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Aim: Write code for a simple user registration form of an event

regform.html

```
<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8" />

    <meta http-equiv="X-UA-Compatible" content="IE=edge"/>

    <meta

        name="viewport"

        content="width=device-width, initial-scale=1.0"

    />

    <link

        rel="stylesheet"

        href="styles.css"

    />

    <title>Registration form</title>

</head>

<body>

    <div class="form-container">

        <h1>Registration form!!</h1>

        <form action="submit.html">

            <input

                type="text"


```

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```
placeholder="Enter your name"  
pattern="\w*"  
/>  
<input  
type="email"  
placeholder="Enter your email"  
/>  
<input  
type="password"  
placeholder="Enter your password"  
/>  
<input  
type="password"  
placeholder="Confirm password"  
/>  
<div class="consent">  
    <input type="checkbox" />  
    I agree with the terms and conditions  
</div>  
  
<button type="submit">Register</button>  
  
</form>  
  
</div>  
</body>
```

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```
</html>

styles.css

* {
    margin: 0;
    box-sizing: border-box;
}

.form-container {
    width: 60%;
    margin: 0 auto;
    margin-top: 2rem;
    padding: 2rem;
    border: 2px solid dodgerblue;
    border-radius: 6px;
}

.form-container > h1 {
    margin-bottom: 1rem;
}

form {
    display: flex;
    flex-direction: column;
    gap: 1rem;
}

input[type="text"],
```

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```
input[type="email"],  
input[type="password"] {  
    padding: 0.8rem 0.6rem;  
    border-radius: 6px;  
    border: 1px solid dodgerblue;  
    box-shadow: 0 2px dodgerblue;  
    outline: none;  
}  
  
input[type="text"]:focus {  
    border: 1px solid dodgerblue;  
    box-shadow: 0 2px dodgerblue;  
}  
  
form > button {  
    padding: 0.8rem;  
    color: white;  
    background-color: rgb(30, 144, 255);  
    border: none;  
    border-radius: 4px;  
}  
  
form > button:hover {  
    background-color: rgba(30, 144, 255, 0.8);  
    cursor: pointer;  
}
```

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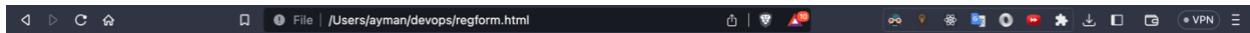
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```
body > h1 {  
    position: fixed;  
    top: 50%;  
    left: 50%;  
    transform: translate(-50%, -50%);  
}
```

Output:



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Aim: Exploring Git and Github Commands

Checking git version

```
[ayman@Aymans-MacBook-Air devops % git --version  
git version 2.32.0
```

Initializing the repository

This creates a .git file which tracks your code changes

```
[ayman@Aymans-MacBook-Air devops % git init  
Initialized empty Git repository in /Users/ayman/devops/.git/
```

Putting meta information

Meta information must only be entered once and will be used later for interacting with the github repository.

```
[ayman@Aymans-MacBook-Air devops % git config --global user.name "ayman"  
[ayman@Aymans-MacBook-Air devops % git config --global user.email "aymanshaik1015@gmail.com"
```

Checking the status of files

```
[ayman@Aymans-MacBook-Air devops % git status  
On branch main  
  
No commits yet  
  
Untracked files:  
(use "git add <file>..." to include in what will be committed)  
  regform.html  
  styles.css  
  
nothing added to commit but untracked files present (use "git add" to track)
```

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Adding the files

```
[ayman@Aymans-MacBook-Air devops % git add .
[ayman@Aymans-MacBook-Air devops % git status
On branch main

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
    new file:   regform.html
    new file:   styles.css
```

Committing the files with a message

```
[ayman@Aymans-MacBook-Air devops % git commit -m "Initial commit"
[main (root-commit) 3a185f6] Initial commit
 2 files changed, 106 insertions(+)
  create mode 100644 regform.html
  create mode 100644 styles.css
```

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Create the repository on github

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository](#).

Owner *



Repository name *

/ regform|

regform is available.

Great repository names are short and memorable. Need inspiration? How about [expert-enigma](#)?

Description (optional)

 Public

Anyone on the internet can see this repository. You choose who can commit.

 Private

You choose who can see and commit to this repository.

Initialize this repository with:

Add a README file

This is where you can write a long description for your project. [Learn more about READMEs](#).

Add .gitignore

.gitignore template: None ▾

Choose which files not to track from a list of templates. [Learn more about ignoring files](#).

Choose a license

License: None ▾

A license tells others what they can and can't do with your code. [Learn more about licenses](#).

 You are creating a public repository in your personal account.



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Push the repository to github

First the remote is added using the URL of the repository

```
ayman@Aymans-MacBook-Air devops % git remote add origin git@github.com:Nesopie/regform.git
git branch -M main
[git push -u origin main
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 8 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 1.08 KiB | 1.08 MiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:Nesopie/regform.git
 * [new branch]      main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.
```

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Output:

A screenshot of a GitHub repository page. The repository has 1 branch and 0 tags. The most recent commit was made by 'ayman' 3 minutes ago, titled 'Initial commit'. This commit added two files: 'regform.html' and 'styles.css', both of which were also committed 3 minutes ago. A message at the bottom encourages adding a README file, with a 'Add a README' button. The 'About' section notes 'No description, website, or topics provided.' and shows statistics: 0 stars, 1 watching, and 0 forks. The 'Releases' section indicates 'No releases published.'

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Aim: Practice Source code management on GitHub. Experiment with the source code written in exercise 1.

Create a new branch for editing

```
[ayman@Aymans-MacBook-Air devops % git branch change_title
```

Switch to that branch which is: change_title

```
[ayman@Aymans-MacBook-Air devops % git switch change_title  
Switched to branch 'change_title'
```

Make changes to the html file

Before:

```
18  
19     <body>  
20         <div class="form-container">  
21             <h1>Registration form! !</h1> ↵  
22             <form action="submit.html">  
23                 <input  
24                     type="text"  
25                     placeholder="Enter your name"
```

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After

```
18
19      <body>
20          <div class="form-container">
21              <h1>Registration form!</h1> ←
22          <form action="submit.html">
23              <input
24                  type="text"
25                  placeholder="Enter your name"
```

We can see the changes using git diff

```
[ayman@Aymans-MacBook-Air devops % git diff
diff --git a/regform.html b/regform.html
index 702eee9..31e292c 100644
--- a/regform.html
+++ b/regform.html
@@ -18,7 +18,7 @@
     </head>
     <body>
         <div class="form-container">
-            <h1>Registration form!!</h1>
+            <h1>Registration form!</h1>
             <form action="submit.html">
                 <input
                     type="text"
```

Track and commit the changes

```
[ayman@Aymans-MacBook-Air devops % git add .
[ayman@Aymans-MacBook-Air devops % git commit -m "Changed the title"
[change_title c38116b] Changed the title
 1 file changed, 1 insertion(+), 1 deletion(-)
```

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Switch to main

```
[ayman@Aymans-MacBook-Air devops % git switch main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.
```

Merge the change_title branch with the main branch

```
[ayman@Aymans-MacBook-Air devops % git merge change_title
Updating 3a185f6..c38116b
Fast-forward
  regform.html | 2 ++
  1 file changed, 1 insertion(+), 1 deletion(-)
```

Push the repository to github

```
[ayman@Aymans-MacBook-Air devops % git push origin main
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 8 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 315 bytes | 315.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To github.com:Nesopie/regform.git
  3a185f6..c38116b  main -> main
```

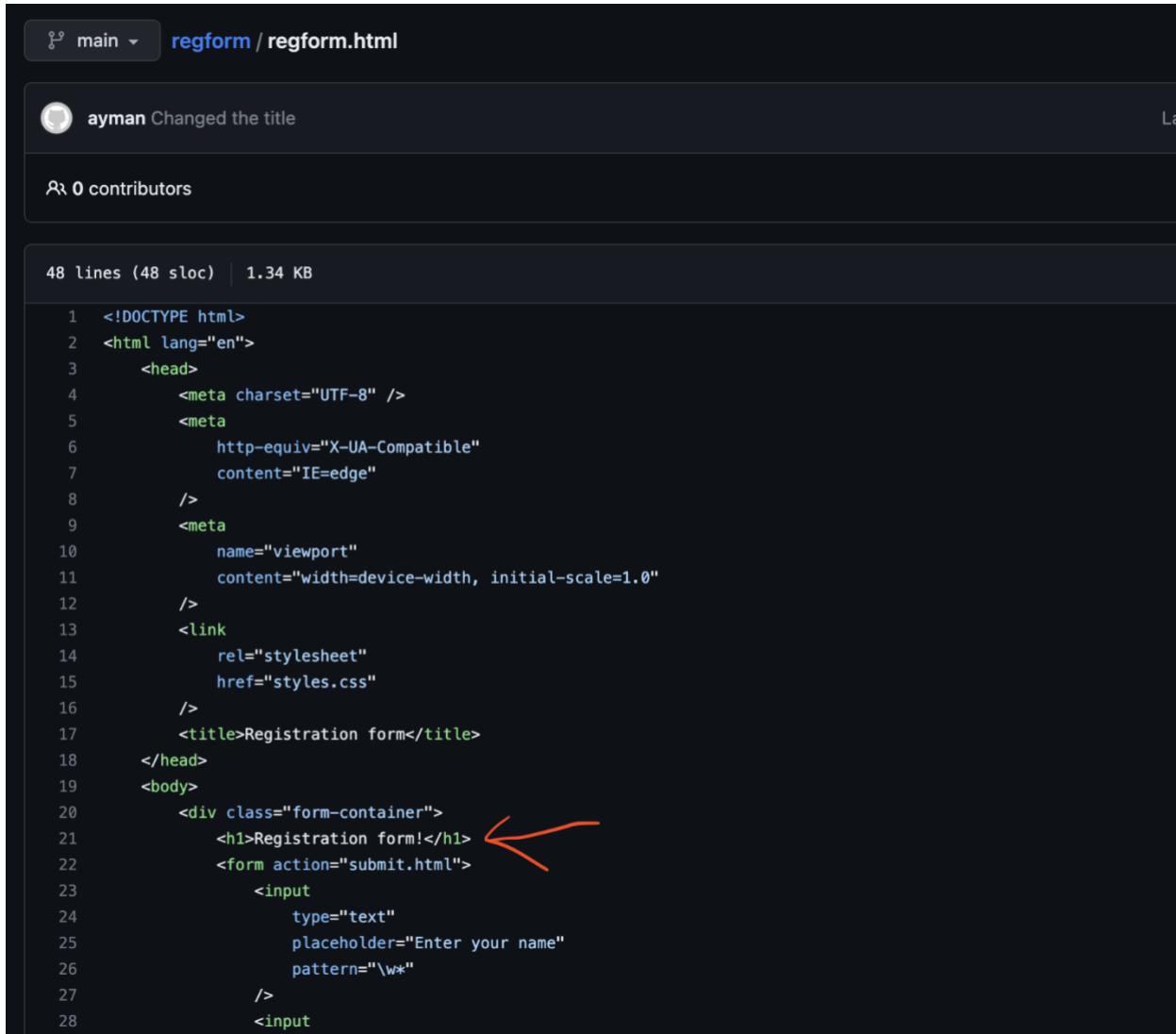
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Output:



main ▾ regform / regform.html

ayman Changed the title

0 contributors

48 lines (48 sloc) | 1.34 KB

```
1  <!DOCTYPE html>
2  <html lang="en">
3      <head>
4          <meta charset="UTF-8" />
5          <meta
6              http-equiv="X-UA-Compatible"
7              content="IE=edge"
8          />
9          <meta
10             name="viewport"
11             content="width=device-width, initial-scale=1.0"
12         />
13         <link
14             rel="stylesheet"
15             href="styles.css"
16         />
17         <title>Registration form</title>
18     </head>
19     <body>
20         <div class="form-container">
21             <h1>Registration form!</h1> ←
22             <form action="submit.html">
23                 <input
24                     type="text"
25                     placeholder="Enter your name"
26                     pattern="\w*"
27                 />
28                 <input
```

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Aim: Install Jenkins and set it up.

First install JDK 11 on your machine. The command for install openjdk-11 is given below:

```
ayman@Aymans-MacBook-Air ~ % brew install openjdk@11
```

Switch to version 11 in case you have other JDks installed and check the current openjdk version.

```
[ayman@Aymans-MacBook-Air ~ % export JAVA_HOME=`/usr/libexec/java_home -v 11.0`  
[ayman@Aymans-MacBook-Air ~ % java -version  
openjdk version "11.0.19" 2023-04-18  
OpenJDK Runtime Environment Homebrew (build 11.0.19+0)  
OpenJDK 64-Bit Server VM Homebrew (build 11.0.19+0, mixed mode)  
ayman@Aymans-MacBook-Air ~ %
```

Install Jenkins using the following command:

```
ayman@Aymans-MacBook-Air ~ % brew install jenkins-lts
```

Start Jenkins server:

```
[ayman@Aymans-MacBook-Air ~ % brew services start jenkins-lts  
==> Successfully started `jenkins-lts` (label: homebrew.mxcl.jenkins-lts)  
ayman@Aymans-MacBook-Air ~ %
```

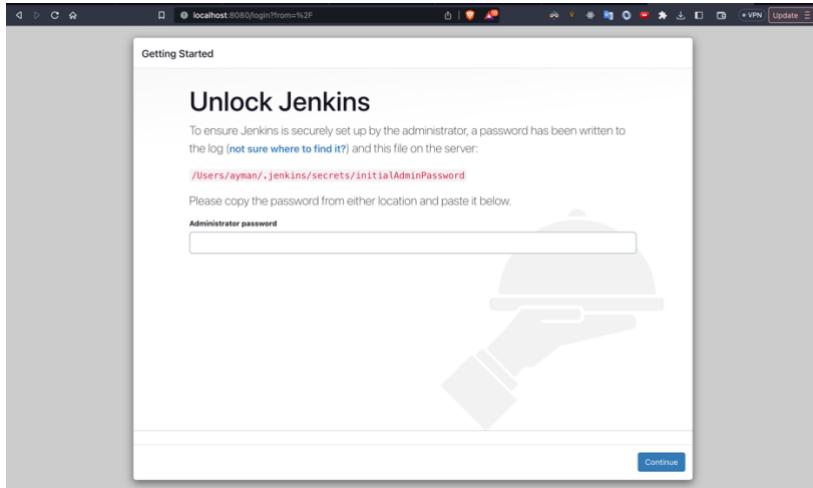
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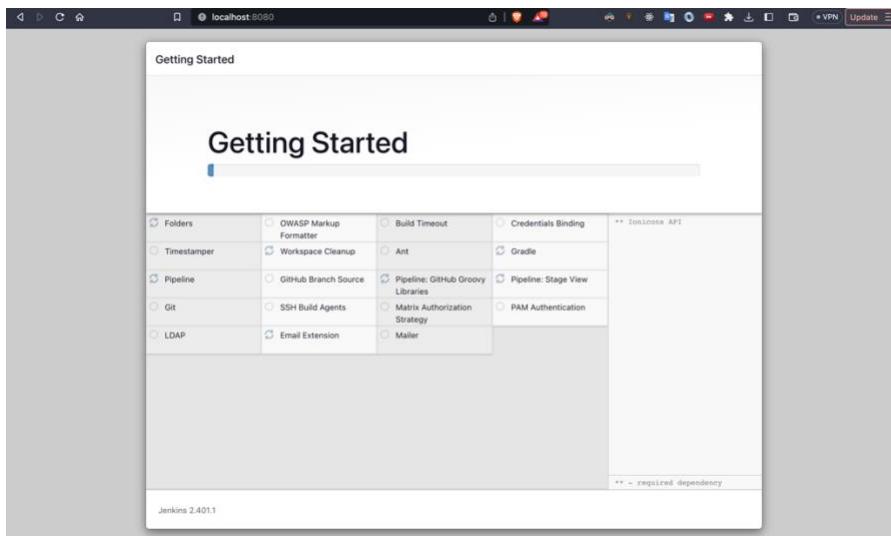
Go to port 8080, it should look like below.



Get the password from the location mentioned on the webpage and use it to unlock jenkins

```
[ayman@Aymans-MacBook-Air ~ % cat /Users/ayman/.jenkins/secrets/initialAdminPassword  
f26fc149e0754386b2799b04383677eb
```

Install all the suggested plugins



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After installing the plugins you will be redirected and will have to create an account

Create an account!

If you already have a Jenkins account, [please sign in.](#)

Username - "" is prohibited as a username for security reasons.

Full name - "" is prohibited as a full name for security reasons.

Email - Invalid e-mail address

Password - Password is required

Show

A strong password is a long password that's unique for every site. Try using a phrase with 5-6 words for the best security.

[Create account](#)

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Output:

The screenshot shows the Jenkins dashboard at localhost:8080. The top navigation bar includes links for VPN, Update, Search (⌘+K), and a user account named jennie. The dashboard features a sidebar with links for New Item, People, Build History, Manage Jenkins, and My Views. It also displays sections for the Build Queue (empty) and Build Executor Status (2 Idle). The main content area is titled "Welcome to Jenkins!" and provides instructions for starting a software project. It includes links for Create a job, Set up a distributed build, Set up an agent, Configure a cloud, and Learn more about distributed builds. At the bottom right, there are links for REST API and Jenkins 2.401.1.

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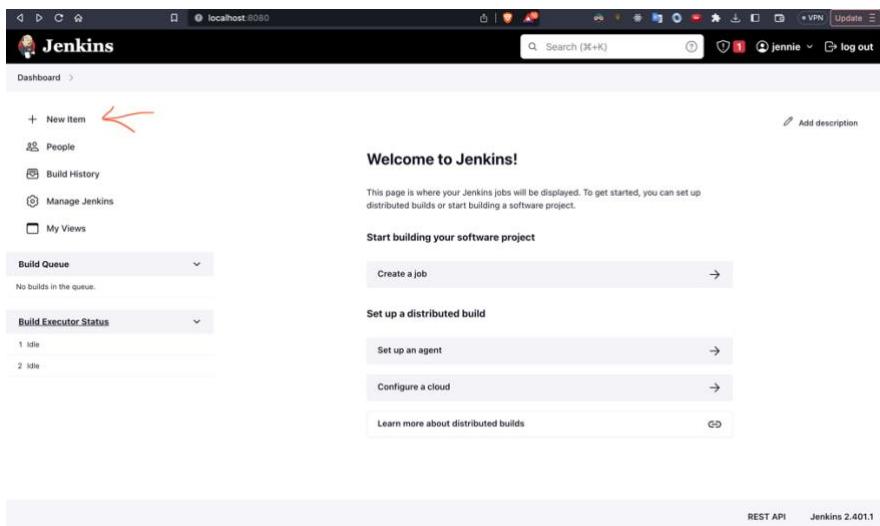
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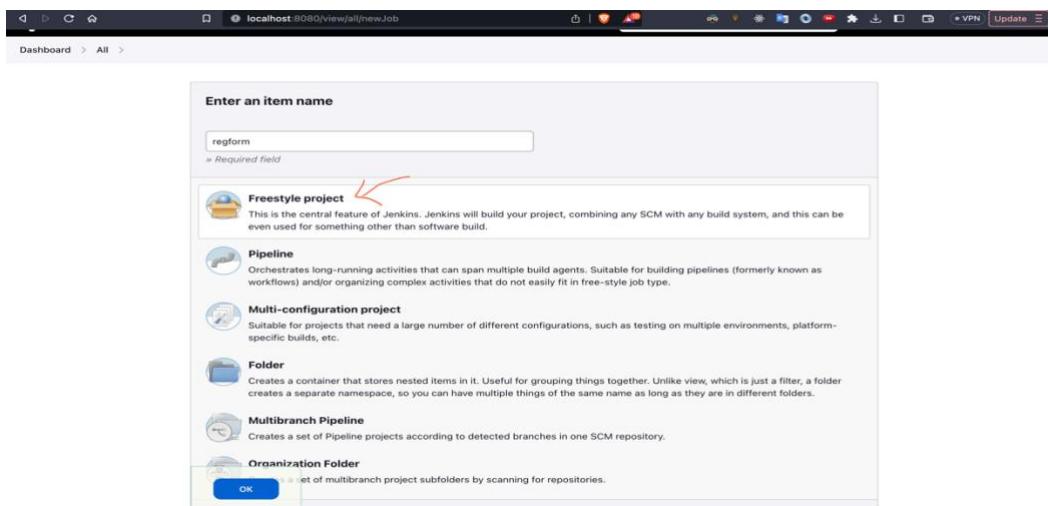
Aim: To demonstrate continuous integration and development using Jenkins

Create a new item as shown below:



The screenshot shows the Jenkins dashboard at localhost:8080. The left sidebar has a 'New Item' button with a red arrow pointing to it. The main area is titled 'Welcome to Jenkins!' with instructions to start building a software project. It includes sections for 'Create a job', 'Set up a distributed build', and 'Build Executor Status'. At the bottom right, it says 'REST API' and 'Jenkins 2.401.1'.

Enter the item name, select freestyle project and click on “OK”.



The screenshot shows the 'New Job' creation dialog at localhost:8080/view/all/newJob. It asks for an item name ('regform') and lists project types: 'Freestyle project' (highlighted with a red arrow), 'Pipeline', 'Multi-configuration project', 'Folder', 'Multibranch Pipeline', and 'Organization Folder'. A blue 'OK' button is at the bottom.

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Enter the description, select GitHub project and enter the project url

The screenshot shows a Jenkins configuration page for a job named "regform". The "General" tab is selected. The "Description" field contains "Sample form". The "GitHub project" checkbox is checked, and the "Project url" field contains "https://github.com/ayman1015/regform". Other options like "Discard old builds", "Advanced", and "Save" are also visible.

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In source code management, select git, add the repository url and change the branch to */main

Source Code Management

None

Git [?](#)

Repositories [?](#)

Repository URL [?](#)
https://github.com/ayman1015/regform/

Credentials [?](#)
- none -
[Add](#)

Advanced [▼](#)

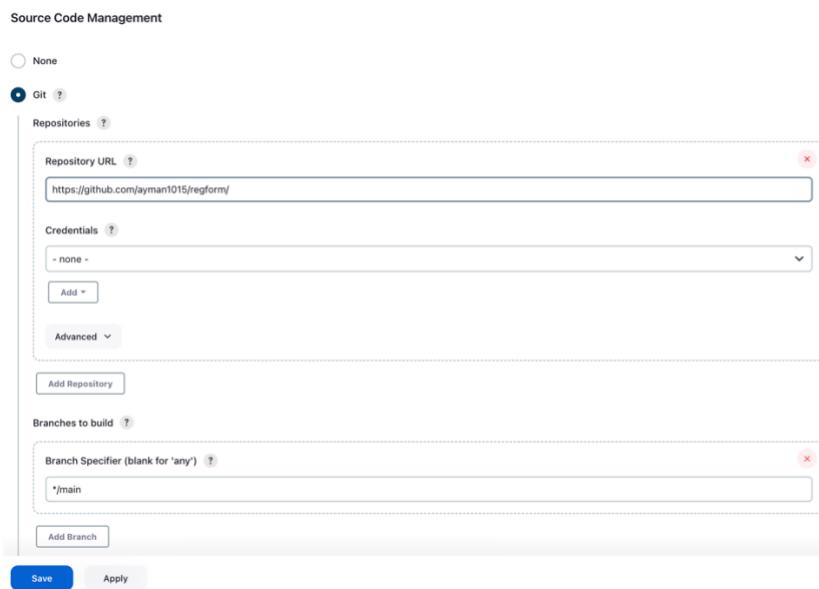
[Add Repository](#)

Branches to build [?](#)

Branch Specifier (blank for 'any') [?](#)
*/main

[Add Branch](#)

[Save](#) [Apply](#)



The result will look like this

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The screenshot shows the Jenkins Project reformat dashboard. On the left, there's a sidebar with options like Status, Changes, Workspace, Build Now, Configure, Delete Project, GitHub, and Rename. The main area is titled "Project reformat" and contains a "Sample form" section. Below it, there's a "Permalinks" section. On the right, there are buttons for "Edit description" and "Disable Project". A "Build History" section is present, showing a dropdown menu set to "trend" and a search bar with the placeholder "Filter builds...". Below the search bar, it says "No builds". At the bottom, there are links for "Atom feed for all" and "Atom feed for failures". The footer of the page includes links for "REST API" and "Jenkins 2.40.1".

After building the result is as follows:

The screenshot shows the Jenkins Build #7 details page. The top navigation bar shows "Dashboard > reformat > #7". The main content area is titled "Build #7 (21 Jun 2023, 18:55:01)" with a green checkmark icon. To the right, there are buttons for "Keep this build forever", "Add description", and "Started 5.8 sec ago Took 3 sec". The left sidebar has options like Status, Changes, Console Output, Edit Build Information, Delete build '#7', and Git Build Data. The "Changes" section indicates "No changes.". The "Console Output" section shows a single line: "Started by user jennie". The "Git Build Data" section shows a revision hash (4628bf05a2db069b3a026f2b670e5a4ab5acf45) and a repository URL (<https://github.com/ayman1015/reformat/>). A note at the bottom says "refs/remotes/origin/main".

Roll No. 20261A66

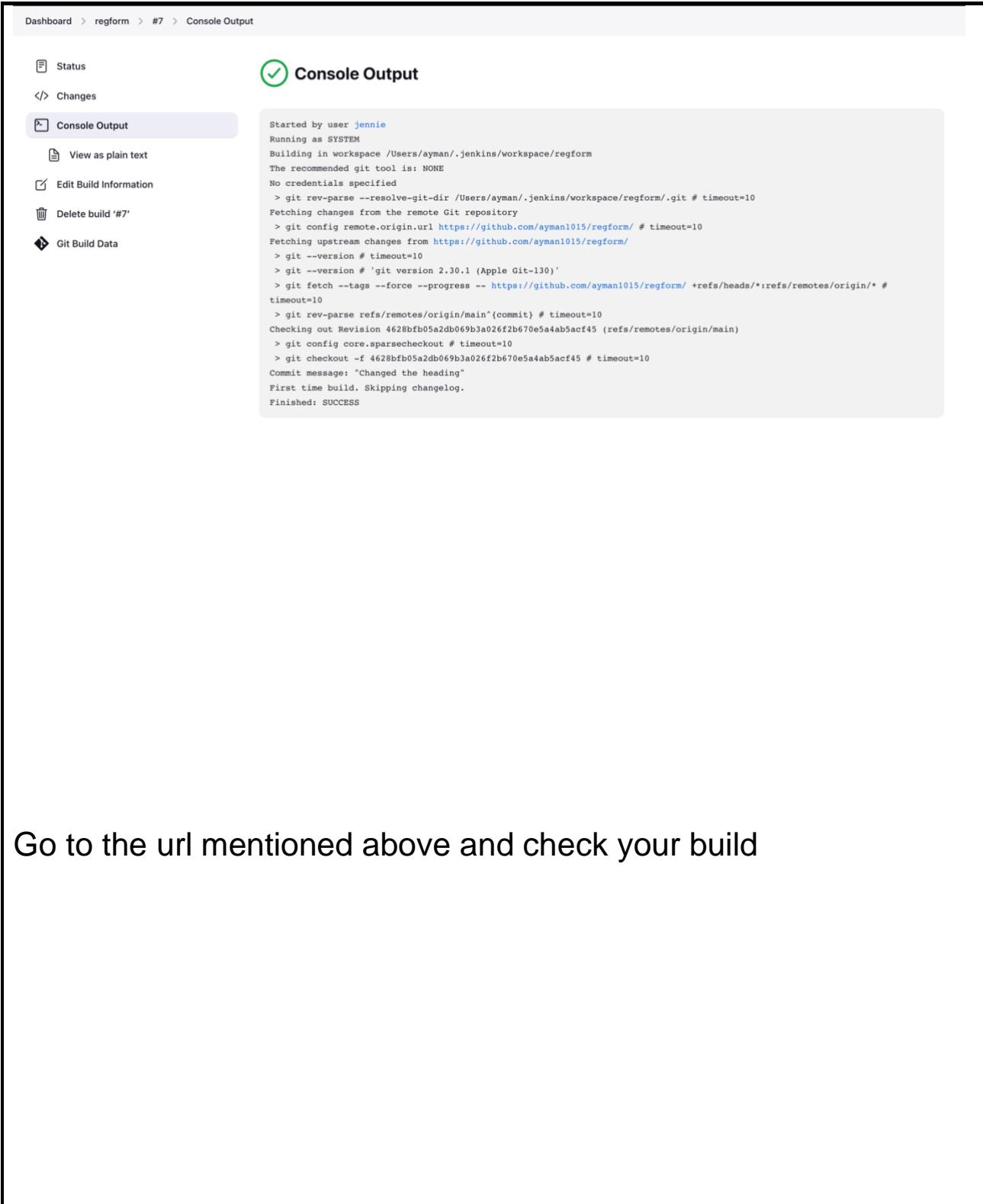
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The screenshot shows a Jenkins console output page. The URL in the address bar is `Dashboard > regform > #7 > Console Output`. On the left, there is a sidebar with links: Status, Changes, **Console Output** (which is selected and highlighted in grey), View as plain text, Edit Build Information, Delete build '#7', and Git Build Data. The main content area is titled "Console Output" with a green checkmark icon. The output text is as follows:

```
Started by user jennie
Running as SYSTEM
Building in workspace /Users/ayman/.jenkins/workspace/regform
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /Users/ayman/.jenkins/workspace/regform/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/ayman1015/regform/ # timeout=10
Fetching upstream changes from https://github.com/ayman1015/regform/
> git --version # timeout=10
> git --version # 'git version 2.30.1 (Apple Git-130)'
> git fetch --tags --force --progress -- https://github.com/ayman1015/regform/ +refs/heads/*:refs/remotes/origin/*
timeout=10
> git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision 4628bfb05a2db069b3a026f2b670e5a4ab5acf45 (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -f 4628bfb05a2db069b3a026f2b670e5a4ab5acf45 # timeout=10
Commit message: "Changed the heading"
First time build. Skipping changelog.
Finished: SUCCESS
```

Go to the url mentioned above and check your build

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The screenshot shows a web browser window with a registration form. The title of the form is "Registration form!!". The form consists of five input fields: "Enter your name", "Enter your email", "Enter your password", and "Confirm password". Below these fields is a checkbox labeled "I agree with the terms and conditions". At the bottom right of the form is a blue "Register" button. The browser's address bar shows the URL: "/Users/ayman/.jenkins/workspace/regform/regform.html". The browser interface includes a toolbar with various icons.

Registration form!!

Enter your name

Enter your email

Enter your password

Confirm password

I agree with the terms and conditions

Register

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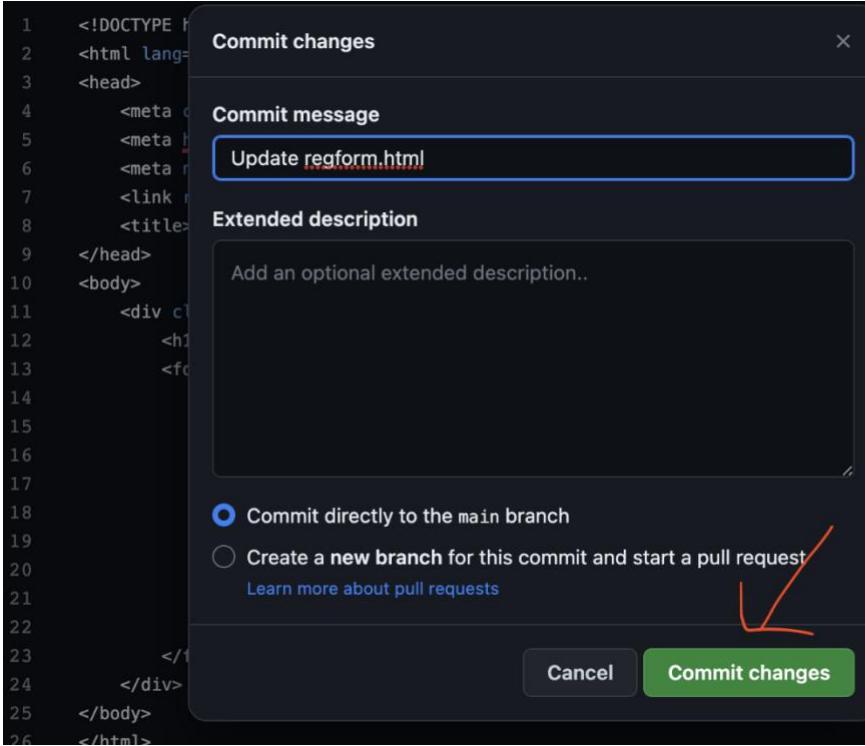
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Change the code in the github repository and commit it:

```
1  <!DOCTYPE html>
2  <html lang="en">
3  <head>
4      <meta charset="UTF-8">
5      <meta http-equiv="X-UA-Compatible" content="IE=edge">
6      <meta name="viewport" content="width=device-width, initial-scale=1.0">
7      <link rel="stylesheet" href="styles.css"/>
8      <title>Registration form</title>
9  </head>
10 <body>
11     <div class="form-container">
12         <h1>Edited Registration form!!!</h1>
13         <form action="submit.html">
14             <input type="text" placeholder="Enter your name" pattern="\w*"/>
```



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Build the project once more:

The screenshot shows a build history interface with the following details:

- Project:** Sample form
- Permalink:** [Last build](#), [Last success](#), [Last failure](#), [Last canceled](#)
- Build History:** trend ▾
 - #8** 21 Jun 2023, 19:01 (Success)
 - #7** 21 Jun 2023, 18:55 (Success)
- Atom feed for all** **Atom feed for failures**

Build #8 (21 Jun 2023, 19:01:10)

Keep this build forever

Started 24 sec ago
Took 3.4 sec

Add description

Changes
1. Update regform.html (commit: 4176ea0) ([details](#) / [githubweb](#))

Started by user [jennie](#)

git
Revision: 4176ea0150082d0a2f4f9c8578763c66793b376b
Repository: <https://github.com/ayman1015/regform/>
refs/remotes/origin/main

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Console Output

```
Started by user jennie
Running as SYSTEM
Building in workspace /Users/ayman/.jenkins/workspace/regform
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /Users/ayman/.jenkins/workspace/regform/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/ayman1015/regform/ # timeout=10
Fetching upstream changes from https://github.com/ayman1015/regform/
> git --version # timeout=10
> git --version # 'git version 2.30.1 (Apple Git-130)'
> git fetch --tags --force --progress -- https://github.com/ayman1015/regform/ +refs/heads/*:refs/remotes/origin/* # timeout=10
> git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision 4176ea0150082d0a2f4f9c8578763c66793b376b (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -f 4176ea0150082d0a2f4f9c8578763c66793b376b # timeout=10
Commit message: "Update regform.html"
> git rev-list --no-walk 4628bfb05a2db069b3a026f2b670e5a4ab5acf45 # timeout=10
Finished: SUCCESS
```

Output:



Edited Registration form!!

Enter your name

Enter your email

Enter your password

Confirm password

I agree with the terms and conditions

Register

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Aim: To explore docker commands for content management

Pull an image from docker hub.

```
[ayman@Aymans-MacBook-Air ~ % docker pull hello-world
Using default tag: latest
latest: Pulling from library/hello-world
70f5ac315c5a: Pull complete
Digest: sha256:c2e23624975516c7e27b1b25be3682a8c6c4c0cea011b791ce98aa423b5040a0
Status: Downloaded newer image for hello-world:latest
docker.io/library/hello-world:latest
ayman@Aymans-MacBook-Air ~ %
```

See all images downloaded with docker using the below command:

```
[ayman@Aymans-MacBook-Air regform % docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
regform        latest    b0c4c49d9f48  20 minutes ago  41MB
<none>          <none>   965fd7cdfd71  24 minutes ago  41MB
new-nginx       latest    ad83b17956f1  42 minutes ago  192MB
nginx          latest    2d21d843073b  7 days ago    192MB
hello-world     latest    b038788ddb22  6 weeks ago   9.14kB
```

Removing a docker image:

```
[ayman@Aymans-MacBook-Air ~ % docker rmi b0
Untagged: hello-world:latest
Untagged: hello-world@sha256:c2e23624975516c7e27b1b25be3682a8c6c4c0cea011b791ce98aa423b5040a0
Deleted: sha256:b038788ddb222cb7d6025b411759e4f5abe9910486c8f98534ead97befd77dd7
Deleted: sha256:a7866053acacfefb68912a8916b67d6847c12b51949c6b8a5580c6609c08ae45
ayman@Aymans-MacBook-Air ~ %
```

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Running a docker image / creating a docker container:

```
[ayman@Aymans-MacBook-Air ~ % docker run hello-world
Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (arm64v8)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
```

Display all running containers:

```
[ayman@Aymans-MacBook-Air ~ % docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED             STATUS              PORTS          NAMES
eaaa920f9d65   nginx      "/docker-entrypoint..."   4 seconds ago     Up 4 seconds      80/tcp        nervous_meitner
```

Stop a running container:

```
[ayman@Aymans-MacBook-Air ~ % docker stop ea
ea
[ayman@Aymans-MacBook-Air ~ % docker ps
CONTAINER ID   IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
```

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Viewing a stopped container:

```
CONTAINER ID  IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
eaaa920f9d65  nginx      "/docker-entrypoint..."  About a minute ago  Exited (0)  About a minute ago
bc592c9b05a4  hello-world  "/hello"    5 minutes ago   Exited (0)  5 minutes ago
ayman@Aymans-MacBook-Air ~ % docker rm ea
ea
ayman@Aymans-MacBook-Air ~ % docker ps -f "status=exited"

CONTAINER ID  IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
bc592c9b05a4  hello-world  "/hello"    6 minutes ago  Exited (0)  6 minutes ago
clever_grothendieck
```

Executing a command within a running container:

```
ayman@Aymans-MacBook-Air ~ % docker ps
CONTAINER ID  IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
86e49b817d35  nginx      "/docker-entrypoint..."  24 seconds ago  Up 24 seconds  80/tcp    stupefied_solomon
ayman@Aymans-MacBook-Air ~ % docker exec -it stupefied_solomon sh
[# echo "inside the container"
inside the container
[# exit
ayman@Aymans-MacBook-Air ~ %
```

Copy a file from within a docker container to local machine:

```
[ayman@Aymans-MacBook-Air ~ % docker exec -it stupefied_solomon sh
[# touch cat.txt
[# exit
[ayman@Aymans-MacBook-Air ~ % docker cp stupefied_solomon:/cat.txt .
Successfully copied 1.54kB to /Users/ayman/.
ayman@Aymans-MacBook-Air ~ %
```

Create a new image from a modified container:

```
ayman@Aymans-MacBook-Air ~ % docker commit stupefied_solomon new-nginx:latest
sha256:ad83b17956f18f023d26c13cc6514ef7a06f5def8a5f459ce1e7f829572b521
ayman@Aymans-MacBook-Air ~ % docker ps
CONTAINER ID  IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
86e49b817d35  nginx      "/docker-entrypoint..."  6 minutes ago  Up 6 minutes  80/tcp    stupefied_solomon
ayman@Aymans-MacBook-Air ~ % docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
new-nginx      latest    ad83b17956f1  6 seconds ago  192MB
nginx          latest    2d21d843073b  7 days ago   192MB
hello-world    latest    b038788ddb22  6 weeks ago   9.14kB
```

Save an image to a tar file and load it from a tar file:

```
[ayman@Aymans-MacBook-Air devops % docker save new-nginx -o new_nginx.tar
[ayman@Aymans-MacBook-Air devops % docker load -i new_nginx.tar
Loaded image: new-nginx:latest
```

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Aim: Develop a simple containerized application using docker

Create a Dockerfile

```
[ayman@Aymans-MacBook-Air project % touch Dockerfile]
```

Edit the Dockerfile to look as follows (note that you must first clone the github repository into the current one):

```
1  FROM nginx:alpine
2
3  COPY index.html /usr/share/nginx/html/
4  COPY styles.css /usr/share/nginx/html/
5  COPY submit.html /usr/shared/nginx/html
6
7  EXPOSE 80
8
9  CMD ["nginx", "-g", "daemon off;"]
```

Build the docker image

```
ayman@Aymans-MacBook-Air regform % docker build -t regform:latest .
[+] Building 11.4s (10/10) FINISHED
--> [internal] load .dockerignore
--> [internal] load context: 2B
--> [internal] load build definition from Dockerfile
--> [internal] load dockerfile: 2248
--> [internal] load metadata for docker.io/library/nginx:alpine
--> [auth] library/nginx:pull token for registry-1.docker.io
[1/4] FROM docker.io/library/nginx:alpine@sha256:2d194184b067db3598771b4cf326cfe6ad5051937ba1132b8b7d4b0184e0d0a6
--> > resolve docker.io/library/nginx:alpine@sha256:2d194184b067db3598771b4cf326cfe6ad5051937ba1132b8b7d4b0184e0d0a6 0.0s
--> > sha256:2d194184b067db3598771b4cf326cfe6ad5051937ba1132b8b7d4b0184e0d0a6 0.0s
--> > sha256:7b9f85644962bd4c0326f5d6e56ad16d6c11e000e4826054b73fc452788b 1.92MB / 1.92MB 0.0s
--> > sha256:e608c530945dd08627568f42ddaa815e3cf86f3e3fd52df1c5507d70080010f1 626B / 626B 1.4s
--> > sha256:40199b09f65752fed2a540913a037a7a2c3120bd9d4cf20e7d85caafa66381d8 1.99kB / 1.99kB 0.0s
--> > sha256:66bf2c914bf4d0aac4b62f409f9f74ad35898d13024a0f2ec94dc9e79fac6ea 16.71kB / 16.71kB 0.0s
--> > sha256:edb6bbabce93be93e930669f43e2e922c8594676aa342a70e221361fd1914d 3.26MB / 3.26MB 0.0s
--> > sha256:a31273f49e643a2139695da7981a83d9538d2ca4240233e927fc7346e9561bd4 957B / 957B 1.7s
--> > sha256:4fbf2e3beac832ec0beb01f066dc3e0046c2009affc2b4a8fdee1cec88d780af 365B / 365B 1.3s
--> > sha256:467b5f1f71f74c9d74015627b2051d84bf4f6bc6d20a6f836c0fd1f4542daf7d 1.21kB / 1.21kB 1.6s
--> > sha256:3d6c132398b370728f1a817cb57d829e9b8a4d4780df604b6705ba70ee26bc 1.40kB / 1.40kB 1.7s
--> > extracting sha256:edb6bbabce93be93e930669f43e2e922c8594676aa342a70e221361fd1914d 0.0s
--> > sha256:fca8748d6c5b612c44f7befb8aed1f463545281aecc58d153e2006d9b0dac0ec 11.15MB / 11.15MB 0.0s
--> > extracting sha256:e608c530945dd08627568f42dd0a15e3cf86f3e3fd52df1c5507d70080010f1 0.0s
--> > extracting sha256:a31273f49e643a2139695da7981a83d9538d2ca4240233e927fc7346e9561bd4 0.0s
--> > extracting sha256:4fbf2e3beac832ec0beb01f066dc3e0046c2009affc2b4a8fdee1cec88d780af 0.0s
--> > extracting sha256:467b5f1f71f74c9d74015627b2051d84bf4f6bc6d20a6f836c0fd1f4542daf7d 0.0s
--> > extracting sha256:3d6c132398b370728f1a817cb557dd829e9b8a44a780df604b6705ba70ee26bc 0.0s
--> > extracting sha256:fca8748d6c5b612c44f7befb8aed1f463545281aecc58d153e2006d9b0dac0ec 0.0s
--> [internal] load build context 0.0s
--> transferring context: 2.35kB 0.0s
--> [2/4] COPY regform.html /usr/share/nginx/html/ 0.1s
--> [3/4] COPY styles.css /usr/share/nginx/html/ 0.0s
--> [4/4] COPY submit.html /usr/shared/nginx/html/ 0.0s
--> exporting to image 0.0s
--> > writing image sha256:965fd7cdfd71dd8b591340bfb13f8b9189be245789a9d39244079ab06e4ce490 0.0s
--> > naming to docker.io/library/regform:latest 0.0s
```

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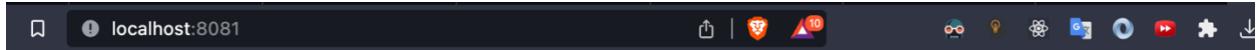
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Run the docker image

```
[ayman@Aymans-MacBook-Air regform % docker run -p 8081:80 regform
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2023/06/21 14:18:31 [notice] 1#1: using the "epoll" event method
2023/06/21 14:18:31 [notice] 1#1: nginx/1.25.1
2023/06/21 14:18:31 [notice] 1#1: built by gcc 12.2.1 20220924 (Alpine 12.2.1_git20220924-r4)
2023/06/21 14:18:31 [notice] 1#1: OS: Linux 5.15.49-linuxkit-pr
2023/06/21 14:18:31 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/06/21 14:18:31 [notice] 1#1: start worker processes
2023/06/21 14:18:31 [notice] 1#1: start worker process 30
2023/06/21 14:18:31 [notice] 1#1: start worker process 31
2023/06/21 14:18:31 [notice] 1#1: start worker process 32
2023/06/21 14:18:31 [notice] 1#1: start worker process 33
```

Output:



Edited Registration form!!

Enter your name

Enter your email

Enter your password

Confirm password

I agree with the terms and conditions

Register

Laboratory Record Of

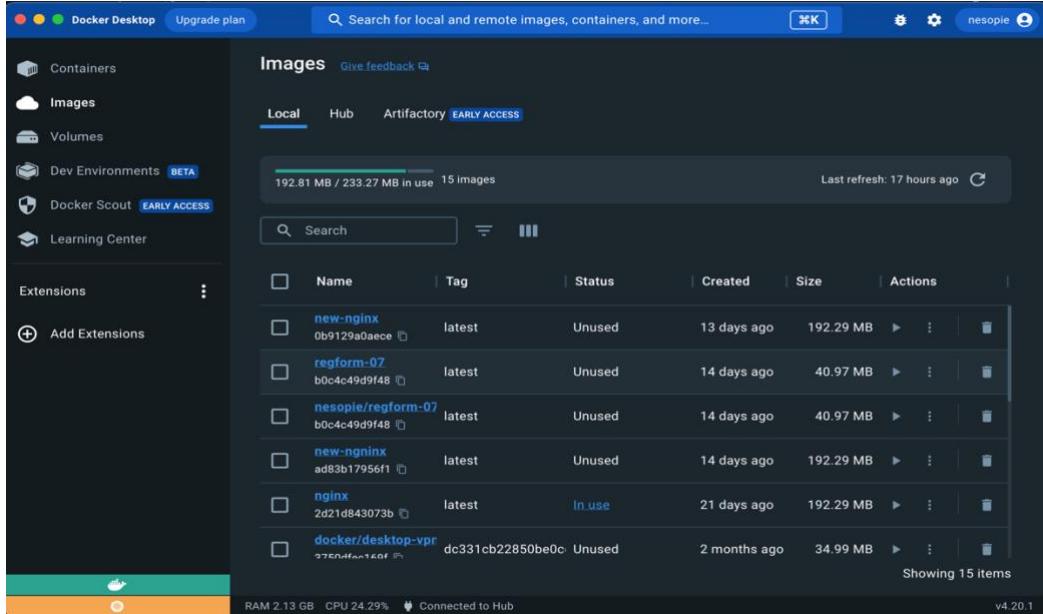
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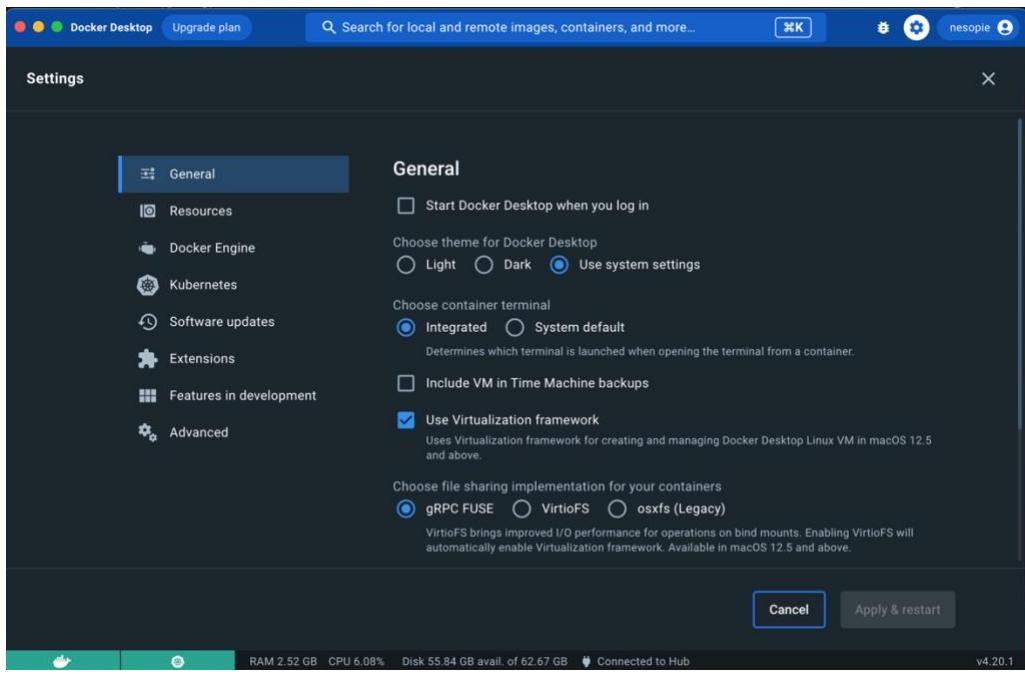
Date _____

Aim: Integrate docker and Kubernetes

Open docker desktop



Go to settings:



Roll No. _20261A66_____

MGIT

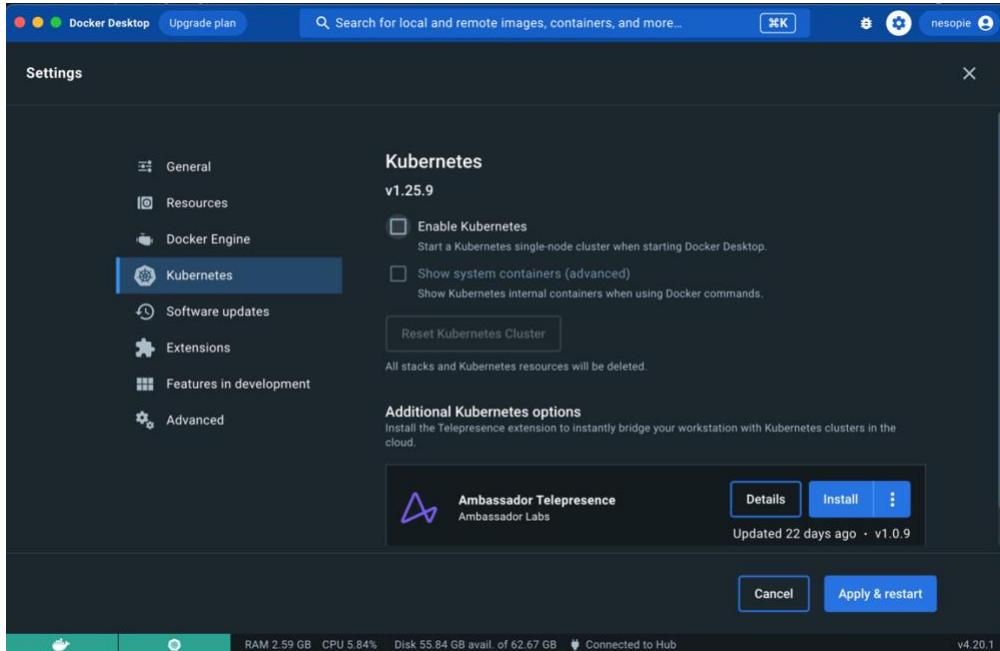
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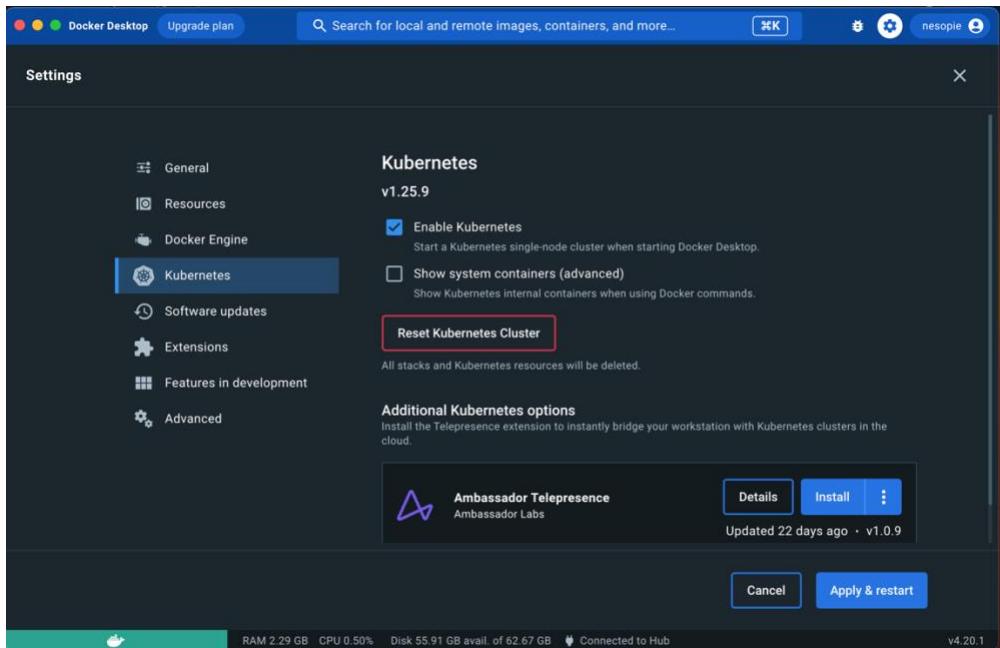
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Select kubernetes



Check the button which says: Enable kubernetes



Roll No. _20261A66_____

MGIT

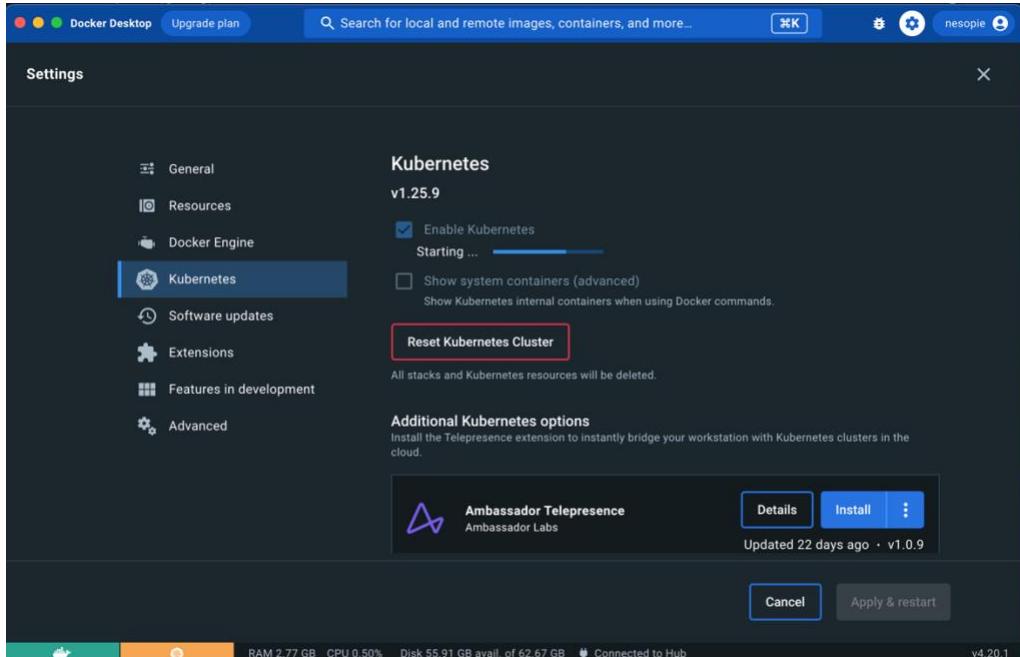
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Click on apply and restart



Verify whether Kubernetes is running using the following command

```
ayman@Aymans-MacBook-Air ~ % kubectl cluster-info
```

Output:

```
ayman@Aymans-MacBook-Air ~ % kubectl cluster-info
Kubernetes control plane is running at https://kubernetes.docker.internal:6443
CoreDNS is running at https://kubernetes.docker.internal:6443/api/v1/namespaces/kube-system/services/kube-dns:dns/proxy
To further debug and diagnose cluster problems, use 'kubectl cluster-info dump'.
```

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Aim: Automate the process of running containerized application developed in exercise 7 using Kubernetes

Build the docker image:

```
[ayman@Aymans-MacBook-Air regform % docker build -t nesopie/regform-07 .
[+] Building 4.0s (10/10) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 222B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/nginx:alpine
=> [auth] library/nginx:pull token for registry-1.docker.io
=> [1/4] FROM docker.io/library/nginx:alpine@sha256:2d194184b067db3598771b4cf326cf6ad5051937ba1132b8b7d4b0184e0d0a6
=> [internal] load build context
=> => transferring context: 93B
=> CACHED [2/4] COPY index.html /usr/share/nginx/html/
=> CACHED [3/4] COPY styles.css /usr/share/nginx/html/
=> CACHED [4/4] COPY submit.html /usr/shared/nginx/html
=> exporting to image
=> => exporting layers
=> => writing image sha256:b0c4c49d9f483fbcaed82346814a27e8853d28a0d48c03d09065811c3a85ef
=> => naming to docker.io/nesopie/regform-07
ayman@Aymans-MacBook-Air regform %
```

Push it to docker hub (make sure you have an account)

```
[ayman@Aymans-MacBook-Air regform % docker push nesopie/regform-07
Using default tag: latest
The push refers to repository [docker.io/nesopie/regform-07]
63d736f8f75a: Pushed
ebda5a6839b6: Pushed
c68ccceb49686: Pushed
0348644449af: Mounted from library/nginx
4b56765b6b5e: Mounted from library/nginx
65bc30a63225: Mounted from library/nginx
6be1b85707bc: Mounted from library/nginx
1eb3501d2fb4: Mounted from library/nginx
81d1bb17d85e: Mounted from library/nginx
5079ade1f5c9: Mounted from library/nginx
9386262d7a74: Mounted from library/nginx
latest: digest: sha256:4a5629cdcb8ed0eae3672e7d2a5d72abc3de0c668451759d83111880006d721e size: 2610
ayman@Aymans-MacBook-Air regform %
```

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Create a infra/k8s folder and put client.yaml in it with the following code:

```
infra > k8s > ! client-depl.yaml
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: client-depl
5  spec:
6    replicas: 1
7    selector:
8      matchLabels:
9        app: client
10   template:
11     metadata:
12       labels:
13         app: client
14     spec:
15       containers:
16         - name: client
17           image: nesopie/regform-07
18 ---
19 apiVersion: v1
20 kind: Service
21 metadata:
22   name: client-srv
23 spec:
24   type: NodePort
25   selector:
26     app: client
27   ports:
28     - name: client
29       protocol: TCP
30       port: 3000
31       targetPort: 80
```

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Create the deployment:

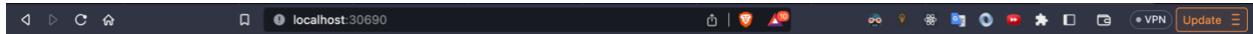
```
[ayman@Aymans-MacBook-Air k8s % kubectl apply -f client.yaml
deployment.apps/client-depl created
service/client-srv created]
```

Check the pods and services:

```
[ayman@Aymans-MacBook-Air k8s % kubectl get pods
NAME                  READY   STATUS    RESTARTS   AGE
client-depl-6cb6b68fc-bfzhh  1/1     Running   0          7m39s
[ayman@Aymans-MacBook-Air k8s % kubectl get services
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)      AGE
client-srv  NodePort  10.105.152.97  <none>           3000:30690/TCP  23m
kubernetes  ClusterIP  10.96.0.1    <none>           443/TCP       27m
```

Output:

Get the target port from client-srv and access that port:



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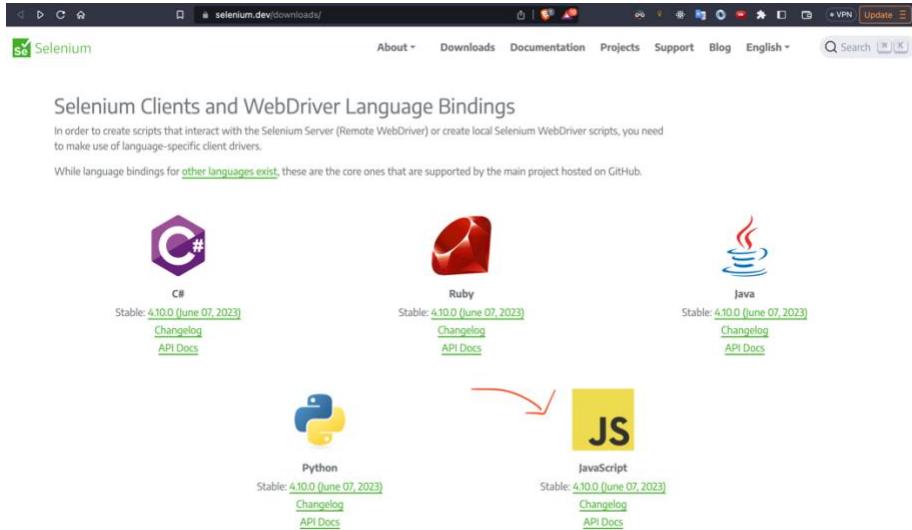
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Aim: Install and explore Selenium for automated testing.

Go to selenium.dev and install the stable JS version for Selenium.



Create a folder and run npm init to initialize the folder and create package.json.

```
ayman@Aymans-MacBook-Air selenium_lab % npm init -y
Wrote to /Users/ayman/selenium_lab/package.json:
```

```
{
  "name": "selenium_lab",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \\\"Error: no test specified\\\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC"
}
```

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Install the selenium package.

```
[ayman@Aymans-MacBook-Air selenium_lab % npm install selenium-webdriver
added 27 packages, and audited 28 packages in 2s
2 packages are looking for funding
  run `npm fund` for details
found 0 vulnerabilities
```

In the npm documentation of selenium, install the webdriver for the browser of your choice.

Browser	Component
Chrome	chromedriver(.exe)
Internet Explorer	IEDriverServer.exe
Edge	MicrosoftWebDriver.msi
Firefox	geckodriver(.exe)
Opera	operadriver(.exe)
Safari	safaridriver

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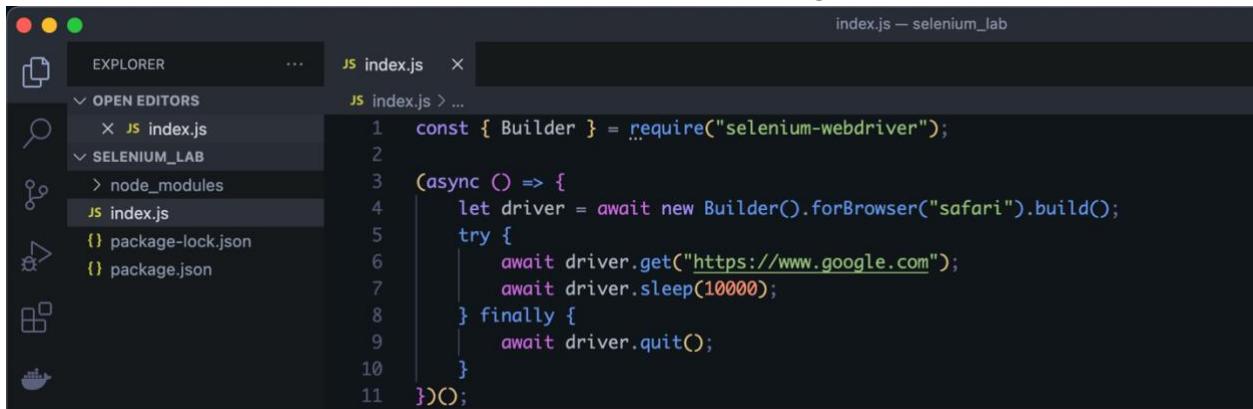
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Enable the safaridriver

```
[ayman@Aymans-MacBook-Air selenium_lab % safaridriver --enable  
[Password:
```

Create an index.js file and add the following code in it:



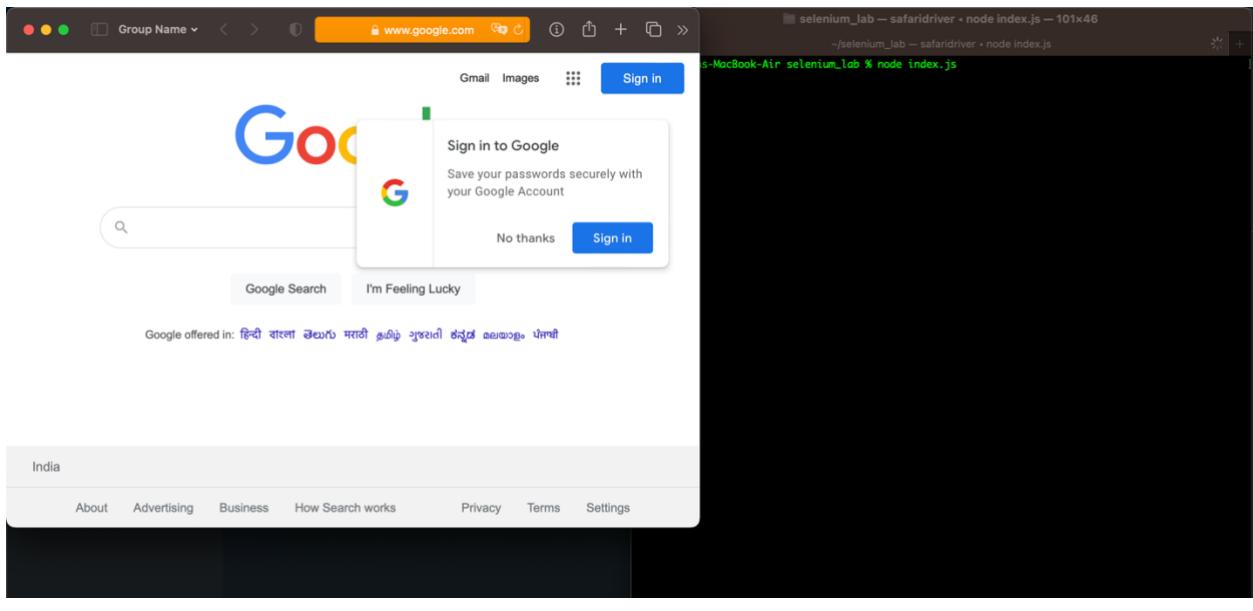
A screenshot of the Visual Studio Code interface. The left sidebar shows a file tree with 'OPEN EDITORS' containing 'index.js'. Below it is a folder named 'SELENIUM_LAB' which contains 'node_modules', 'index.js', 'package-lock.json', and 'package.json'. The main editor area is titled 'index.js — selenium_lab' and contains the following JavaScript code:

```
const { Builder } = require("selenium-webdriver");
(async () => {
  let driver = await new Builder().forBrowser("safari").build();
  try {
    await driver.get("https://www.google.com");
    await driver.sleep(10000);
  } finally {
    await driver.quit();
}
```

Run the file:

```
ayman@Aymans-MacBook-Air selenium_lab % node index.js
```

Output:



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Aim: Write a simple program in JavaScript and perform testing using Selenium

Create a folder and run npm init to initialize the folder and create package.json.

```
ayman@Aymans-MacBook-Air selenium_lab % npm init -y
Wrote to /Users/ayman/selenium_lab/package.json:
```

```
{
  "name": "selenium_lab",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \\\"Error: no test specified\\\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC"
}
```

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Create a html webpage as shown in the next page:

```
index.html > html > body > script
1  <!DOCTYPE html>
2  <html lang="en">
3      <head>
4          <meta charset="UTF-8" />
5          <meta
6              http-equiv="X-UA-Compatible"
7              content="IE=edge"
8          />
9          <meta
10             name="viewport"
11             content="width=device-width, initial-scale=1.0"
12         />
13         <link
14             rel="stylesheet"
15             href="styles.css"
16         />
17         <title>Simple Calculator</title>
18     </head>
19     <body>
20         <div class="form-container">
21             <input
22                 id="num-1"
23                 type="number"
24                 placeholder="Enter num1"
25             />
26             <input
27                 id="num-2"
28                 type="number"
29                 placeholder="Enter num2"
30             />
31             <button
32                 type="submit"
33                 onclick="addnumbers()"
34             >
35                 Add
36             </button>
37             <div id="result">Result:</div>
38         </div>
39         <script>
40             const addnumbers = function () {
41                 const num1 = +document.querySelector("#num-1").value;
42                 const num2 = +document.querySelector("#num-2").value;
43                 document.querySelector("#result").innerText =
44                     "Result: " + (num1 + num2);
45             };
46         </script>
47     </body>
48 </html>
49
```

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Install selenium-webdriver and jest

```
ayman@Aymans-MacBook-Air selenium_lab % npm install selenium-webdriver jest
added 269 packages, and audited 297 packages in 14s

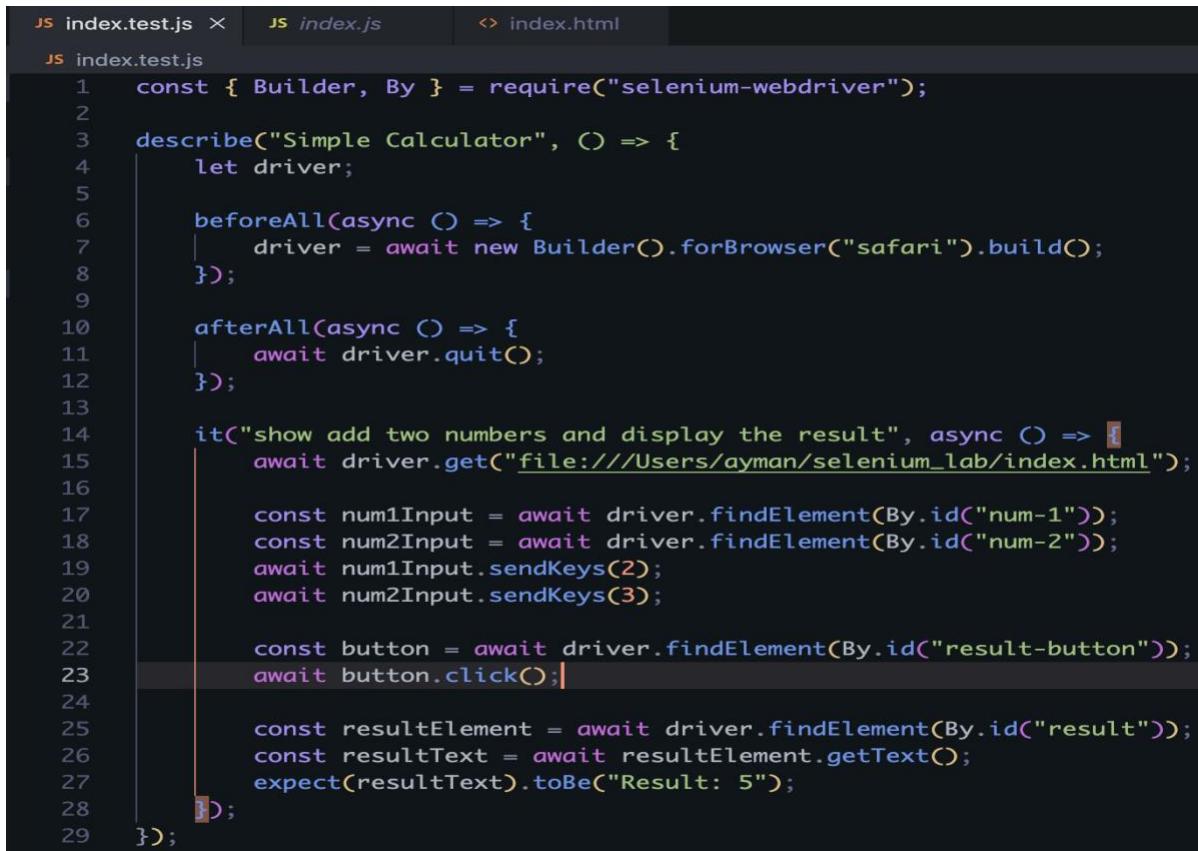
[32 packages are looking for funding
 [ run `npm fund` for details

20 moderate severity vulnerabilities

To address all issues, run:
  npm audit fix

Run `npm audit` for details.
```

Add the following code in index.test.js



The screenshot shows a code editor with three tabs at the top: 'index.test.js', 'index.js', and 'index.html'. The 'index.test.js' tab is active, displaying the following Jest test code:

```
JS index.test.js × JS index.js < index.html
JS index.test.js
1 const { Builder, By } = require("selenium-webdriver");
2
3 describe("Simple Calculator", () => {
4   let driver;
5
6   beforeAll(async () => {
7     driver = await new Builder().forBrowser("safari").build();
8   });
9
10  afterAll(async () => {
11    await driver.quit();
12  });
13
14  it("show add two numbers and display the result", async () => {
15    await driver.get("file:///Users/ayman/selenium_lab/index.html");
16
17    const num1Input = await driver.findElement(By.id("num-1"));
18    const num2Input = await driver.findElement(By.id("num-2"));
19    await num1Input.sendKeys(2);
20    await num2Input.sendKeys(3);
21
22    const button = await driver.findElement(By.id("result-button"));
23    await button.click();
24
25    const resultElement = await driver.findElement(By.id("result"));
26    const resultText = await resultElement.getText();
27    expect(resultText).toBe("Result: 5");
28  });
29});
```

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Change the test script in package.json to be as follows:

```
js index.test.js    {} package.json X  < index.html
{} package.json > {} scripts > test
1  {
2    "name": "selenium_lab",
3    "version": "1.0.0",
4    "description": "",
5    "main": "index.js",
6    ▷ Debug
7    "scripts": {
8      "test": "jest index.test.js"
9    },
10   "keywords": [],
11   "author": "",
12   "license": "ISC",
13   "dependencies": {
14     "jest": "^29.5.0",
15     "selenium-webdriver": "^4.10.0"
16   }
}
```

Run the test:

```
ayman@Aymans-MacBook-Air selenium_lab % npm run test
```

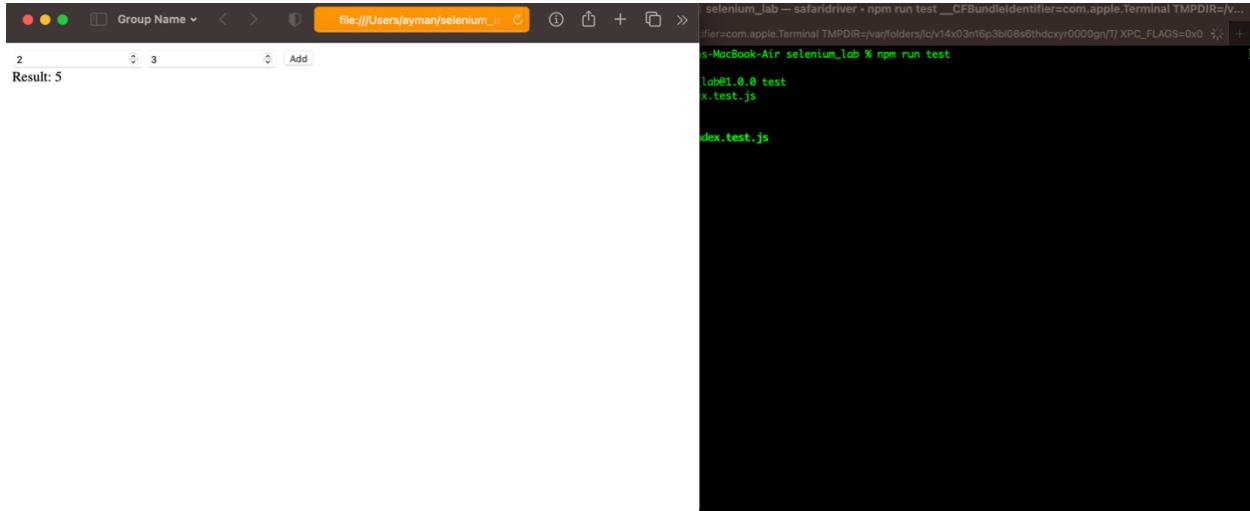
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Output:



```
selenium_lab — safaridriver • npm run test __CFBundleIdentifier=com.apple.Terminal TMPDIR=/v...  
file:///Users/ayman/selenium_lab  
2 3 Add  
Result: 5  
s-MacBook-Air selenium_lab % npm run test  
lab@1.0.0 test  
x.test.js  
index.test.js
```

```
[ayman@Aymans-MacBook-Air selenium_lab % npm run test  
  
> selenium_lab@1.0.0 test  
> jest index.test.js  
  
PASS ./index.test.js  
Simple Calculator  
✓ show add two numbers and display the result (195 ms)  
  
Test Suites: 1 passed, 1 total  
Tests: 1 passed, 1 total  
Snapshots: 0 total  
Time: 1.451 s, estimated 7 s  
Ran all test suites matching /index.test.js/i.  
ayman@Aymans-MacBook-Air selenium_lab % ]
```

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Aim : Develop test cases for the above containerized application using selenium:

Add a script to your application so that it performs basic validation to your input fields.

```
59 |     <script>
60 |         const form = document.querySelector("#registrationForm");
61 |         const nameInput = document.querySelector("#name");
62 |         const emailInput = document.querySelector("#email");
63 |         const passwordInput = document.querySelector("#password");
64 |         const confirmPasswordInput =
65 |             document.querySelector("#confirmPassword");
66 |         const agreeCheckbox = document.querySelector("#agreeCheckbox");
67 |         const errorMessage = document.querySelector("#errorMessage");
68 |
69 |         form.addEventListener("submit", function (event) {
70 |             console.log("hi");
71 |             event.preventDefault();
72 |
73 |             errorMessage.textContent = "";
74 |
75 |             if (
76 |                 !nameInput.value ||
77 |                 !emailInput.value ||
78 |                 !passwordInput.value ||
79 |                 !confirmPasswordInput.value ||
80 |                 !agreeCheckbox.checked
81 |             ) {
82 |                 errorMessage.textContent =
83 |                     "Please fill in all fields and agree to the terms and conditions.";
84 |                 setTimeout(() => {
85 |                     errorMessage.textContent = "";
86 |                 }, 5000);
87 |                 return;
88 |             }
89 |
90 |             form.submit();
91 |         });
92 |     </script>
```

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Build the docker image and run it using the dockerfile created in experiment 7

```
ayman@Aymans-MacBook-Air regform % docker build -t nesopie/regform-07 .
[+] Building 4.0s (10/10) FINISHED
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 2228
=> [internal] load metadata for docker.io/library/nginx:alpine
=> [auth] library/nginx:pull token for registry-1.docker.io
=> CACHED [1/4] FROM docker.io/library/nginx@sha256:2d194184b067db3598771b4cf326cfe6ad5051937ba1132b8b7d4b0184e0d0a6
=> [internal] load build context
=> => transferring context: 3.17kB
=> [2/4] COPY index.html /usr/share/nginx/html/
=> [3/4] COPY styles.css /usr/share/nginx/html/
=> [4/4] COPY submit.html /usr/shared/nginx/html
=> exporting to image
=> => exporting layers
=> => writing image sha256:8c7d45d2fcf96ff209f4ae7dfe8361268f98a7611f4c1a0d40c64598c3e2bc2
=> => naming to docker.io/nnesopie/regform-07
```

Run the docker image:

```
ayman@Aymans-MacBook-Air regform % docker run -p 8082:80 nesopie/regform-07
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2023/07/05 08:19:43 [notice] 1#1: using the "epoll" event method
2023/07/05 08:19:43 [notice] 1#1: nginx/1.25.1
2023/07/05 08:19:43 [notice] 1#1: built by gcc 12.2.1 20220924 (Alpine 12.2.1_git20220924-r4)
2023/07/05 08:19:43 [notice] 1#1: OS: Linux 5.15.49-linuxkit-pr
2023/07/05 08:19:43 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/07/05 08:19:43 [notice] 1#1: start worker processes
2023/07/05 08:19:43 [notice] 1#1: start worker process 30
2023/07/05 08:19:43 [notice] 1#1: start worker process 31
2023/07/05 08:19:43 [notice] 1#1: start worker process 32
2023/07/05 08:19:43 [notice] 1#1: start worker process 33
```

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Initialise the npm repository and install selenium-webdriver and jest.

```
ayman@Aymans-MacBook-Air regform % npm init -y && npm install selenium-webdriver jest
Wrote to /Users/ayman/devops/project/regform/package.json:

{
  "name": "regform",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC"
}

added 296 packages, and audited 297 packages in 17s

32 packages are looking for funding
  run `npm fund` for details

20 moderate severity vulnerabilities

To address all issues, run:
  npm audit fix

Run `npm audit` for details.
ayman@Aymans-MacBook-Air ~%
```

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Create index.test.js and add the following code in it:

```
1 const { Builder, By } = require("selenium-webdriver");
2
3 describe("Registration Form Validation", () => {
4     let driver;
5
6     beforeAll(async () => {
7         driver = await new Builder().forBrowser("safari").build();
8     });
9
10    afterAll(async () => {
11        await driver.quit();
12    });
13
14    beforeEach(async () => {
15        await driver.get("http://localhost:8082");
16
17        const emailInput = await driver.findElement(By.id("email"));
18        await emailInput.sendKeys("test@example.com");
19
20        const confirmPasswordInput = await driver.findElement(
21            By.id("confirmPassword")
22        );
23        await confirmPasswordInput.sendKeys("password");
24
25        const consentCheckbox = await driver.findElement(
26            By.id("agreeCheckbox")
27        );
28        await consentCheckbox.click();
29    });
30}
```

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```
31     test("Should display error message if username field is empty", async () => {
32       await driver
33         .findElement(By.id("password"))
34         .then(
35           async (passwordInput) =>
36             await passwordInput.sendKeys("password")
37         );
38       const usernameInput = await driver.findElement(By.id("name"));
39       await usernameInput.sendKeys("");
40
41       const button = await driver.findElement(By.css("button"));
42       await button.click();
43
44       const errorMessage = await driver.findElement(By.id("errorMessage"));
45       const errorMessageText = await errorMessage.getText();
46
47       expect(errorMessageText).toBe(
48         "Please fill in all fields and agree to the terms and conditions."
49       );
50     });
51
52     test("Should display error message if password field is empty", async () => {
53       await driver
54         .findElement(By.id("name"))
55         .then(async (nameInput) => await nameInput.sendKeys("name"));
56       const passwordInput = await driver.findElement(By.id("password"));
57       await passwordInput.sendKeys("");
58
59       const button = await driver.findElement(By.css("button"));
60       await button.click();
61
62       const errorMessage = await driver.findElement(By.id("errorMessage"));
63       const errorMessageText = await errorMessage.getText();
64
65       expect(errorMessageText).toBe(
66         "Please fill in all fields and agree to the terms and conditions."
67       );
68     });
69   });

```

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Go to package.json and change the test script to be as follows:

```
1  {
2      "name": "regform",
3      "version": "1.0.0",
4      "description": "",
5      "main": "index.js",
6      "scripts": {
7          "test": "jest index.test.js"
8      },

```

Run the following in the terminal:

```
[ayman@Aymans-MacBook-Air regform % npm run test
```

Output:

```
[ayman@Aymans-MacBook-Air regform % npm run test

> regform@1.0.0 test
> jest index.test.js

PASS  ./index.test.js
  Registration Form Validation
    ✓ Should display error message if username field is empty (532 ms)
    ✓ Should display error message if password field is empty (246 ms)

Test Suites: 1 passed, 1 total
Tests:       2 passed, 2 total
Snapshots:   0 total
Time:        2.266 s, estimated 7 s
Ran all test suites matching /index.test.js/i.
```

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