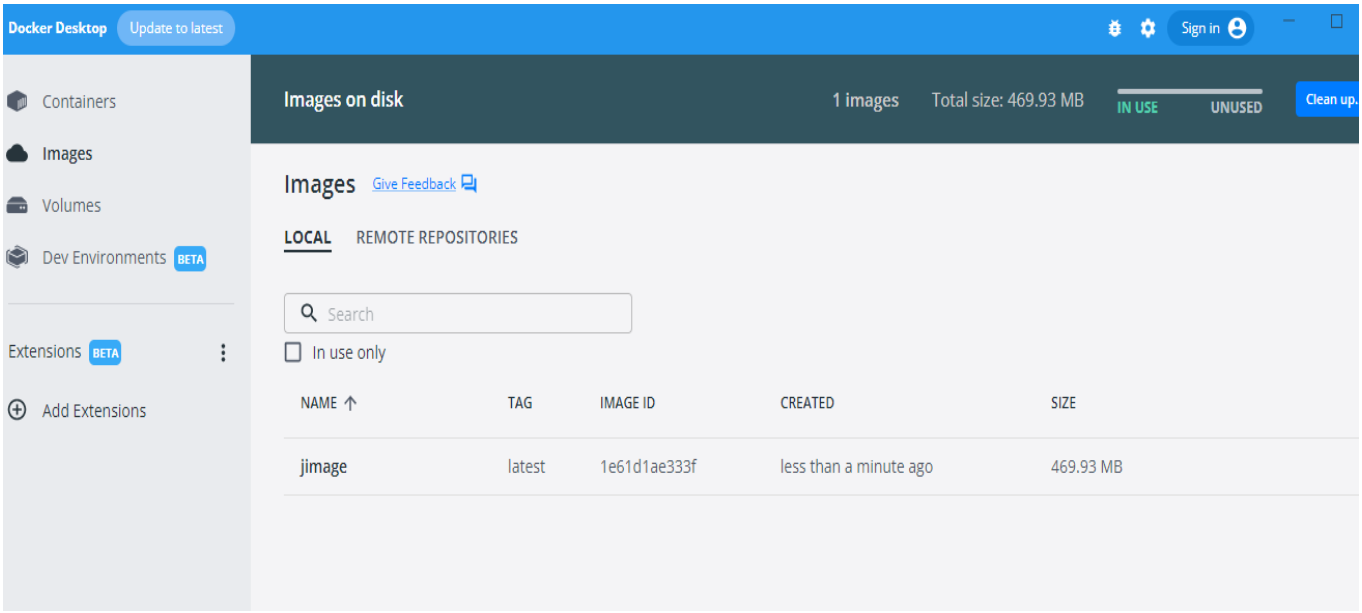
Build the Docker image using the **docker build** command. This command builds a new Docker image using the Dockerfile and tags the image with the name

Command : docker build -t "any name for your docker image" .

Example : **docker build -t helloworld .**



View the image created in the docker



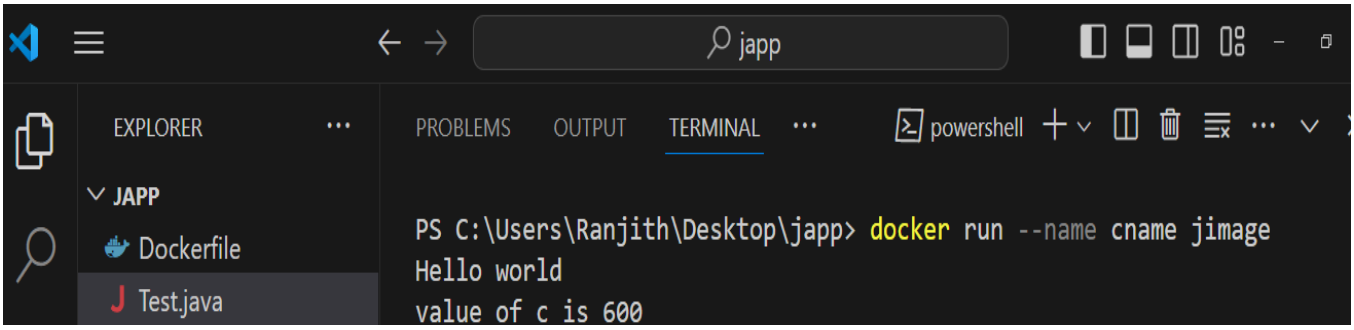
Run the Docker container:

Run the following command to start a new container based on the image:

$ docker run --name mycontainer myimage

This command starts a new container named "mycontainer" based on the "myimage" image and runs the Java code inside the container.

Example

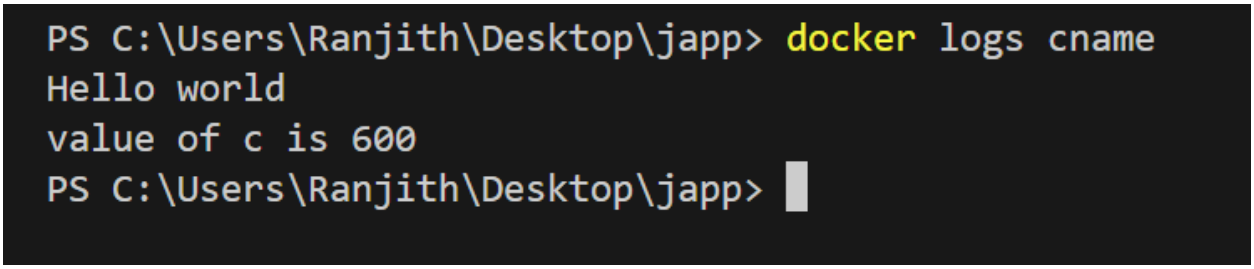


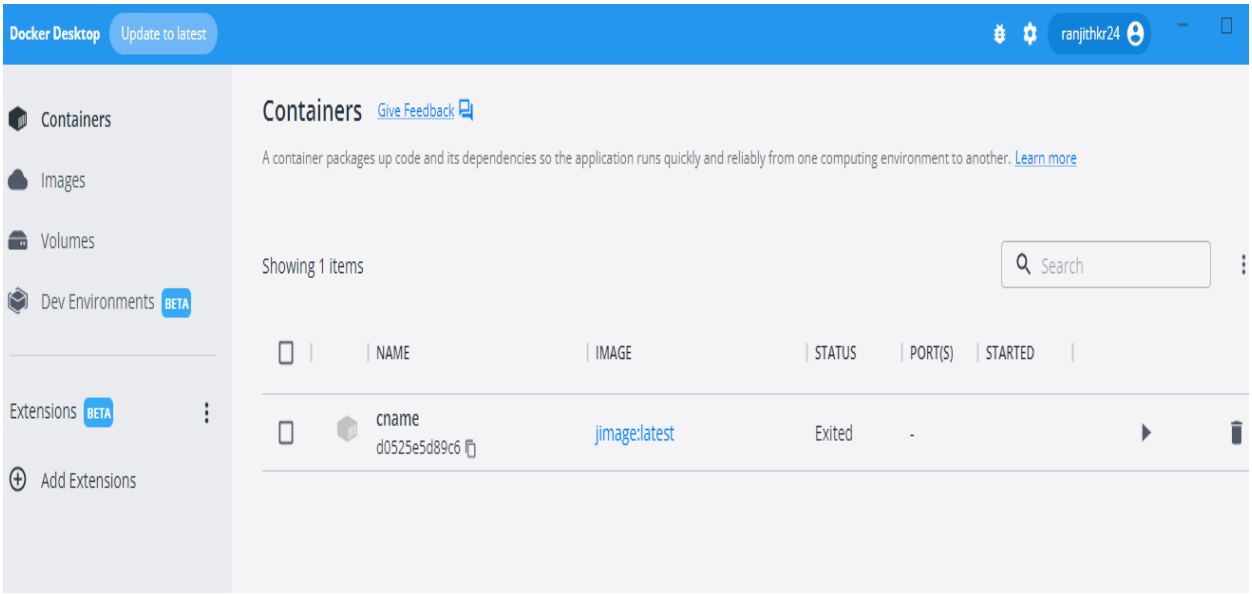
- **Verify the output**:

Run the following command to verify the output of the container:

$ docker logs mycontainer

This command displays the logs of the container and should show the programs output





Pushing images into the docker hub

Create a repository

Login to Dockerhub, Select Create Repository, name it and choose it to make it as public or private

Tag the Image use the command

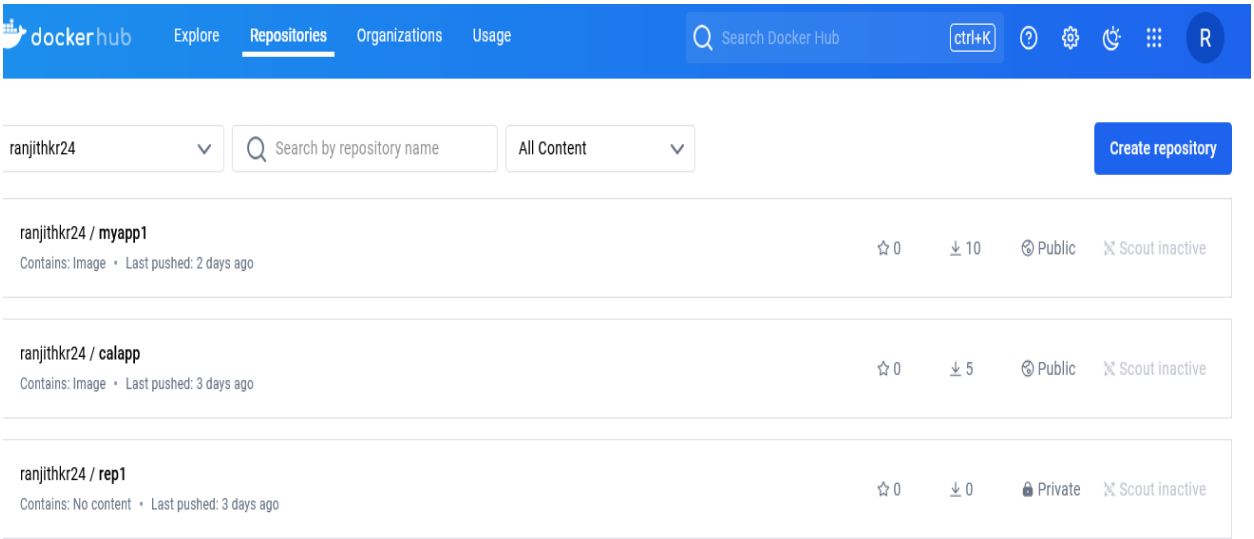
docker tag <image name> <dockerhub-user name>/<repo-name><version>

Log into Docker

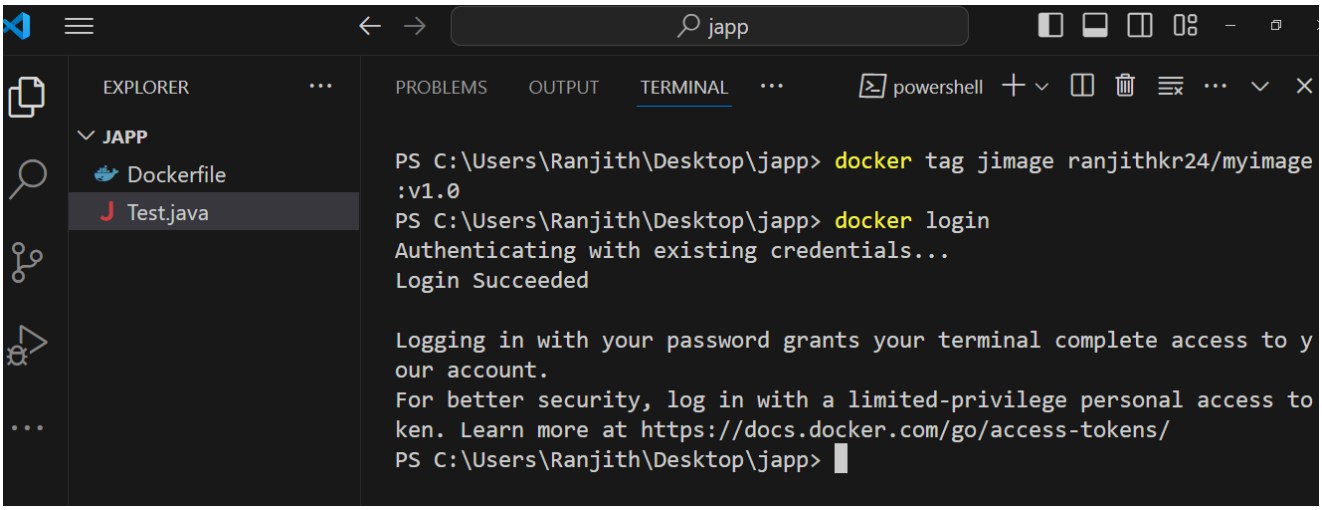
docker login **give login credentials**

Push the Image use the command **docker push <docker-hub-username>/<image name> <version name>**

Login into Docker hub



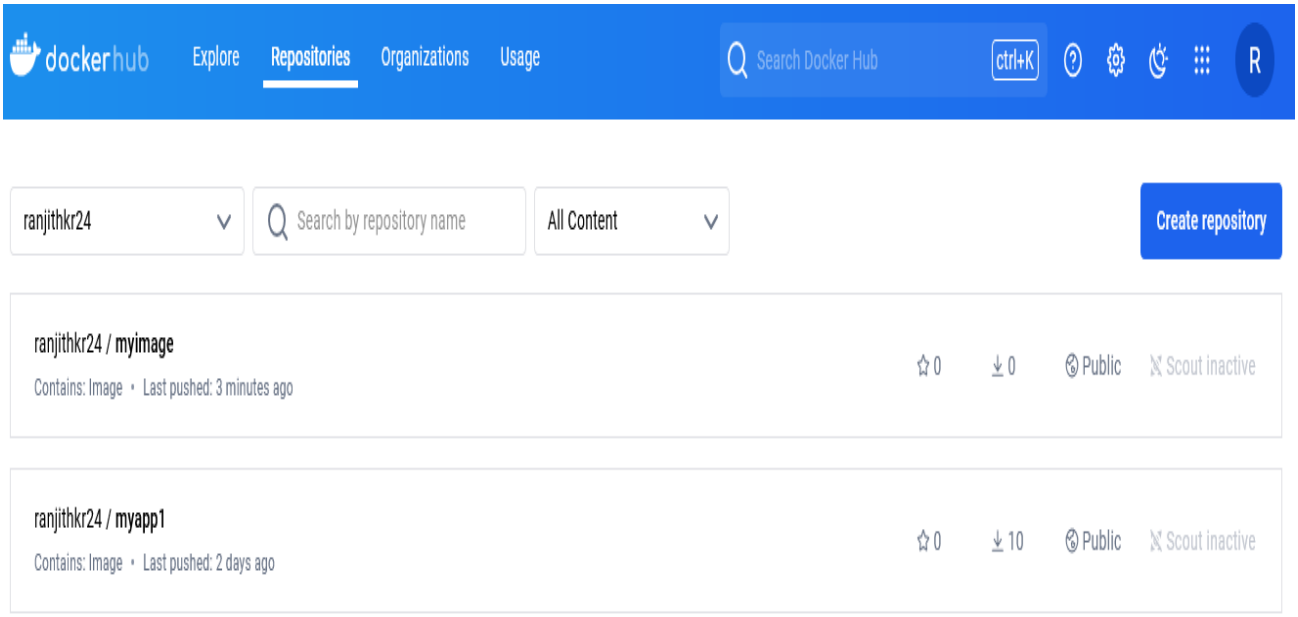
Tagging docker image and login into docker hub



Issuing docker push command to push the image

```
Logging in with your password grants your terminal complete access to y
our account.
For better security, log in with a limited-privilege personal access to
ken. Learn more at https://docs.docker.com/go/access-tokens/
PS C:\Users\Ranjith\Desktop\japp> docker push ranjithkr24/myimage:v1.0
The push refers to repository [docker.io/ranjithkr24/myimage]
d9081b57f2d9: Pushed
7f43ae0d9720: Pushed
020c055d83f3: Mounted from ranjithkr24/myapp1
56285d9a7760: Mounted from ranjithkr24/myapp1
077bff59ce57: Mounted from ranjithkr24/myapp1
9cd9df9ffc97: Mounted from ranjithkr24/myapp1
v1.0: digest: sha256:3d3de30bf1a86b342f65536c3122ff6552c015beaeb171e763
7d2d6d2342634f size: 1575
```

Pushed image can be viewed in dockerhub



Week 8 Integrate Kubernetes and Docker.

Kubernetes

Kubernetes, also known as K8s, is an **open-source system for automating deployment, scaling, and management of container-based applications** in different kinds of environments like physical, virtual, and cloud-native computing foundations.

Some of the benefits of Kubernetes

 Container Orchestration: Kubernetes manages the placement and scheduling of containers across a cluster of machines, ensuring that the desired state of the application is maintained.

 Scalability: Kubernetes allows applications to scale horizontally by automatically adding or removing containers based on resource utilization and user-defined rules.

 Self-Healing: Kubernetes monitors the health of containers. It automatically restarts failed containers or replaces them with new ones to ensure the desired state of the application is maintained.

 Rolling Updates and Rollbacks: Kubernetes supports rolling updates, allowing applications to be updated with minimal downtime. If any issues arise, it also facilitates rollbacks to previous versions.

 Storage Orchestration: Kubernetes provides a way to manage persistent storage volumes and attach them to containers as needed.

Differences between Docker and Kubernetes

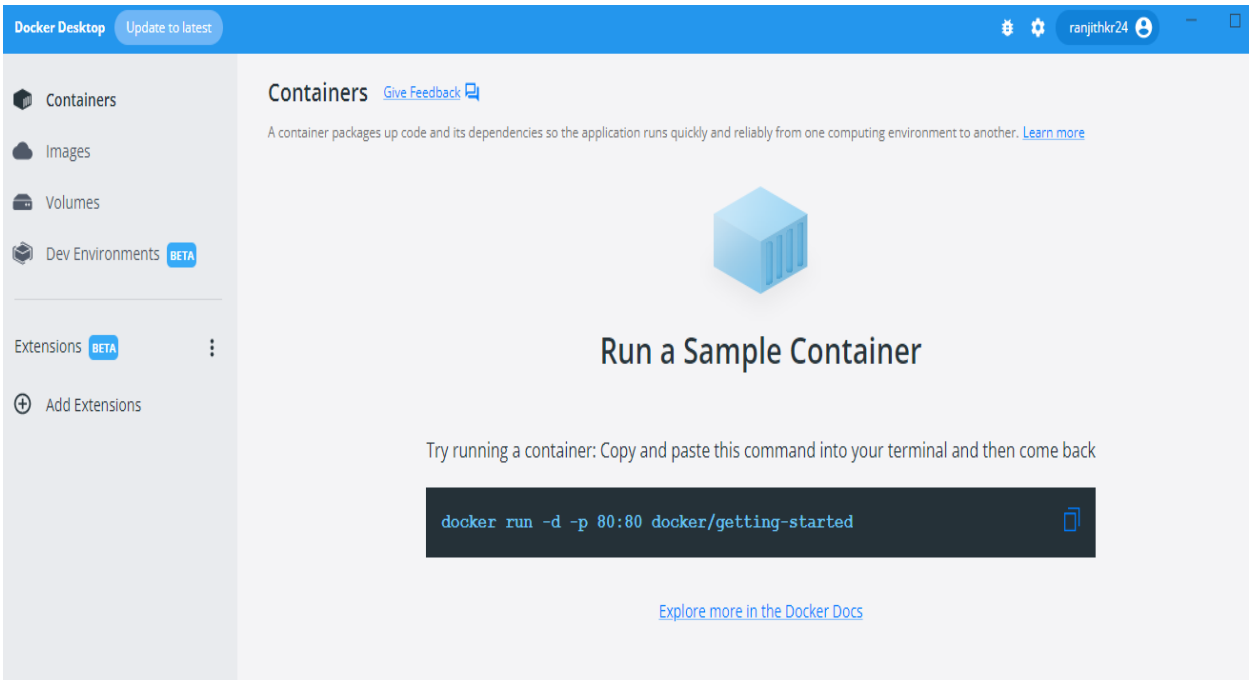
Docker is used for **building, shipping, and running containers**—it provides the means to create isolated environments for applications.

On the other hand, Kubernetes focuses on orchestrating containers, meaning it helps **manage, scale, and ensure the smooth operation of large collections of containers**.

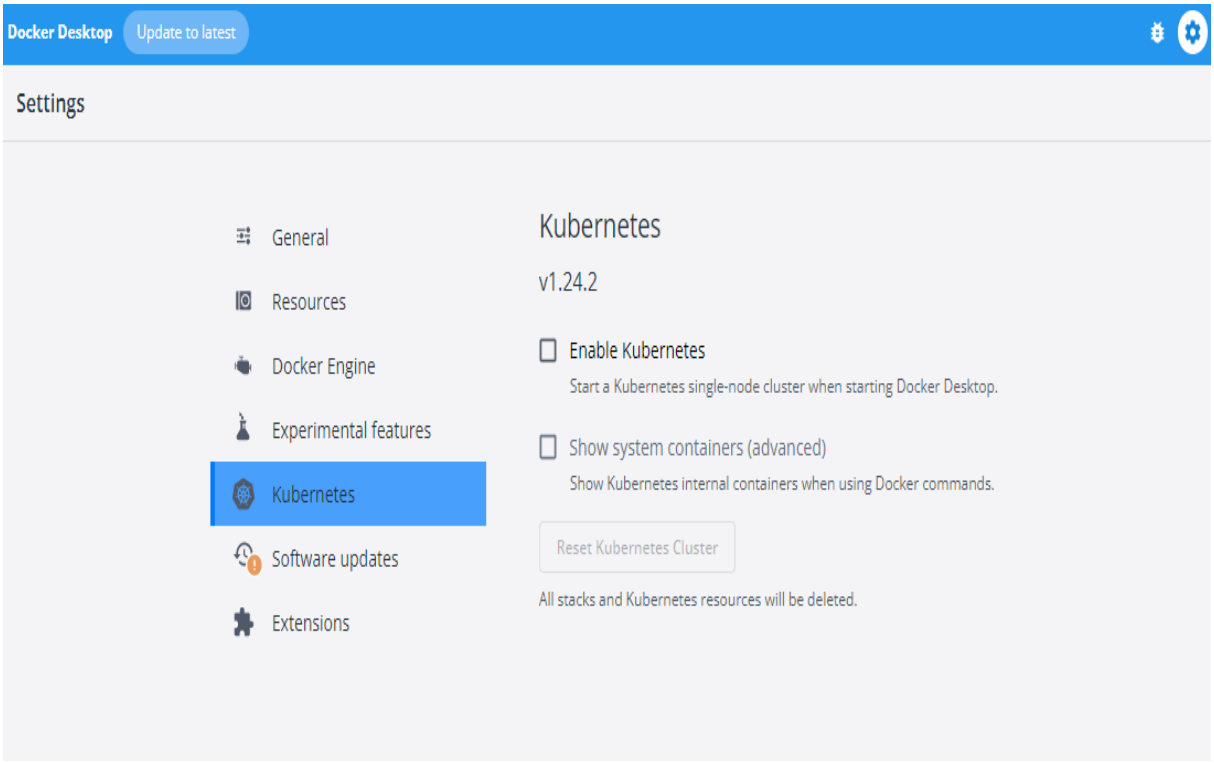
Docker manages individual containers, whereas Kubernetes manages multiple containers across clusters.

Integrating Kubernetes with Docker

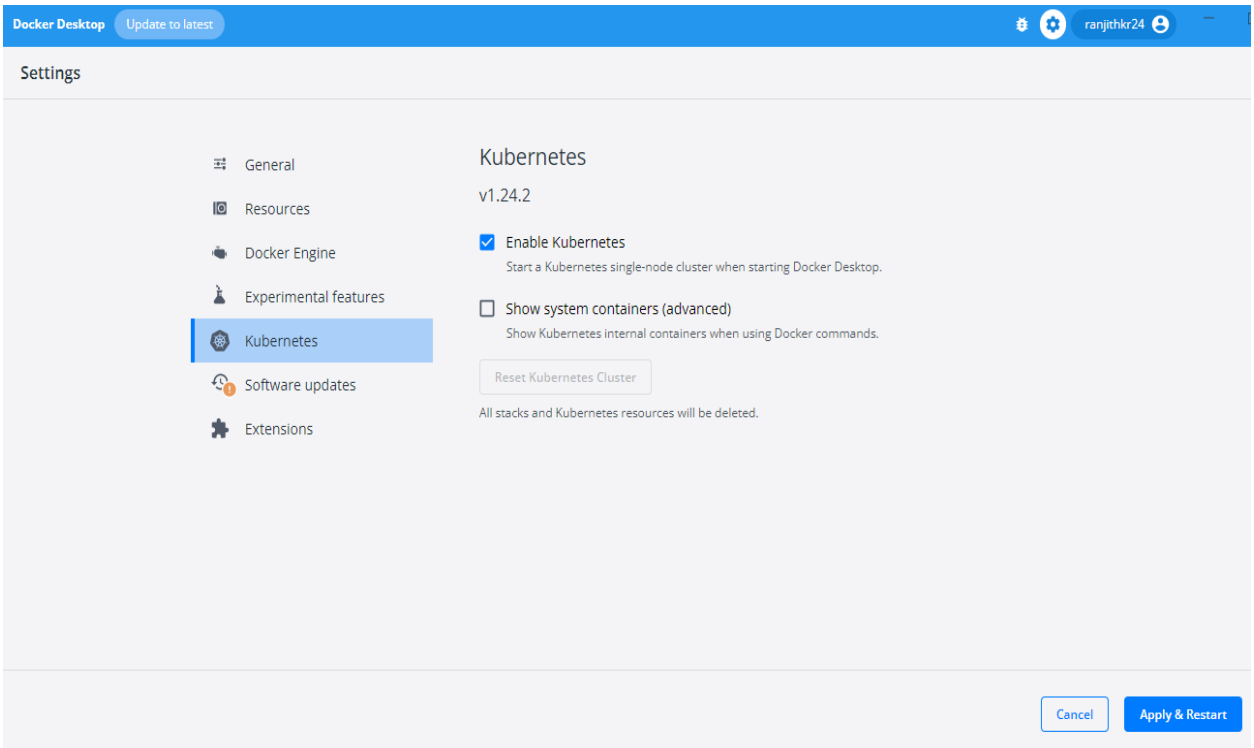
1. **Start the Docker Desktop**



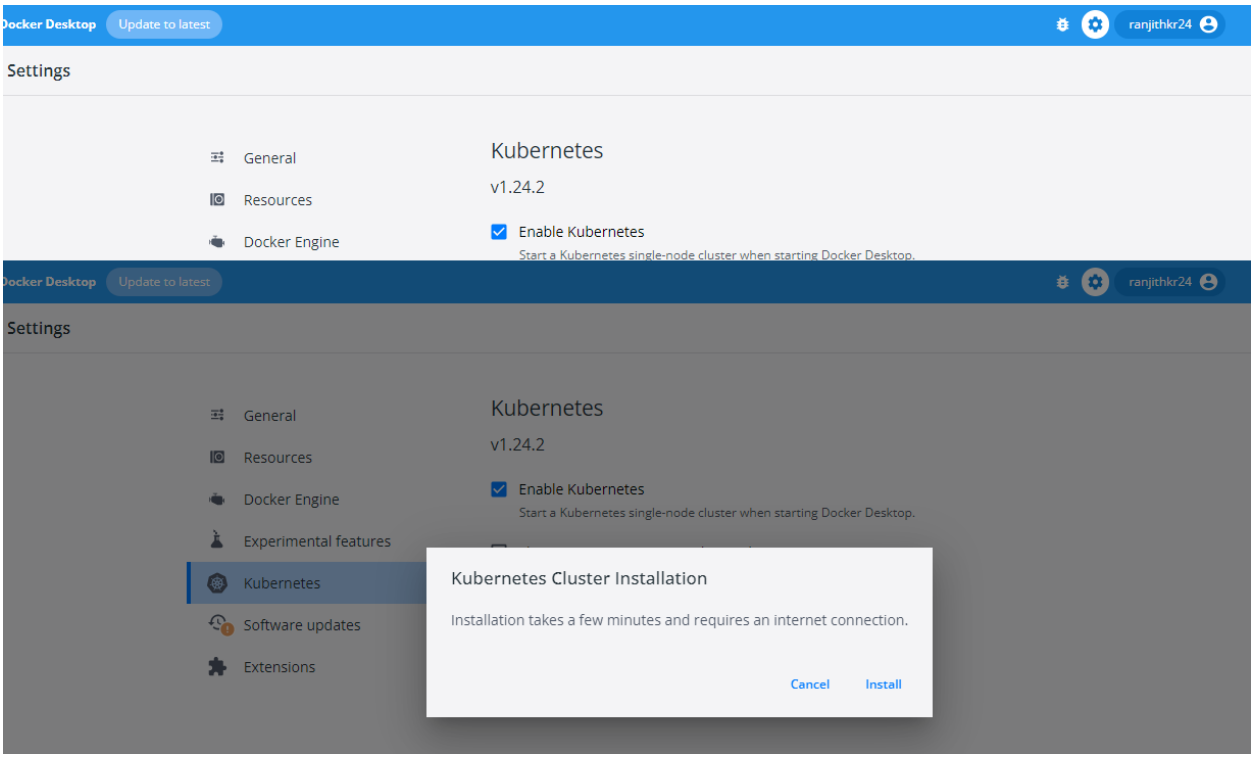
2. **Select Settings on the top right side from the Docker Desktop Dashboard**



3. Select Kubernetes from the left side bar
4. Check the Enable Kubernetes checkbox



5. Select Apply & restart to save the settings
6. Select Install to confirm



7.Go to Kubernetes website , https://kubernetes.io/releases/download/#binaries

Download **kubectlconvert.exe for Windows OS**

8 Save this file **kubectlconvert.exe** in a folder **and copy the folder into**

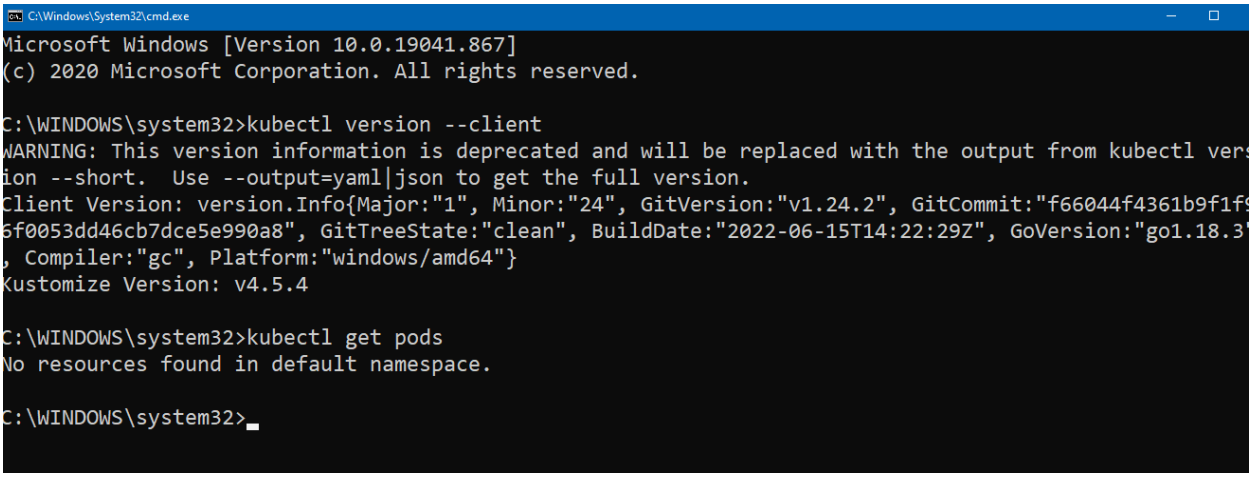
C//Windows//System32

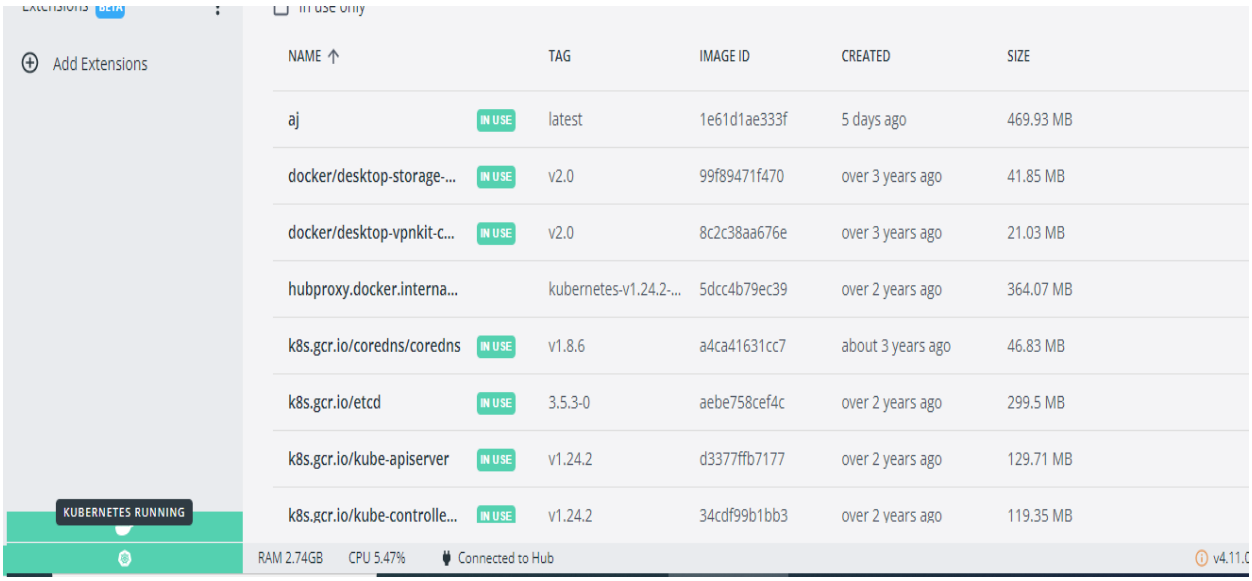
9. Set the path in environment path variable **for the kubectlconvert.exe file**

10. Open command prompt and type the following commands

kubectl version –client

kubectl get pods


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19041.867]
(c) 2020 Microsoft Corporation. All rights reserved.
C:\WINDOWS\system32>kubectl version --client
WARNING: This version information is deprecated and will be replaced with the output from kubectl vers
ion --short. Use --output=yaml|json to get the full version.
Client Version: version.Info{Major:"1", Minor:"24", GitVersion:"v1.24.2", GitCommit:"f66044f4361b9f1f
6f0053dd46cb7dce5e990a8", GitTreeState:"clean", BuildDate:"2022-06-15T14:22:29Z", GoVersion:"go1.18.3
, Compiler:"gc", Platform:"windows/amd64"}
Kustomize Version: v4.5.4
C:\WINDOWS\system32>kubectl get pods
No resources found in default namespace.
C:\WINDOWS\system32>


Add Extensions
KUBERNETES RUNNING
NAME
TAG
IMAGE ID
CREATED
SIZE
aj
IN USE
latest
1e61d1ae333f
5 days ago
469.93 MB
docker/desktop-storage-...
IN USE
v2.0
99f89471f470
over 3 years ago
41.85 MB
docker/desktop-vpnkit-c...
IN USE
v2.0
8c2c38aa676e
over 3 years ago
21.03 MB
hubproxy.docker.interna...
kubernetes-v1.24.2-...
5dcc4b79ec39
over 2 years ago
364.07 MB
k8s.gcr.io/coredns/coredns
IN USE
v1.8.6
a4ca41631cc7
about 3 years ago
46.83 MB
k8s.gcr.io/etcd
IN USE
3.5.3-0
aebe758cef4c
over 2 years ago
299.5 MB
k8s.gcr.io/kube-apiserver
IN USE
v1.24.2
d3377ffb7177
over 2 years ago
129.71 MB
k8s.gcr.io/kube-controlle...
IN USE
v1.24.2
34cdf99b1bb3
over 2 years ago
119.35 MB
RAM 2.74GB
CPU 5.47%
Connected to Hub

Week 9. Automate the process of running containerized application

Kubernetes is an open-source platform for **managing containerized workloads and services**. It provides a **robust framework for automating deployments, scaling, and managing containerized applications**

Prerequisites

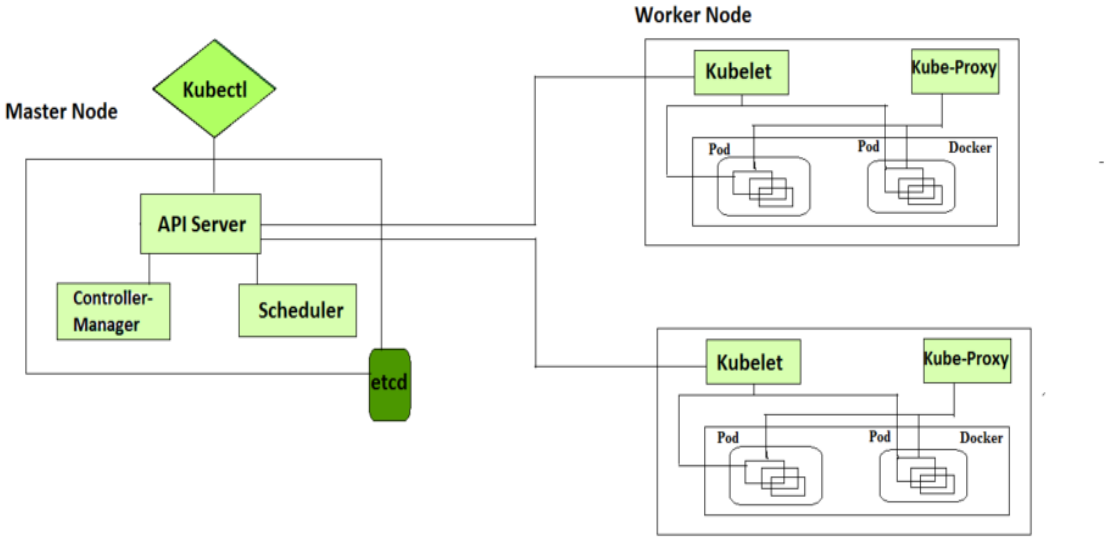
following prerequisites are required:

- **Kubernetes Cluster**: A running Kubernetes cluster. You can set up a local cluster using Minikube or use a managed service like Google Kubernetes Engine (GKE).
- **kubectl**: The command-line tool for interacting with your Kubernetes cluster.
- **Docker**: Installed and running on your machine.
- **Containerized Application**: Your application packaged into a Docker image.

Kubernetes Cluster Architecture

Kubernetes comes with a client-server architecture. It consists of master and worker nodes

The master node, contains the components such as API Server, controller manager, scheduler, and etcd database for stage storage. kubelet to communicate with the master, the kube-proxy for networking, and a container runtime such as Docker to manage containers.



Kubernetes Components

Kubernetes is composed of a number of components, each of which plays a specific role in the overall system. These components can be divided into two categories:

- **nodes:** Each Kubernetes cluster requires at least one worker node, which is a collection of worker machines that make up the nodes where our container will be deployed.
- **Control plane:** The worker nodes and any pods contained within them will be under the control plane.

Control Plane Components

It is basically a collection of various components that help us in managing the overall health of a cluster. For example, if you want to set up new pods, destroy pods, scale pods, etc. Basically, 4 services run on Control Plane**:**

1. Kube-API server

2. Kube-Scheduler

3. Kube-Controller-Manager

4. etcd

Node Components

These are the nodes where the actual work happens. Each Node can have multiple pods and pods have containers running inside them.

1. Container runtime

2. kubelet

3. kube-proxy

Test.java

```
import java.io.IOException;

import java.net.InetSocketAddress;

import com.sun.net.httpserver.HttpServer;
```

```
public class Test {
   public static void main(String[] args) throws IOException
       {
      int port = 8080; // Port on which the server will listen
      System.out.println("Starting server on port " + port);
      HttpServer server = HttpServer.create(new InetSocketAddress(port), 0);
      server.createContext("/", (exchange -> {
         String response = "Hello, Kubernetes!";
         exchange.sendResponseHeaders(200, response.getBytes().length);
         exchange.getResponseBody().write(response.getBytes());
         exchange.close();
      }));
      server.setExecutor(null);
      server.start();
      System.out.println("Server is running at http://localhost:" + port);
   }
}
```

Step 1: Create a Docker Image

First, create a Docker image for your application. This involves writing a Dockerfile that specifies the base image, copies the application code, and sets the command to run the application.

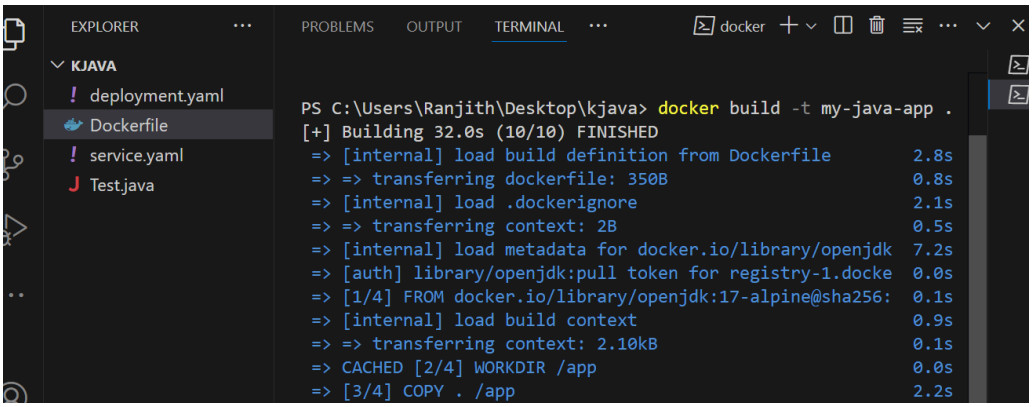
Dockerfile

```
# Use OpenJDK base image
FROM openjdk:17-alpine
# Set working directory
WORKDIR /app
# Copy all files to the working directory
COPY . /app
```

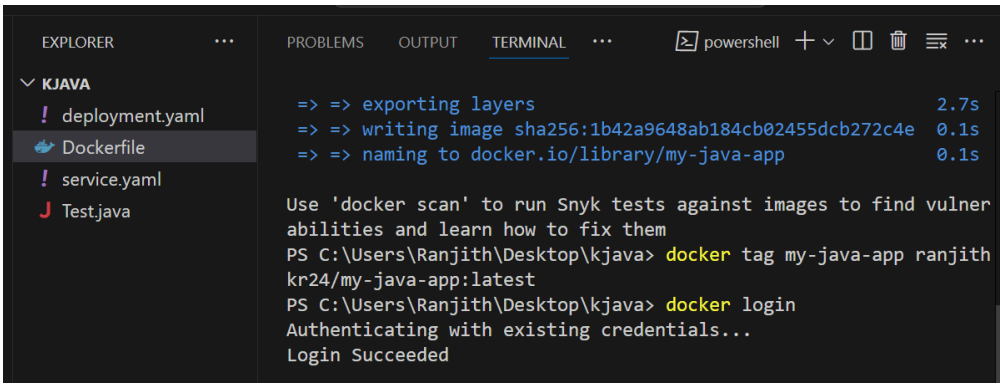
```
# Compile the Java application

RUN javac Test.java

# Expose port 8080 for the application

EXPOSE 8080

# Run the Java application

CMD ["java", "Test"]
```

Build the Docker image using the Dockerfile:

- **docker build -t my-java-app .**



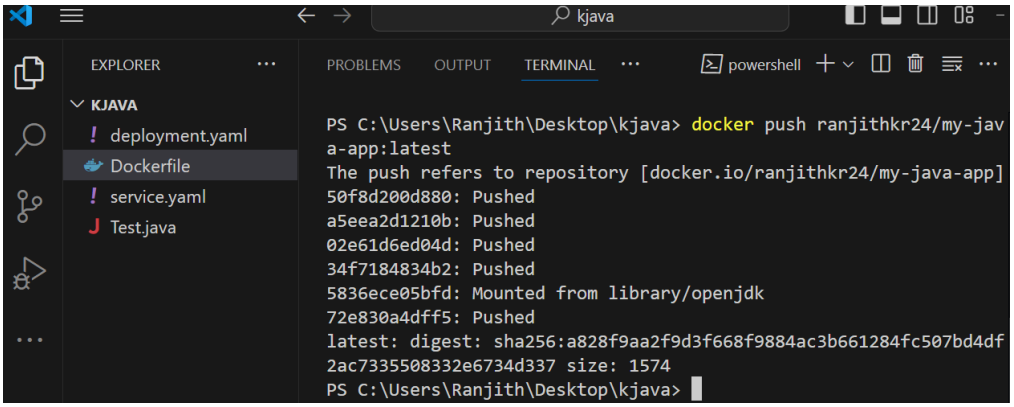
Tagging the image and login into dockerhub



Step 2: Push the Docker Image to a Registry

Push the Docker image to a container registry like Docker Hub

docker tag my-java-app:latest <your-docker-hub-username>/my-java-app:latest
docker push <your-docker-hub-username>/my-java-app:latest



Step 3: Create a Kubernetes Deployment

A Kubernetes Deployment is a resource that manages the rollout of new versions of an application. It ensures that a specified number of replicas (i.e., copies) of your application are running at any given time.

Create a YAML file named deployment.yaml with the following content:

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-java-app
spec:
  replicas: 3
  selector:
    matchLabels:
      app: my-java-app
  template:
    metadata:
      labels:
```

```
      app: my-java-app
  spec:
    containers:
     - name: my-java-app
       image: ranjithkr24/my-java-app:latest
       ports:
        - containerPort: 8080
       env:
        - name: PORT
          value: "8080"
```

Apply the deployment configuration to your Kubernetes cluster:

kubectl apply -f deployment.yaml

Step 4: Create a Kubernetes Service

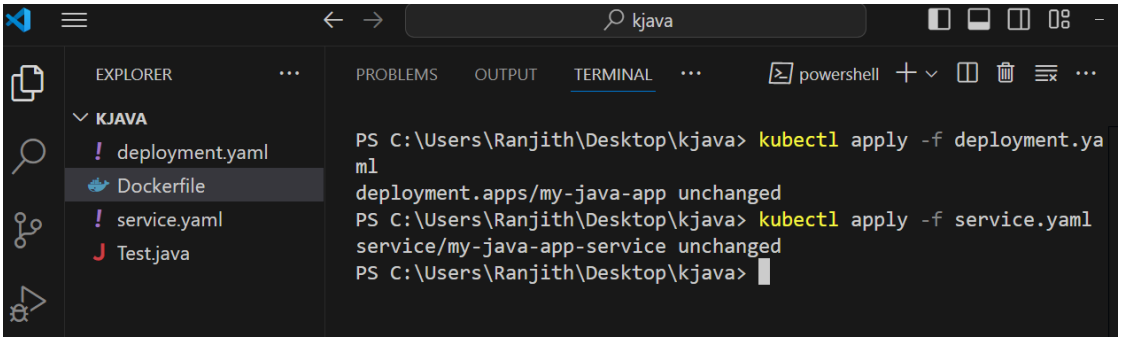
A Kubernetes Service provides a network identity and load balancing for accessing your application. Create a YAML file named service.yaml with the following content:

```
apiVersion: v1
kind: Service
metadata:
  name: my-java-app-service
spec:
  selector:
    app: my-java-app
  ports:
    - protocol: TCP
      port: 80         # Port exposed inside the cluster
      targetPort: 8080  # Port your Java app is running on
      nodePort: 30007   # External port
```

type: NodePort

Apply the service configuration to your Kubernetes cluster:

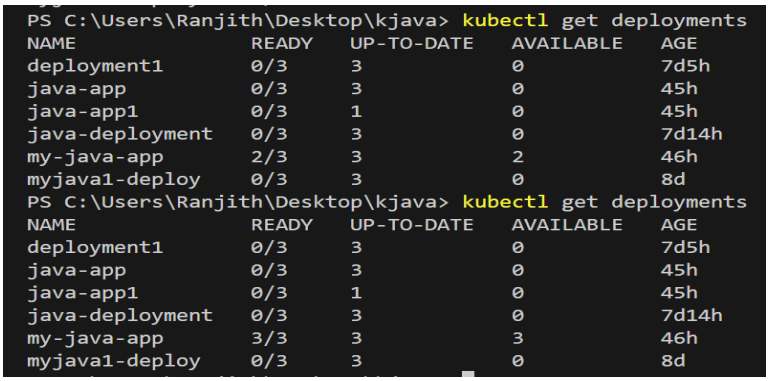
kubectl apply -f service.yaml



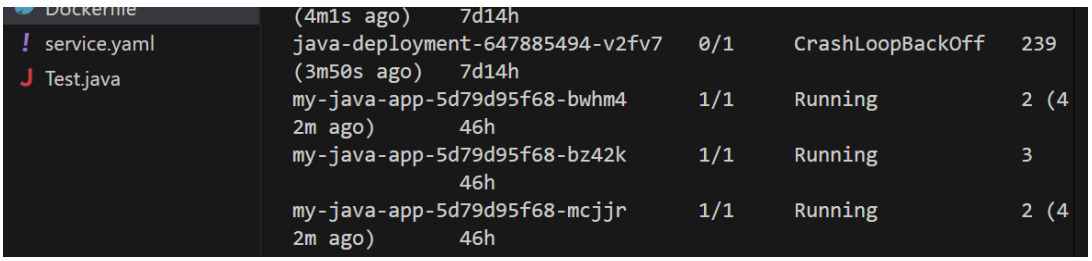
Step 5: Verify the Deployment

Check the status of your deployment and service:

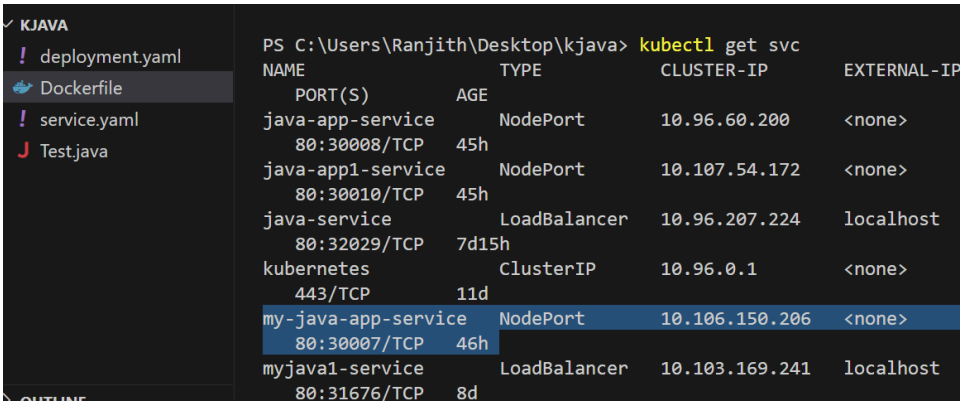
kubectl get deployments



kubectl get pods



kubectl get svc



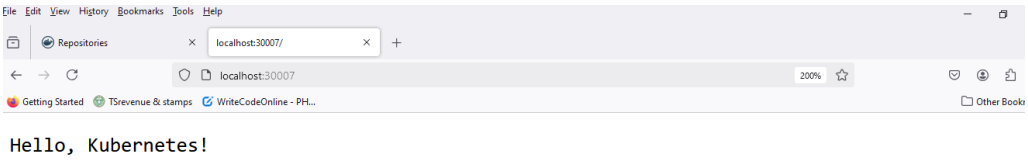
Step 6: Access the Application

To access your application, you need to get the external IP address of the service:

Open a web browser and navigate to the external IP address to access your application.

Type: http://localhost:port number of the application service

Type in the browser -- http://localhost:30007 to access the application for the above example



Install and Explore Selenium for automated testing

Selenium is an open-source, automated testing tool used to test web applications across various browsers. Selenium can be easily deployed on platforms such as Windows, Linux, Solaris and Macintosh.

Selenium supports a variety of programming languages through the use of drivers specific to each language. Languages supported by Selenium include C#, Java, Perl, PHP, Python and Ruby.

Selenium Web driver is most popular with Java and C#.

Selenium test scripts can be coded in any of the supported programming languages and can be run directly in most modern web browsers. Browsers supported by Selenium include Internet Explorer, Mozilla Firefox, Google Chrome and Safari.

Selenium can be integrated with tools like JUnit and TestNG for test management

Selenium has a dedicated suite that facilitates easy testing of web applications.

Installing **Selenium** requires going through the following steps:

Step 1: Install Java

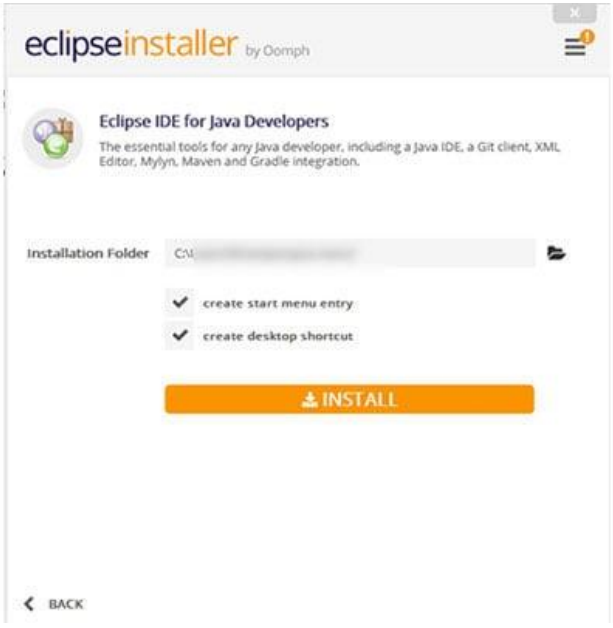
Step 2: Download and Configure Eclipse IDE

- **Open URL: https://www.eclipse.org/downloads/ .**
- **Click on the "Download Packages" link-- get "Eclipse IDE for Java Developers"**

  Click on the downloaded eclipse set up file

Select "Eclipse IDE for Java Developers"

“c:\eclipse” and Install.



Step 3 Download Selenium WebDriver Java Client

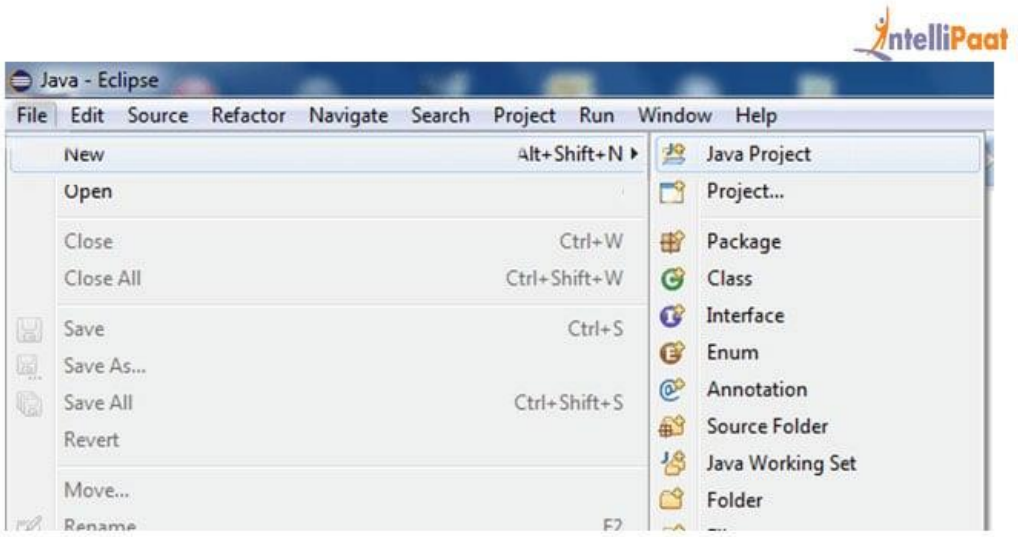
- Open URL: https://docs.seleniumhq.org/download/
  It will redirect you to the "downloads page" of Selenium official website.
- Scroll down through the web page and locate Selenium Client & WebDriver Language Bindings.
- Click on the "Download" link of Java Client Driver as shown in the image given below.

The downloaded file would be in zipped format. Unpack the contents in a convenient directory.

It contains the essential jar files required to configure Selenium WebDriver in Eclipse IDE.

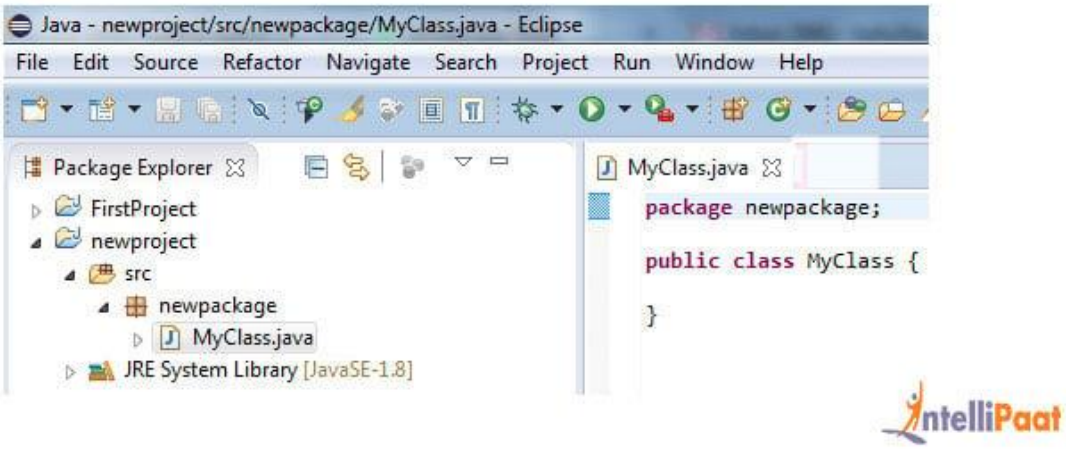
Step 4 – Configure Eclipse IDE with WebDriver-- Create a new Java Project in Eclipse

Click on the File menu, then go to New and select Java Project. Save the project as 'new project'.



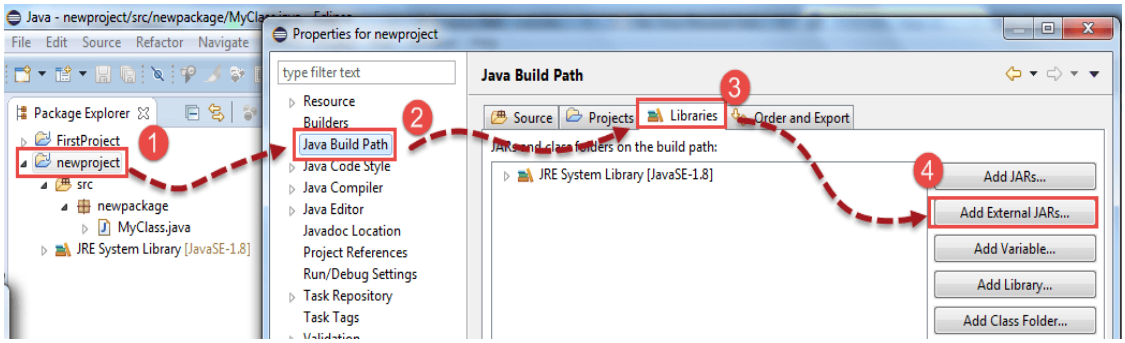
Create a new Java Class

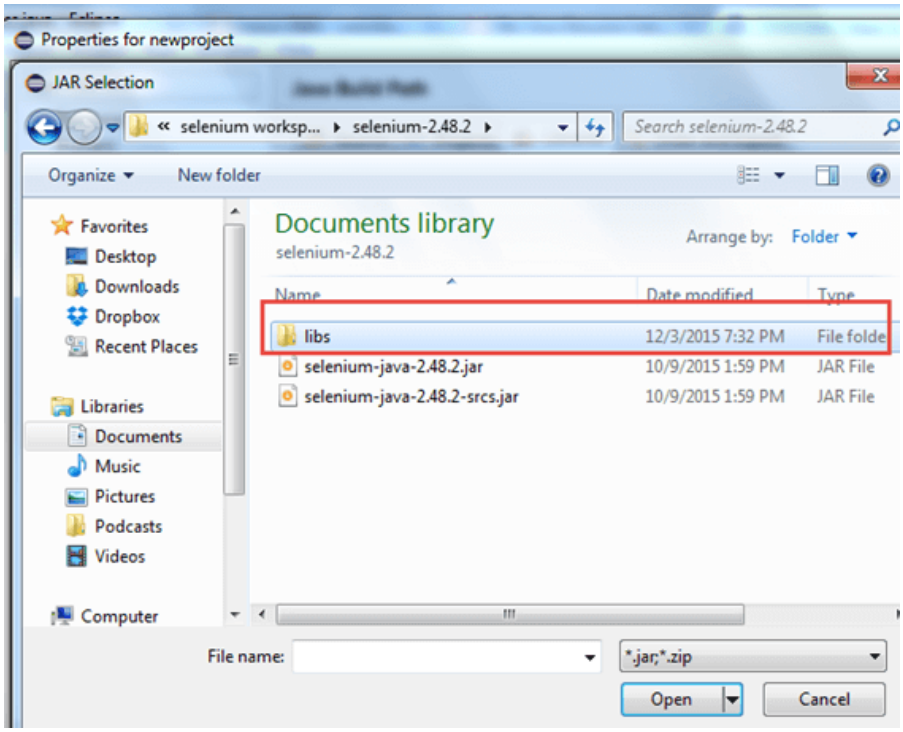
In order to create a new Java Class, click on File Menu and go to New and save it as ‘Myclass’.



set Selenium WebDriver’s libraries into Java Build Path. In this step,

1. Right-click on “newproject” and select **Properties**.
2. On the Properties dialog, click on “Java Build Path”.
3. Click on the **Libraries** tab, and then
4. Click on “Add External JARs..”





Add all the JAR files that are inside and outside the “libs” folder. Now click Ok to finish importing the library files

Lab Title:

JavaScript Registration Form Testing using Selenium

Objective:

To create a simple registration form using HTML and JavaScript, and perform automated functional testing using Selenium.

Step 1: Creating the Registration Form

1. Open Visual Studio Code.
2. Create a folder named RegistrationForm.
3. Inside the folder, create a file named index.html with the following content:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Registration Form</title>
    <!-- Inline CSS -->
    <style>
        body {
            font-family: Arial, sans-serif;
            text-align: center;
            margin-top: 50px;
            background-color: #f5f5f5;
        }
        form {
            display: inline-block;
            text-align: left;
            background-color: #ffffff;
            padding: 20px;
            border-radius: 8px;
            box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);
        }
        input {
            width: 100%;
            padding: 10px;
            margin: 10px 0;
            box-sizing: border-box;
            border-radius: 4px;
            border: 1px solid #ccc;
        }
        button {
```

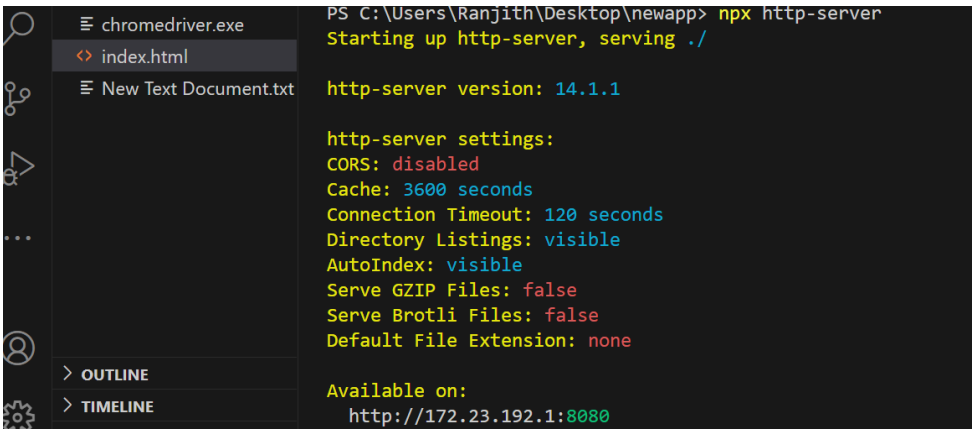
```
            background-color: #4CAF50;
            color: white;
            padding: 10px 20px;
            border: none;
            border-radius: 4px;
            cursor: pointer;
        }
        button:hover {
            background-color: #45a049;
        }
        #message {
            color: green;
            font-weight: bold;
            margin-top: 20px;
        }
        .error {
            color: red;
        }
    </style>
</head>
<body>
    <h2>Registration Form</h2>
    <!-- Registration Form -->
    <form id="registrationForm">
        <label for="username">Username:</label><br>
        <input type="text" id="username" name="username" placeholder="Enter username" required><br>

        <label for="email">Email:</label><br>
        <input type="email" id="email" name="email" placeholder="Enter email" required><br>

        <label for="password">Password:</label><br>
        <input type="password" id="password" name="password" placeholder="Enter password" required><br>

        <button type="submit">Register</button>
    </form>

    <!-- Message Display -->
    <p id="message"></p>

    <!-- Inline JavaScript -->
    <script>
        document.getElementById("registrationForm").addEventListener("submit", function(event) {
            event.preventDefault(); // Prevent form from submitting

            // Get input values
```

```
        const username = document.getElementById("username").value;
        const email = document.getElementById("email").value;
        const password = document.getElementById("password").value;
        const messageElement = document.getElementById("message");
        // Validate inputs
        if (username === "" || email === "" || password === "") {
            messageElement.textContent = "All fields are required!";
            messageElement.classList.add("error");
            return;
        }
        // Check for valid email format
        const emailPattern = /^[^\s@]+@[^\s@]+\.[^\s@]+$/;
        if (!emailPattern.test(email)) {
            messageElement.textContent = "Invalid email format!";
            messageElement.classList.add("error");
            return;
        }
        // If all validations pass, show success message
        messageElement.textContent = "Registration Successful!";
        messageElement.classList.remove("error");
                messageElement.style.color = "green";

                // Clear the form
                document.getElementById("registrationForm").reset();
            });
        </script>
    </body>
    </html>
```

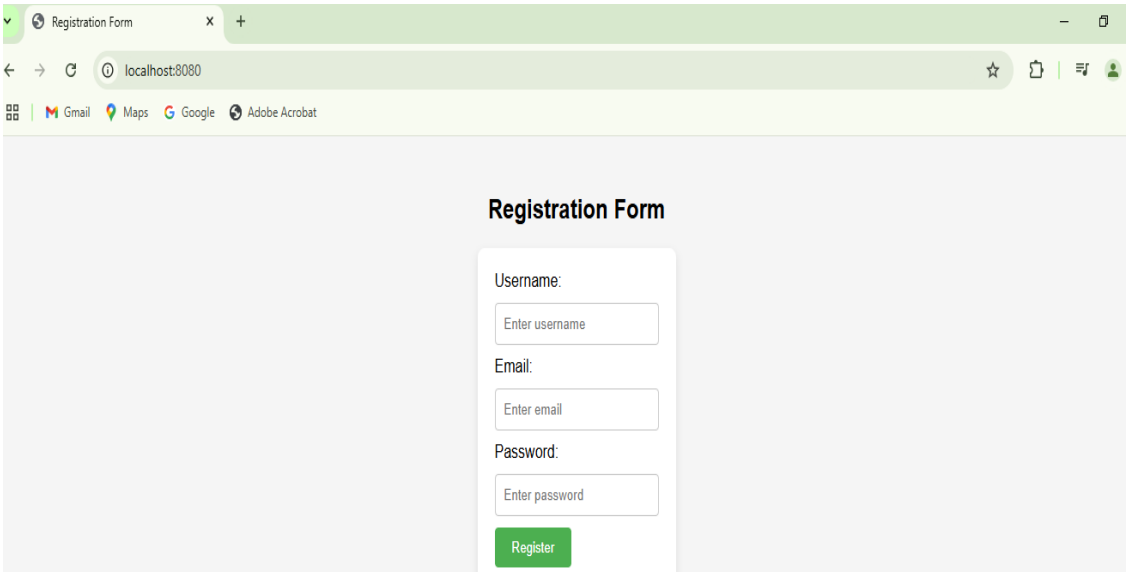
Step 2: Running the Web Application

1. Open the terminal in Visual Studio Code
2. Use the following command to start a simple HTTP server:

   npx http-server



3. Open your browser and go to http://localhost:8080 to view the form.

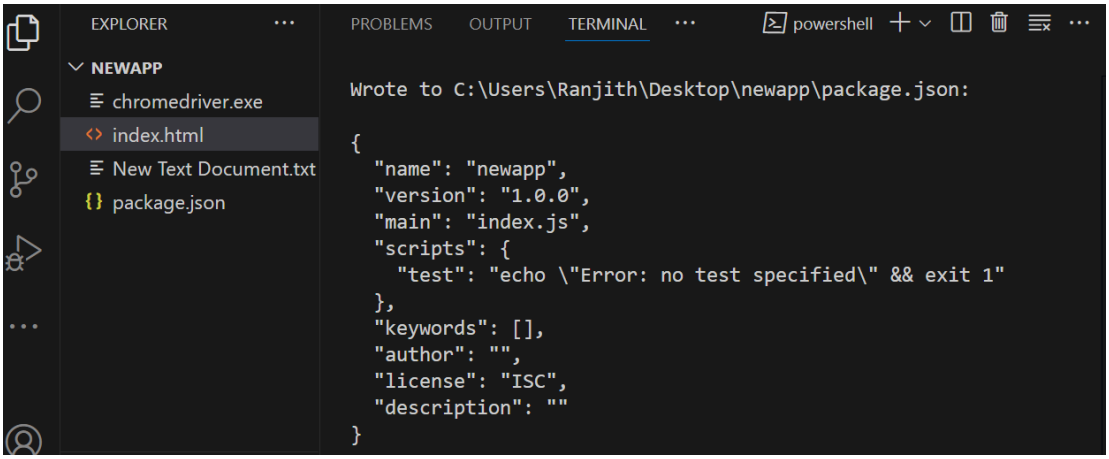


Part 2: Testing the Registration Form using Selenium

Step 1: Setting up Selenium in Node.js

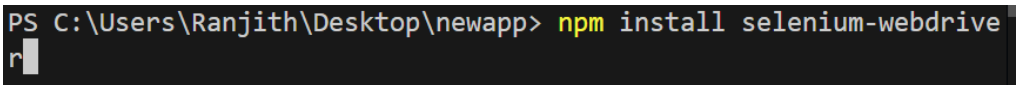
1. Initialize a Node.js project:

   npm init -y



2. Install the Selenium WebDriver package:

   npm install selenium-webdriver



3. Download the ChromeDriver that matches your Chrome browser version from ChromeDriver Downloads.

4. Extract the downloaded chromedriver and place it in the project folder.

Step 2: Writing the Selenium Test Script

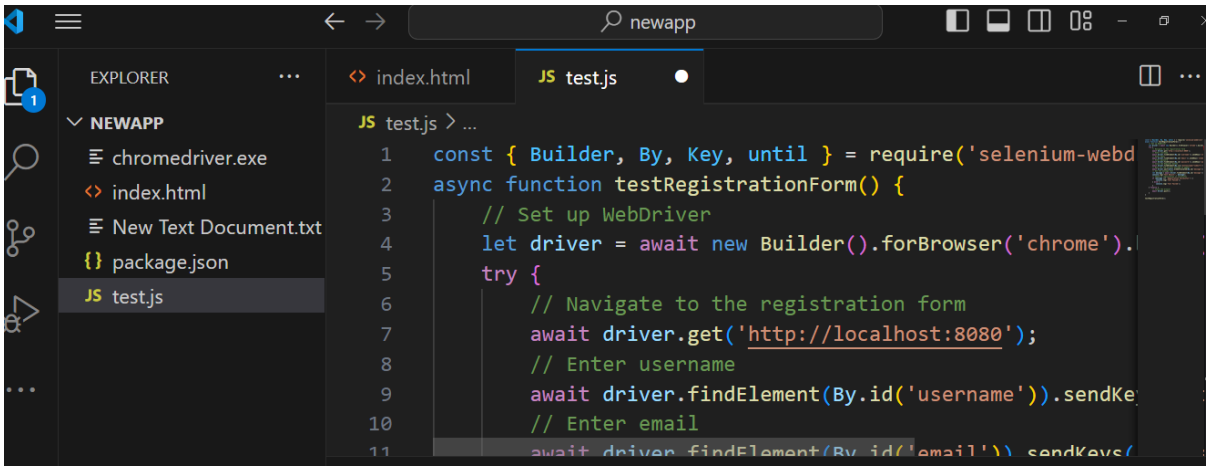
Create a file named test.js and add the following code:

javascript

Copy code

```
const { Builder, By, Key, until } = require('selenium-webdriver');
async function testRegistrationForm() {
  // Set up WebDriver
  let driver = await new Builder().forBrowser('chrome').build();
  try {
    // Navigate to the registration form
    await driver.get('http://localhost:8080');
    // Enter username
    await driver.findElement(By.id('username')).sendKeys('student1');
    // Enter email
    await driver.findElement(By.id('email')).sendKeys('student1@example.com');
    // Enter password
    await driver.findElement(By.id('password')).sendKeys('password123');
    // Click the Register button
    await driver.findElement(By.css('button[type="submit"]')).click();
    // Wait for the success message to appear
    await driver.wait(until.elementLocated(By.id('message')), 5000);
    // Get the message text
    let message = await driver.findElement(By.id('message')).getText();
    console.log('Test Result:', message);
    // Check if registration is successful
    if (message === 'Registration Successful!') {
      console.log('Test Passed');
    } else {
      console.log('Test Failed');
    }
  } finally {
    // Close the browser
    await driver.quit();
```

```
    }
}

testRegistrationForm();
```



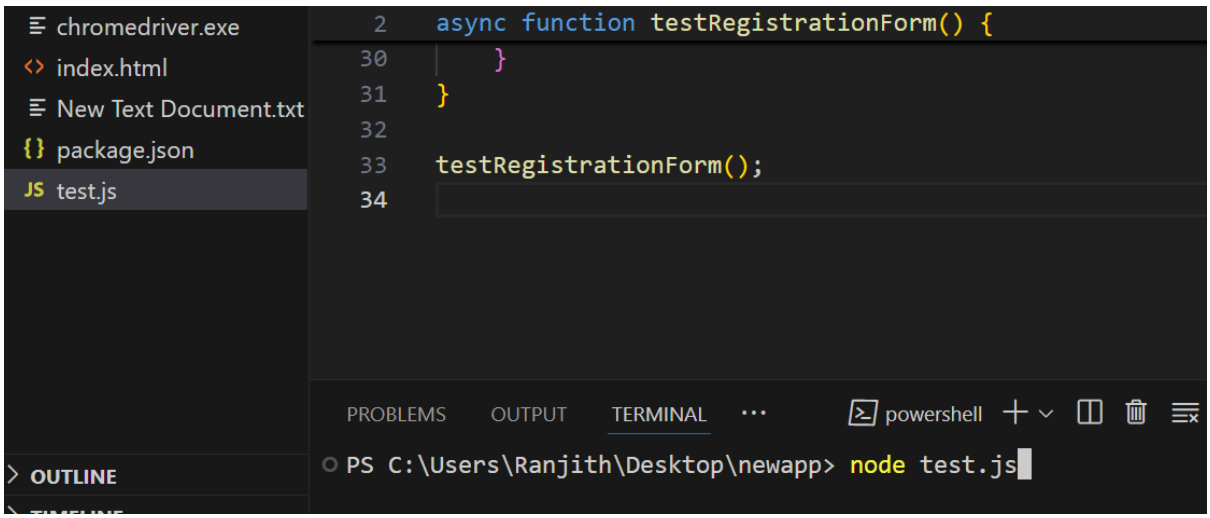
Step 3: Running the Selenium Test

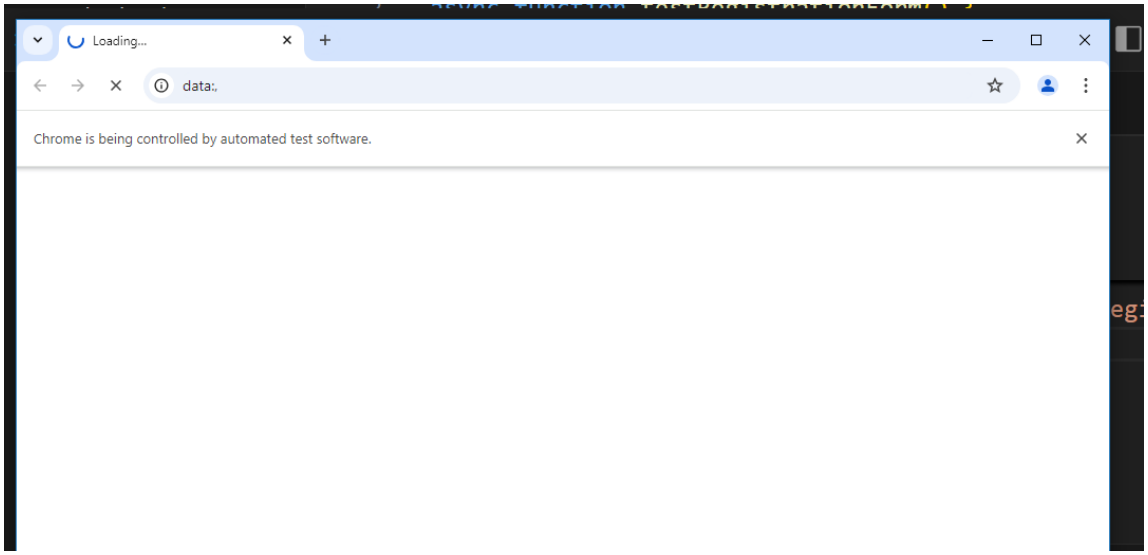
1. Ensure your HTTP server is running:

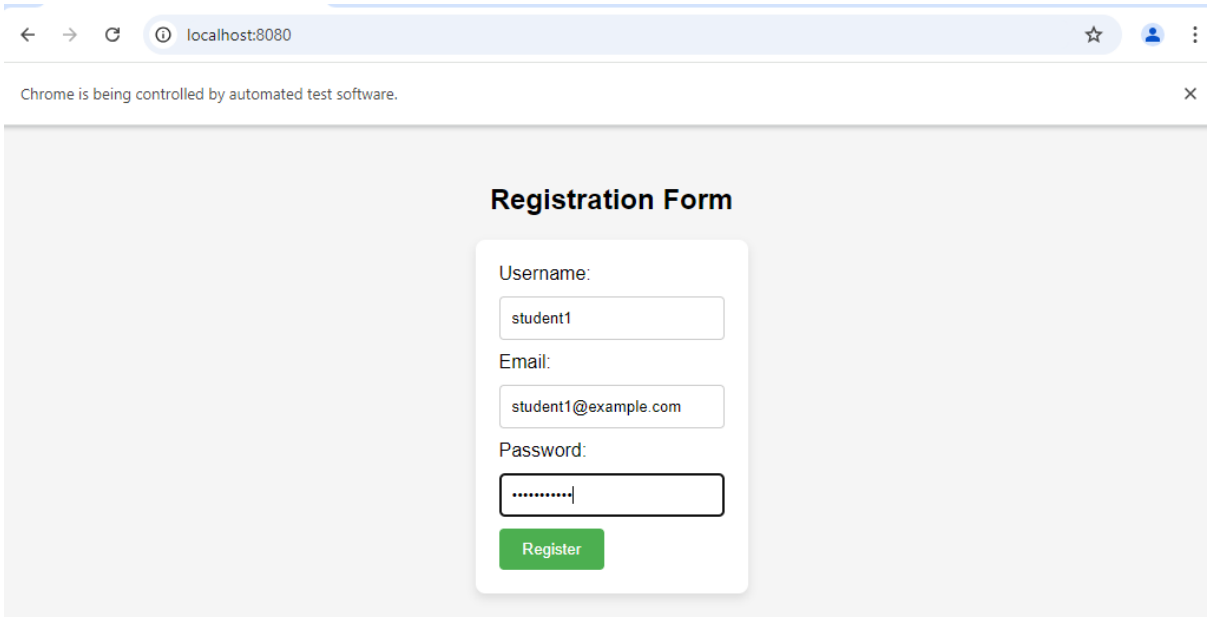
   ```
   npx http-server
   ```

2. Open a new terminal and run the Selenium test script:

   ```
   node test.js
   ```





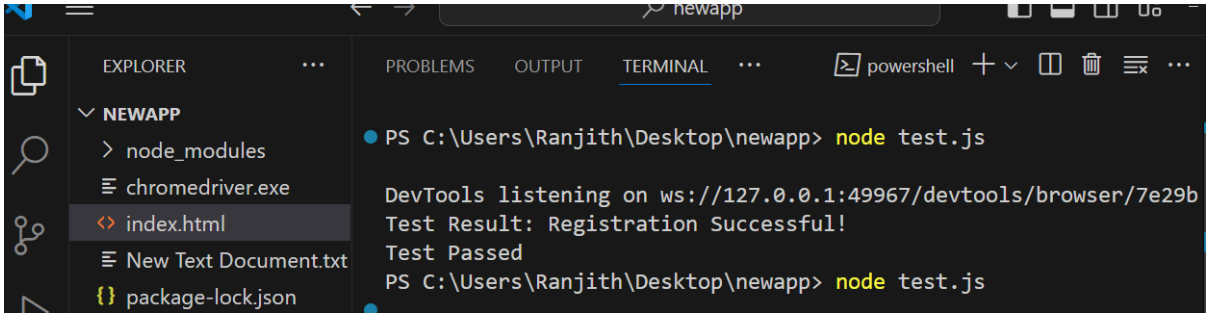


Expected Output:

The console should display:

Test Result: Registration Successful!

Test Passed



Step 4: Observations and Conclusion

- The automated test checks if the registration form functions correctly by filling in sample data and verifying the success message.
- If the form works as expected, the test will pass; otherwise, it will fail.

Viva Questions:

1. What is Selenium used for?
2. What is the difference between functional and non-functional testing?
3. How can you automate browser testing using JavaScript?
4. What are the benefits of automated testing?

Assignment:

1. Modify the registration form to include additional fields like phone number and address.
2. Write a new Selenium test case to validate the new fields.

Week 12:

Understand the Application*: Identify the functionality and purpose of the containerized app. For example, if it's a web application, determine its main workflows (e.g., login, search, CRUD operations).*

 Set Up Selenium Environment*:*

- *Install Selenium in your test environment.*
- Install the necessary dependencies:
- pip install selenium
- *Use a compatible WebDriver (e.g., ChromeDriver or GeckoDriver) for the browser.*
- *Ensure the containerized app is running and accessible (via localhost or a specific IP).*
- Ensure the application container is up and running (e.g., docker run -d -p 8080:80 your-app).

 Create Test Scenarios*: Write user stories or cases describing expected behavior.*

 Implement Test Cases in Selenium*: Use programming languages like Python or Java for scripting.*

 Generate Output Screenshots*: Use Selenium's screenshot functionality to capture results.*

Example Test Case: Containerized Web App with Login Page

Scenario: Verify login functionality.

Steps:

Open the application URL.

Enter username and password.

Click the login button.

Assert the user is redirected to the dashboard page.

Selenium Script (Python Example)

```
from selenium import webdriver
from selenium.webdriver.common.by import By
from selenium.webdriver.common.keys import Keys
import time
```

```
# Set up the WebDriver
driver = webdriver.Chrome()  # Ensure chromedriver is installed and in PATH
driver.get("http://localhost:8080")  # Replace with your app's URL

# Step 1: Open the application
print("Navigating to the application...")

# Step 2: Locate and interact with the login form
username_field = driver.find_element(By.ID, "username")  # Replace with actual ID
password_field = driver.find_element(By.ID, "password")  # Replace with actual ID
login_button = driver.find_element(By.ID, "loginButton")  # Replace with actual ID

username_field.send_keys("testuser")
password_field.send_keys("password123")
time.sleep(1)  # Pause for visibility

# Take a screenshot before login
driver.save_screenshot("screenshots/login_page.png")

# Step 3: Submit the form
login_button.click()

# Step 4: Assert and validate
time.sleep(3)  # Wait for the page to load
dashboard_title = driver.title
assert "Dashboard" in dashboard_title, "Login failed or incorrect page loaded"

# Take a screenshot after login
```

driver.save_screenshot("screenshots/dashboard.png")

print("Login test passed.")

 # Clean up

driver.quit()

Outputs

- *Screenshots:*
  - *Before Login: A screenshot of the login form filled.*
  - *After Login: A screenshot of the dashboard page.*
- *Logs:*
  - *Include printed logs such as "Navigating to the application..." or "Login test passed."*

Additional Test Cases

- *Invalid Login:*
  - *Enter invalid credentials.*
  - *Assert error message is displayed.*
- *UI Element Availability:*
  - *Verify that all UI elements (buttons, fields, links) load correctly.*
- *Form Validation:*
  - *Leave fields empty and attempt login.*
  - *Verify error messages appear.*
- *Responsive Design:*
  - *Test on different screen sizes using Selenium's window resize method.*

Basic Test Cases:

1. Verify Home Page Loads

Steps:

Navigate to the application URL (e.g., http://localhost:8080).

Verify the title of the page.

Code:

```
from selenium import webdriver
driver = webdriver.Chrome()  # Use the driver for your browser
driver.get("http://localhost:8080")
assert "Expected Title" in driver.title, "Home page title did not match"
driver.quit()
```

2. Login Functionality

Steps:

Open the login page.

Enter valid credentials.

Submit the form.

Verify redirection or a success message.

Code:

```
from selenium import webdriver
from selenium.webdriver.common.by import By
from selenium.webdriver.common.keys import Keys

driver = webdriver.Chrome()
driver.get("http://localhost:8080/login")
driver.find_element(By.ID, "username").send_keys("test_user")
driver.find_element(By.ID, "password").send_keys("secure_password")
driver.find_element(By.ID, "login-button").click()
success_message = driver.find_element(By.ID, "success-message").text
assert "Welcome" in success_message, "Login failed"
```

driver.quit()