

# CLOUD COMPUTING ASSIGNMENT

## JENKINS/GIT

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## Assignment 4(a)- Jenkins(Creating a DevOps Pipeline, CI/CD tool)

### Task-1

```
Last login: Sat Mar 9 24:16:57 on ttys000
(base) sirigowrinh@PES1UG21CS599 ~ % docker run -p 8890:8080 -p 50000:50000 -it jenkins:PES1UG21CS599
Running from: /usr/share/jenkins/jenkins.war
webroot: /var/jenkins_home/war
2024-03-09 09:02:02.847+0000 [id=1]     INFO   winstone.Logger$logInternal: Beginning extraction from war file
2024-03-09 09:02:04.071+0000 [id=1]     WARNING o.e.j.s.handler.ContextHandler#setContextPath: Empty contextPath
2024-03-09 09:02:04.071+0000 [id=1]     INFO   org.eclipse.jetty.util.log: Logging with Jetty 17.0.10+0.10.0-27701:09:58:248Z; git: b548fd9bf4cd8d0888f626b405fd47634415a46b7; jvm 17.0.10+7
2024-03-09 09:02:04.204+0000 [id=1]     INFO   o.e.j.s.StandardDescriptorProcessor#visitServlet: No JSP Support for /, did not find org.eclipse.jetty.jsp.JspServlet
2024-03-09 09:02:04.327+0000 [id=1]     INFO   o.e.j.s.i.DefaultSessionInitManager#doStart: Session workerName=nod0
2024-03-09 09:02:04.674+0000 [id=1]     INFO   hudson.WebAppMain#contextInitialized: Jenkins home directory: /var/jenkins_home found at: EnvVars.masterEnvVars.get("JENKINS_HOME")
2024-03-09 09:02:04.674+0000 [id=1]     INFO   o.e.j.server.AbstractConnector#doStart: Started ServerConnector@78365cfa[HTTP/1.1, ((http/1.1))@0.0.0.0:8080]
2024-03-09 09:02:04.675+0000 [id=1]     INFO   org.eclipse.jetty.util.log: Logging with Jetty 17.0.10+0.10.0-27701:09:58:248Z; git: b548fd9bf4cd8d0888f626b405fd47634415a46b7; jvm 17.0.10+7
2024-03-09 09:02:04.708+0000 [id=27]    INFO   winstone.Logger$logInternal: Winstone Servlet Engine running: controlPort=disabled
2024-03-09 09:02:04.829+0000 [id=34]    INFO   jenkins.InitReactorRunner$1#onAttained: Started initialization
2024-03-09 09:02:04.844+0000 [id=35]    INFO   jenkins.InitReactorRunner$1#onAttained: Listed all plugins
2024-03-09 09:02:05.267+0000 [id=36]    INFO   jenkins.InitReactorRunner$1#onAttained: Prepared all plugins
2024-03-09 09:02:05.279+0000 [id=39]    INFO   jenkins.InitReactorRunner$1#onAttained: Started all plugins
2024-03-09 09:02:05.302+0000 [id=40]    INFO   jenkins.util.PluginManager#load: Loaded bundled extensions
2024-03-09 09:02:05.389+0000 [id=33]    INFO   jenkins.InitReactorRunner$1#onAttained: System config added
2024-03-09 09:02:05.389+0000 [id=35]    INFO   jenkins.InitReactorRunner$1#onAttained: System config adapted
2024-03-09 09:02:05.389+0000 [id=35]    INFO   jenkins.InitReactorRunner$1#onAttained: Loaded all jobs
2024-03-09 09:02:05.399+0000 [id=37]    INFO   jenkins.InitReactorRunner$1#onAttained: Configuration for all jobs updated
2024-03-09 09:02:05.448+0000 [id=52]    INFO   hudson.util.Retrier#start: Attempt #1 to do the action check updates server
2024-03-09 09:02:05.736+0000 [id=37]    INFO   jenkins.Install.SetupWizardInit:
*****
*****  

*****  

*****  

*****  

****

Jenkins initial setup is required. An admin user has been created and a password generated.  

Please use the following password to proceed to installation:  

3c4f5977bad14969b595931d899f49eb

This may also be found at: /var/jenkins_home/secrets/initialAdminPassword
*****
*****  

*****  

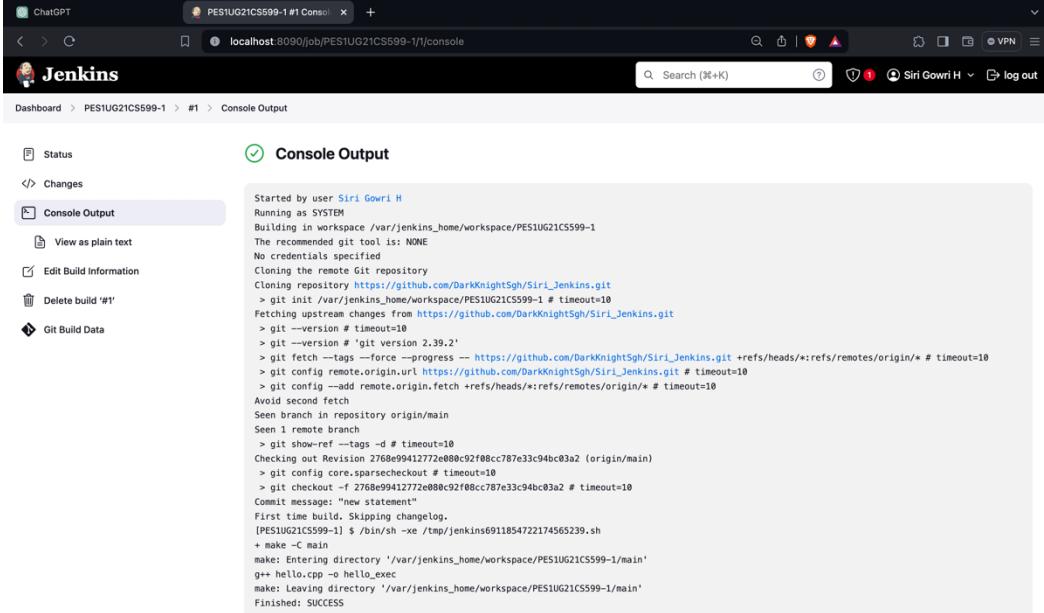
*****  

*****  

*****  

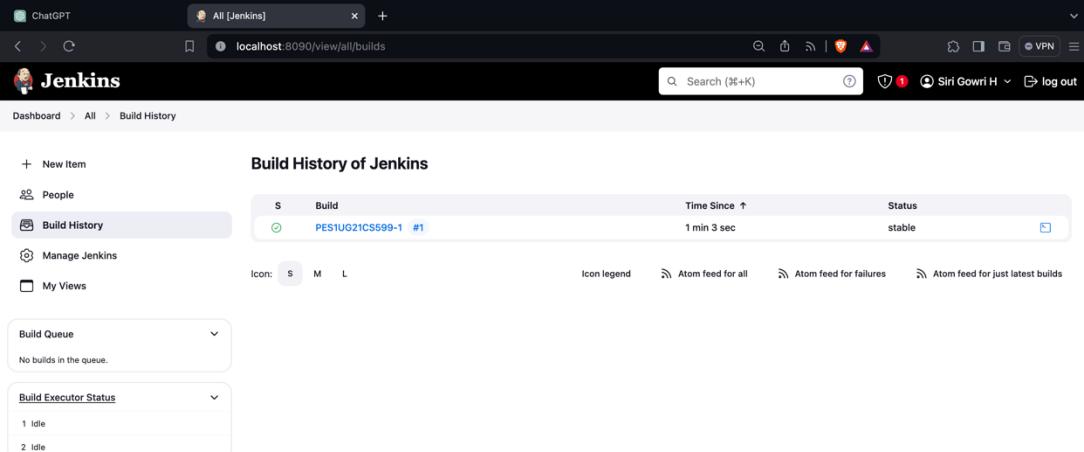
2024-03-09 09:02:28.642+0000 [id=37]    INFO   jenkins.InitReactorRunner$1#onAttained: Completed initialization
2024-03-09 09:02:28.642+0000 [id=37]    INFO   Hudson$onActionInitialization#onActionCompleted: Jenkins is fully up and running
2024-03-09 09:02:24.523+0000 [id=52]    INFO   h.m.maven.MavenInstaller#downloadableJobs: Obtained the updated data files for hudson.tasks.Maven.MavenInstaller
2024-03-09 09:02:24.523+0000 [id=52]    INFO   hudson.util.Retrifier#start: Performed the action check updates server successfully at the attempt #1
2024-03-09 09:02:24.026+0000 [id=75]    INFO   hudson.PluginManager#install: Starting installation of a batch of 21 plugins plus their dependencies
2024-03-09 09:02:24.049+0000 [id=89]    INFO   h.model.UpdateSiteDownloadJobRun: Starting the installation of ionicons-api on behalf of admin
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.model.UpdateSiteDownloadJobRun: Adding dependent install of ionicons-api for plugin cloudbees-folder
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.model.UpdateSiteDownloadJobRun: Adding dependent install of json-path-api for plugin token-macro
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Downloading ionicons-api
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of json-path-api for plugin token-macro
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of workflow-step-api for plugin token-macro
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of plain-credentials for plugin credentials-binding
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of credentials for plugin plain-credentials
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of plain-credentials for plugin plain-credentials-binding
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of triled-api for plugin ssh-credentials
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of json-api for plugin triled-api
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of workflow-api for plugin timestamp
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of scm-api for plugin workflow-api
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of commons-lang3-api for plugin timestamp
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of matrix-project for plugin ws-cleanups
2024-03-09 09:02:24.049+0000 [id=75]    INFO   hudson.PluginManager#install: Adding dependent install of script-security for plugin matrix-project
```

## Task-2



The screenshot shows the Jenkins console output for build #1 of the PES1UG21CS599-1 job. The output details the git clone process, upstream changes, and a successful build with no errors.

```
Started by user Siri Gowri H
Running as SYSTEM
Building in workspace /var/jenkins_home/workspace/PES1UG21CS599-1
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
  Cloning repository https://github.com/DarkKnight5gh/Siri_Jenkins.git
    > git init /var/jenkins_home/workspace/PES1UG21CS599-1 # timeout=10
Fetching upstream changes from https://github.com/DarkKnight5gh/Siri_Jenkins.git
  > git --version # timeout=10
  > git -version # 'git' version 2.39.2
  > git fetch --tags --force --progress -- https://github.com/DarkKnight5gh/Siri_Jenkins.git +refs/heads/*:refs/remotes/origin/* # timeout=10
  > git config remote.origin.url https://github.com/DarkKnight5gh/Siri_Jenkins.git # timeout=10
  > git config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
Seen branch in repository origin/main
Seen 1 remote branch
  > git show-ref --tags -d # timeout=10
Checking out Revision 2768e99412772e080c92f08cc787e33c94bc03a2 (origin/main)
  > git config core.sparsecheckout # timeout=10
  > git checkout -f 2768e99412772e080c92f08cc787e33c94bc03a2 # timeout=10
Commit message: "new statement"
First time build. Skipping changelog.
[PE1UG21CS599-1] $ /bin/sh -xe /tmp/jenkins6911854722174565239.sh
+ make -C main
make: Entering directory '/var/jenkins_home/workspace/PES1UG21CS599-1/main'
g++ hello.cpp -o hello_exec
make: Leaving directory '/var/jenkins_home/workspace/PES1UG21CS599-1/main'
Finished: SUCCESS
```

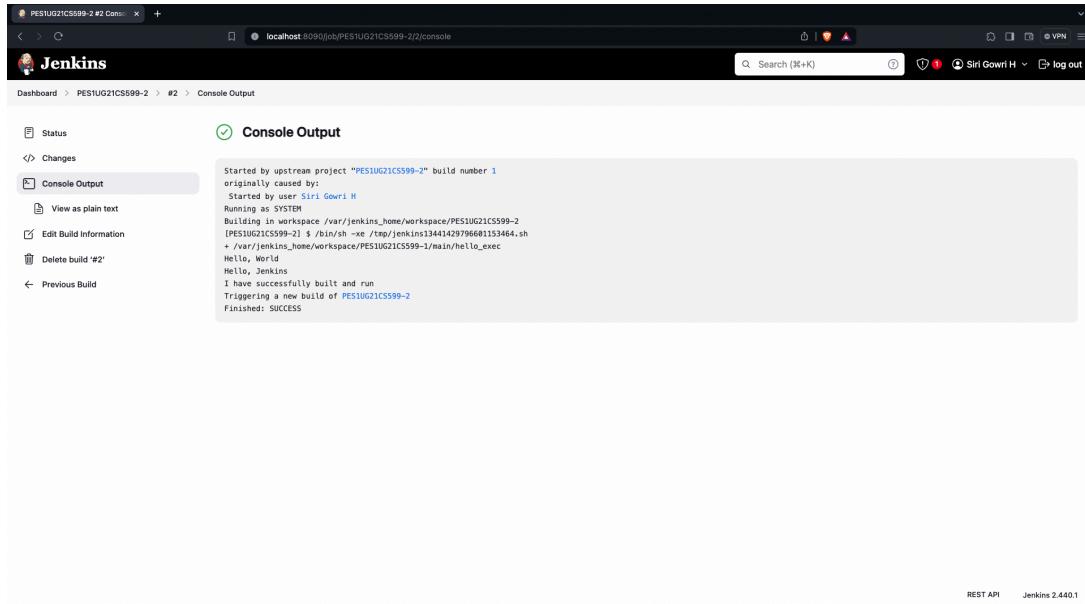


The screenshot shows the Jenkins build history page. It displays a single build entry for build #1 of the PES1UG21CS599-1 job, which was stable and completed 1 minute and 3 seconds ago.

S	Build	Time Since	Status
○	PES1UG21CS599-1 #1	1 min 3 sec	stable

Below the table, there are sections for the build queue (empty) and build executor status (2 idle).

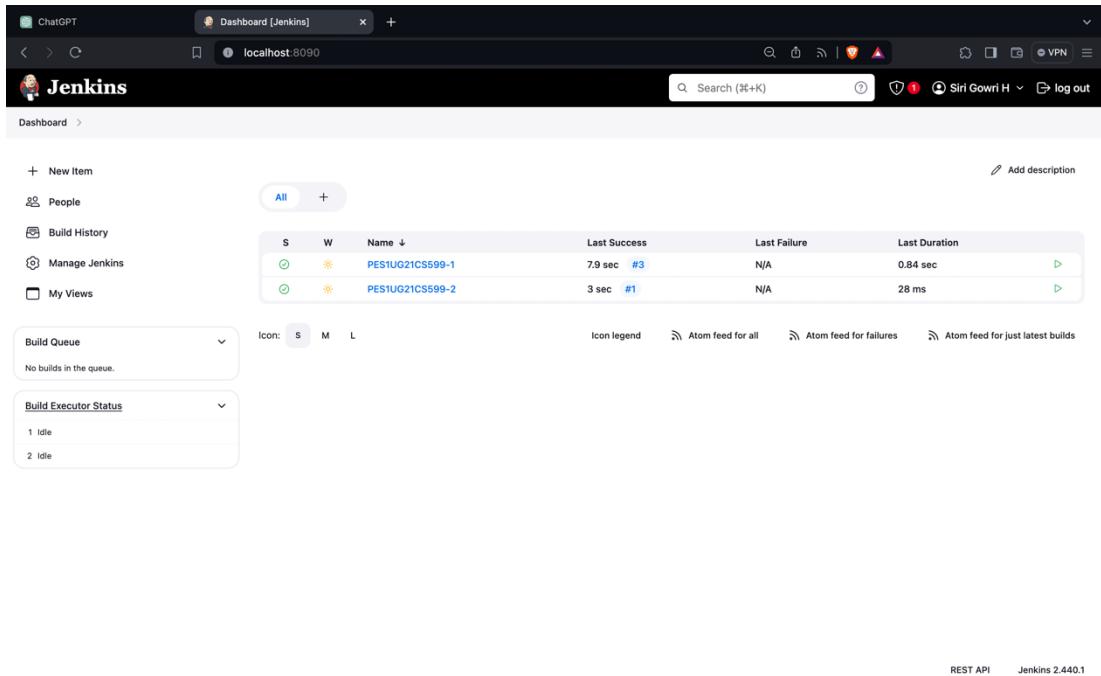
## Task-3



The screenshot shows the Jenkins 'Console Output' page for build #2 of the 'PESIUG21CS599-2' project. The console output window displays the following log:

```
Started by upstream project "PESIUG21CS599-2" build number 1
originally triggered by:
Started by user Siri Gowri H
Running as SYSTEM
Building in workspace /var/jenkins_home/workspace/PESIUG21CS599-2
[PESIUG21CS599-2] $ /bin/sh -xe /tmp/jenkins13441429796681153444.sh
+ /var/lib/jenkins_home/workspace/PESIUG21CS599-1/main/hello_exec
Hello, World
Hello, Jenkins
I have successfully built and run
Triggering a new build of PESIUG21CS599-2
Finished: SUCCESS
```

The left sidebar includes links for Status, Changes, Console Output (which is selected), View as plain text, Edit Build Information, Delete build '#2', and Previous Build.



The screenshot shows the Jenkins 'Dashboard' page. The main content area displays a table of build history:

S	W	Name ↓	Last Success	Last Failure	Last Duration
Green	Yellow	PESIUG21CS599-1	7.9 sec #3	N/A	0.84 sec
Green	Yellow	PESIUG21CS599-2	3 sec #1	N/A	28 ms

Below the table, there are two sections: 'Build Queue' (No builds in the queue) and 'Build Executor Status' (1 idle, 2 idle). A legend indicates icons for S (Success), M (Medium), L (Large), and X (Failure). At the bottom right, there are links for 'Icon legend', 'Atom feed for all', 'Atom feed for failures', and 'Atom feed for just latest builds'. The footer indicates 'REST API' and 'Jenkins 2.440.1'.

ChatGPT All [Jenkins] +

localhost:8090/view/all/builds

# Jenkins

Dashboard > All > Build History

## Build History of Jenkins

S	Build	Time Since ↑	Status
✓	PES1UG21CS599-2 #1	9.9 sec	stable
✓	PES1UG21CS599-1 #3	14 sec	stable
✓	PES1UG21CS599-1 #2	17 sec	stable
✓	PES1UG21CS599-1 #1	3 min 3 sec	stable

Build Queue: No builds in the queue.

Build Executor Status: 1 Idle, 2 Idle.

Icon legend: S M L. Atom feed for all, Atom feed for failures, Atom feed for just latest builds.

REST API Jenkins 2.440.1

ChatGPT PES1UG21CS599-1 [Jenkins] +

localhost:8090/job/PES1UG21CS599-1/

# Jenkins

Dashboard > PES1UG21CS599-1 >

## PES1UG21CS599-1

Status Changes Workspace Build Now Configure Delete Project Git Polling Log GitHub Rename Add description Disable Project

### Downstream Projects

- PES1UG21CS599-2

### Permalinks

- Last build (#3), 32 sec ago
- Last stable build (#3), 32 sec ago
- Last successful build (#3), 32 sec ago
- Last completed build (#3), 32 sec ago

### Build History

#	Date
#3	9 Mar 2024, 09:15
#2	9 Mar 2024, 09:15
#1	9 Mar 2024, 09:12

Atom feed for all, Atom feed for failures.

REST API Jenkins 2.440.1

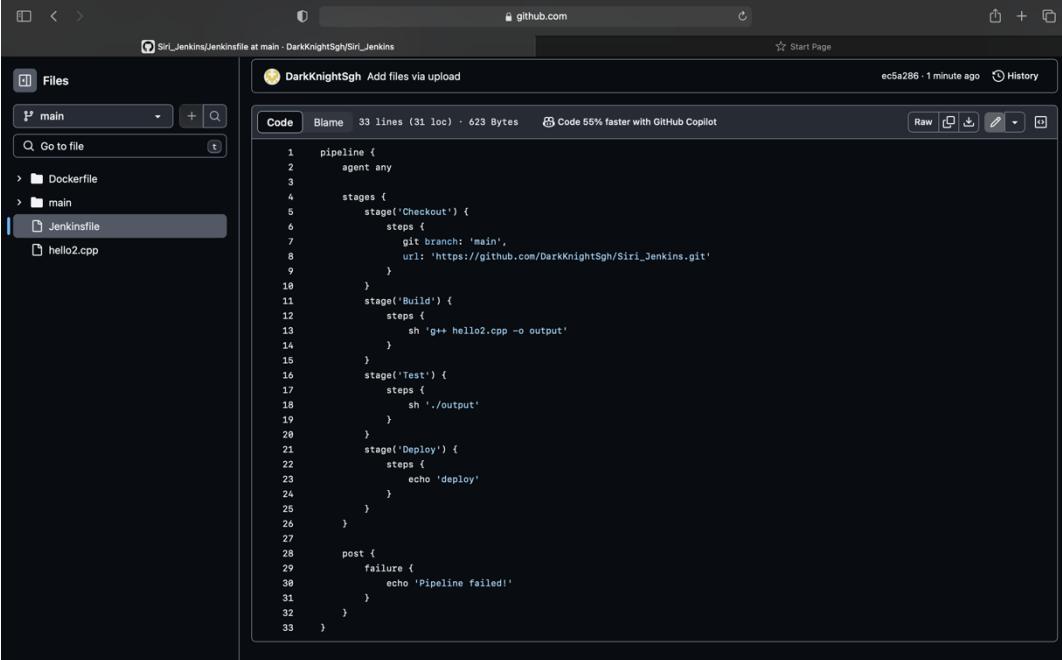
## Task-4

The screenshot shows the GitHub Settings page for the repository "DarkKnightSgh/Siri\_Jenkins". The "Webhooks" section is active. A single webhook is listed with the URL <https://877e-2406-7400-9f-4f3-...> (push). There are "Edit" and "Delete" buttons next to it. The left sidebar shows various settings categories like General, Access, Code and automation, Security, and Integrations, with "Webhooks" currently selected.

The screenshot shows the Jenkins Console Output for build #2 of the job "PES1UG21CS599-2". The log output is as follows:

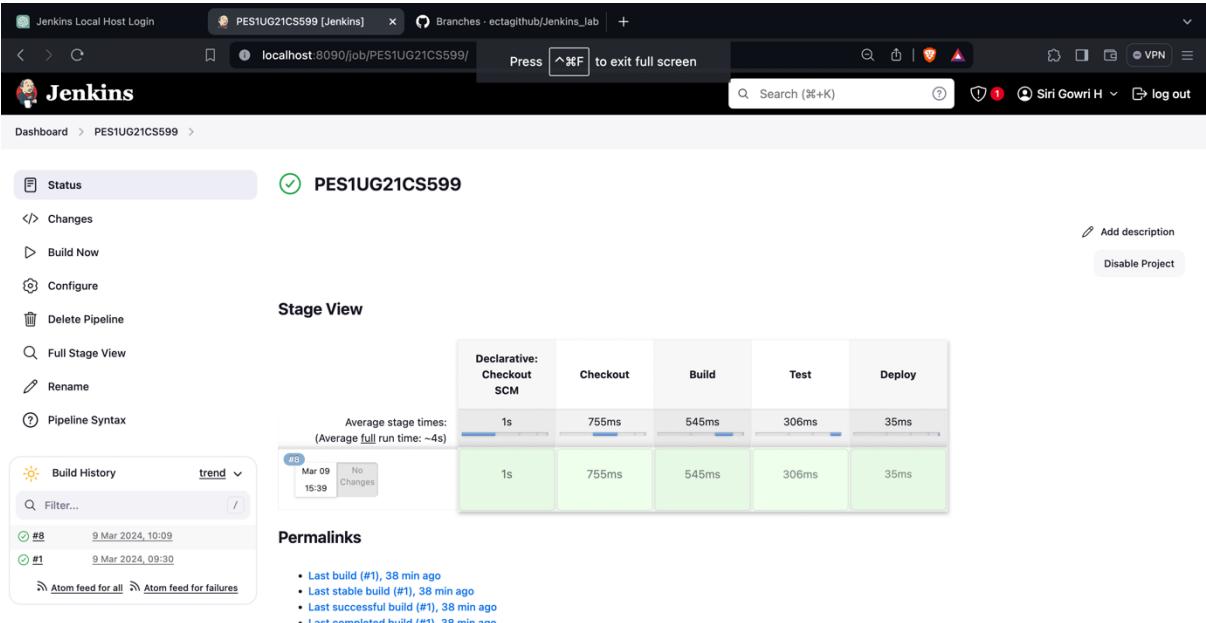
```
Started by user Siri Gowri H
Running as SYSTEM
Building in workspace /var/jenkins_home/workspace/PES1UG21CS599-2
[PES1UG21CS599-2] $ /bin/sh -xe /tmp/jenkins14587561776361040750.sh
+ ./var/jenkins_home/workspace/PES1UG21CS599-1/main/hello_exec
Hello, World
Hello, Jenkins
I have successfully built and run WebHook
WEBHOOKCommitFinished: SUCCESS
```

## Task-5



The screenshot shows a GitHub repository page for 'DarkKnightSgh/Siri\_Jenkins'. The 'Jenkinsfile' is selected in the left sidebar. The code editor displays the Jenkins pipeline script:

```
1 pipeline {
2     agent any
3
4     stages {
5         stage('Checkout') {
6             steps {
7                 git branch: 'main',
8                 url: 'https://github.com/DarkKnightSgh/Siri_Jenkins.git'
9             }
10        }
11        stage('Build') {
12            steps {
13                sh 'g++ hello2.cpp -o output'
14            }
15        }
16        stage('Test') {
17            steps {
18                sh './output'
19            }
20        }
21        stage('Deploy') {
22            steps {
23                echo 'deploy'
24            }
25        }
26    }
27
28    post {
29        failure {
30            echo 'Pipeline failed!'
31        }
32    }
33 }
```



The screenshot shows the Jenkins Pipeline Stage View for the job 'PES1UG21CS599'. The 'Stage View' section displays the execution times for each stage: Checkout (1s), Build (755ms), Test (545ms), and Deploy (306ms). The 'Permalinks' section provides links to the last four builds.

Declarative: Checkout SCM	Checkout	Build	Test	Deploy
Average stage times: (Average full run time: ~4s)	1s	755ms	545ms	306ms
Mar 09 15:39	1s	755ms	545ms	35ms

**Permalinks**

- Last build (#1), 38 min ago
- Last stable build (#1), 38 min ago
- Last successful build (#1), 38 min ago
- Last completed build (#1), 38 min ago

Jenkins Local Host Login PES1UG21CS599 #8 Console Branches - ectagithub/Jenkins\_lab

localhost:8090/job/PES1UG21CS599/8/console

Search | VPN

Siri Gowri H log out

Dashboard > PES1UG21CS599 > #8

Console Output

Started by user Siri Gowri H  
Lightweight checkout support not available, falling back to full checkout.  
Checking out Revision eca5286ce7364eb566ff97267d99088776406c200 into /var/jenkins\_home/workspace/PES1UG21CS599@script/debc13c8ea3267678980cf159fd5e3c2ec17c3ae7d1f9e674392c77fe969 to read Jenkinsfile  
The recommended git tool is: NONE  
No credentials specified  
Edit Build Information  
Delete build #8\*  
Git Build Data  
Restart from Stage  
Reply  
Pipeline Steps  
Workspaces  
Previous Build

```
<pre>> git rev-parse --git-dir /var/jenkins_home/workspace/PES1UG21CS599/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/DarkKnight5gh/Siri_Jenkins.git # timeout=10
Fetching upstream changes from https://github.com/DarkKnight5gh/Siri_Jenkins.git
> git -version # git version 2.39.2
> git config core.sparsecheckout # timeout=10
> git fetch -f eca5286ce7364eb566ff97267d99088776406c200 # timeout=10
Commit message: "Add files via upload"
First time build. Skipping changelog.
> [Pipeline] node
[Pipeline] node
Running on Jenkins in /var/jenkins_home/workspace/PES1UG21CS599
> [Pipeline] stage
[Pipeline] stage
> [Pipeline] { (Declarative: Checkout SCM)
[Pipeline] checkout
The recommended git tool is: NONE
No credentials specified
> git rev-parse --git-dir /var/jenkins_home/workspace/PES1UG21CS599/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/DarkKnight5gh/Siri_Jenkins.git # timeout=10
Fetching upstream changes from https://github.com/DarkKnight5gh/Siri_Jenkins.git
> git -version # git version 2.39.2
> git fetch --tags --force --progress -- https://github.com/DarkKnight5gh/Siri_Jenkins.git +refs/heads/*:refs/remotes/origin/* # timeout=10
Seen branch in repository origin/main
Seen branch in repository origin/main
> git show-ref --tags # timeout=10
Checking out Revision eca5286ce7364eb566ff97267d99088776406c200 (origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -f eca5286ce7364eb566ff97267d99088776406c200 # timeout=10
Commit message: "Add files via upload"
> [Pipeline]
> [Pipeline] // stage
[Pipeline] withEnv
```

Jenkins Local Host Login PES1UG21CS599 #8 Console Branches - ectagithub/Jenkins\_lab

localhost:8090/job/PES1UG21CS599/8/console

Search | VPN

Siri Gowri H log out

Dashboard > PES1UG21CS599 > #8

```
[Pipeline] withEnv
[Pipeline] stage
[Pipeline] stage
[Pipeline] { (Checkout)
[Pipeline] sh
The recommended git tool is: NONE
No credentials specified
> git rev-parse --git-dir /var/jenkins_home/workspace/PES1UG21CS599/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/DarkKnight5gh/Siri_Jenkins.git # timeout=10
Fetching upstream changes from https://github.com/DarkKnight5gh/Siri_Jenkins.git
> git -version # timeout=10
> git --version # git version 2.39.2
> git fetch --tags --force --progress -- https://github.com/DarkKnight5gh/Siri_Jenkins.git +refs/heads/*:refs/remotes/origin/* # timeout=10
Checking out Revision eca5286ce7364eb566ff97267d99088776406c200 (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -f eca5286ce7364eb566ff97267d99088776406c200 # timeout=10
> git branch --v --no-abbrev # timeout=10
> git checkout -b main eca5286ce7364eb566ff97267d99088776406c200 # timeout=10
Commit message: "Add files via upload"
> [Pipeline]
> [Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Build)
[Pipeline] sh
+ ./output
hello,hi namaskara
> [Pipeline] stage
[Pipeline] stage
[Pipeline] stage
[Pipeline] { (Test)
[Pipeline] sh
+ ./output
deploy
> [Pipeline]
> [Pipeline] / stage
[Pipeline]
> [Pipeline] // withEnv
[Pipeline]
> [Pipeline] // mode
[Pipeline] End of Pipeline
```

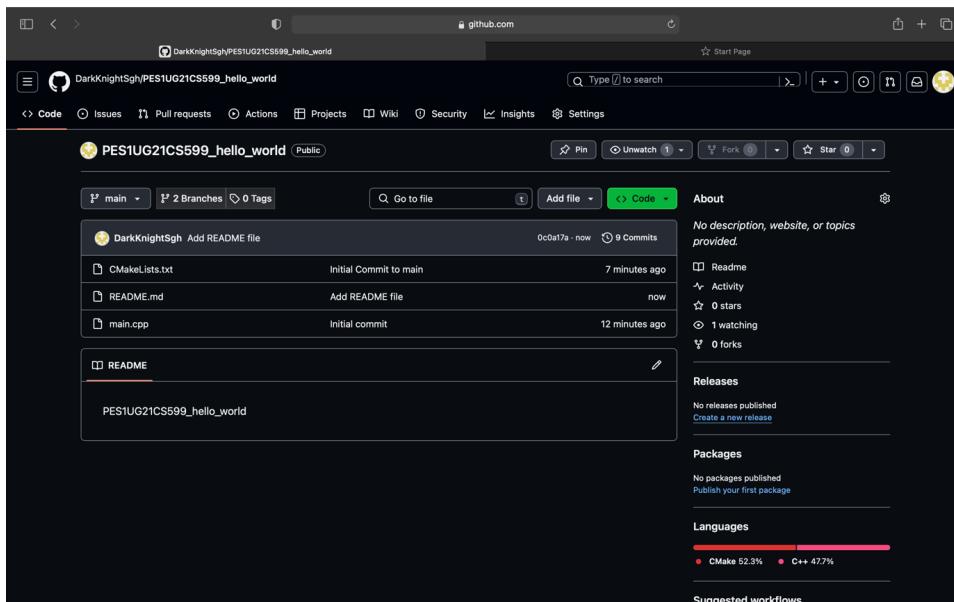
Finished: SUCCESS

# Assignment - 4(b) – GitHub Actions

## Building A CI Pipeline With GitHub Actions

### Project Setup:

#### 1. Initialize Git Repository: (a)



#### 2. Create the GitHub Actions Workflow: (b),(c),(d),(e)

A screenshot of the GitHub Actions workflow editor. The file being edited is ".github/workflows/main.yml". The code is as follows:

```
name: Build C++ Project (Optional Testing Removed)
on:
  push:
    branches: [ main ]
  pull_request:
    branches: [ main ]
jobs:
  build:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v3
      - name: Configure CMake
        run: cmake -B ${github.workspace}/build -DCMAKE_BUILD_TYPE=Release
      - name: Build
        run: cmake --build ${github.workspace}/build --config Release
```

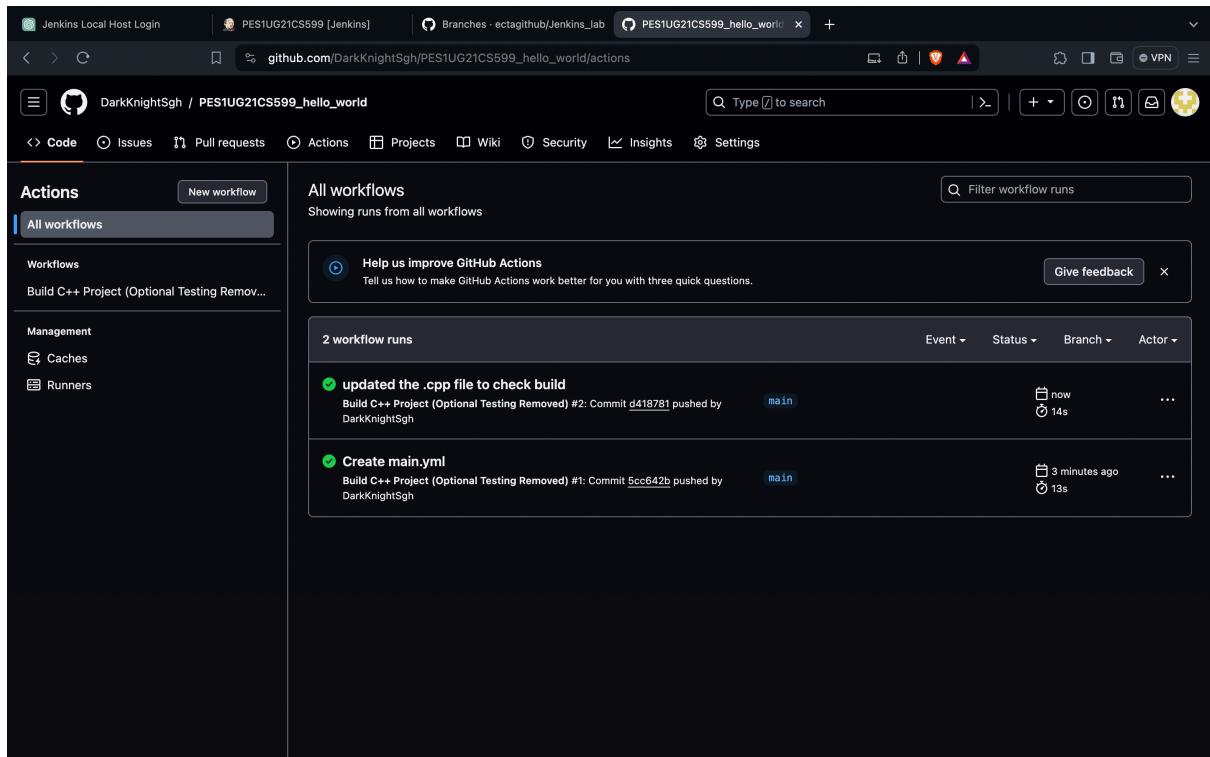
The editor shows a preview of the workflow and a marketplace sidebar with featured actions like Cache, Close stale issues, Download a build artifact, Setup .NET Core SDK, and First interaction.

The screenshot shows a GitHub commit page for a repository named 'PES1UG21CS599\_hello\_world'. The commit message is 'Create main.yml'. The commit was made by 'DarkKnightSgh' 1 minute ago and is verified. It contains 15 additions and 0 deletions. The code editor shows the content of the newly created .github/workflows/main.yml file:

```
15 @@ -0,0 +1,15 @@
1 + name: Build C++ Project (Optional Testing Removed)
2 + on:
3 +   push:
4 +     branches: [ main ]
5 +   pull_request:
6 +     branches: [ main ]
7 + jobs:
8 +   build:
9 +     runs-on: ubuntu-latest
10+   steps:
11+     - uses: actions/checkout@v3
12+     - name: Configure CMake
13+       run: cmake -B ${{github.workspace}}/build -DCMAKE_BUILD_TYPE=Release
14+     - name: Build
15+       run: cmake --build ${{github.workspace}}/build --config Release
```

The screenshot shows the GitHub file editor for the main.cpp file in the PES1UG21CS599\_hello\_world repository. The file contains the following C++ code:

```
#include <iostream>
int main()
{
    std::cout << "Hello, world! This is PES1UG21CS599" << std::endl;
    return 0;
}
```



The screenshot shows the GitHub Actions workflow runs page for the repository `PES1UG21CS599_hello_world`. The left sidebar is titled "Actions" and includes sections for "All workflows", "Workflows", and "Management". The main content area is titled "All workflows" and shows two workflow runs:

- updated the .cpp file to check build**: This run was triggered by a commit (`d418781`) pushed by `DarkKnightSgh` to the `main` branch. It was completed `now` ago (14s). The status is green.
- Create main.yml**: This run was triggered by a commit (`5cc642b`) pushed by `DarkKnightSgh` to the `main` branch. It was completed `3 minutes ago` (13s). The status is green.

At the top of the page, there are tabs for "Code", "Issues", "Pull requests", "Actions", "Projects", "Wiki", "Security", "Insights", and "Settings". A search bar at the top right says "Type ⌘ to search".