

## Task 2: GitHub Actions CI/CD Pipeline Flask App

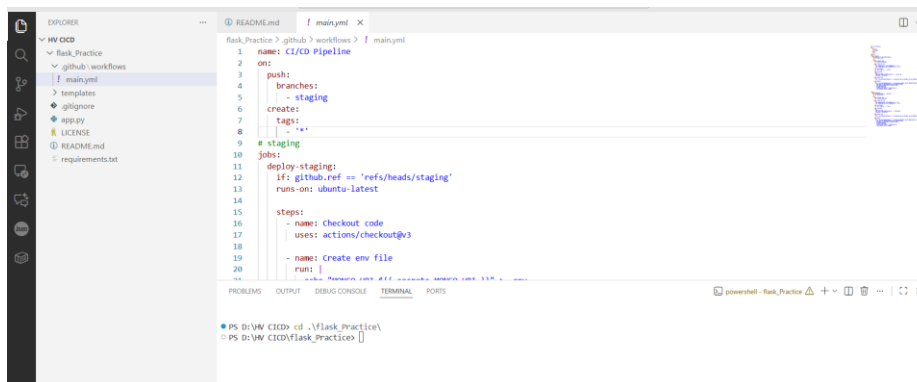
### Objective:

Implement a CI/CD workflow using GitHub Actions for a Python application.

Github Link: [https://github.com/jatinggg/flask\\_Practice.git](https://github.com/jatinggg/flask_Practice.git)

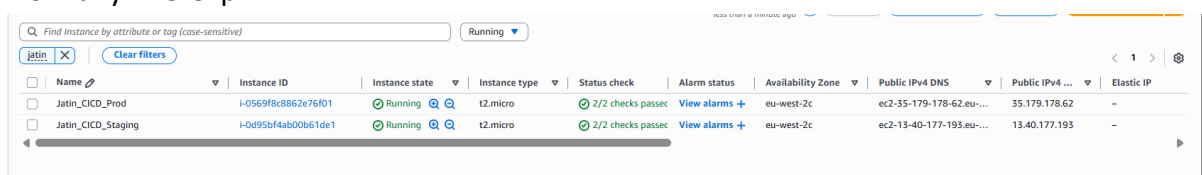
### Steps:

1. Fork the provided repo in your github account.
2. Create a staging branch in your forked repo.
3. Clone the github repository in your local system.
4. Now create a new directory .github/workflows in this and add main.yml file with following code in both main and staging branch:



```
1 name: CI/CD Pipeline
2
3 push:
4   branches:
5     - staging
6 create:
7   tags:
8     - "*"
9 # staging
10 jobs:
11   deploy-staging:
12     if: github.ref == 'refs/heads/staging'
13     runs-on: ubuntu-latest
14
15     steps:
16       - name: Checkout code
17         uses: actions/checkout@v3
18       - name: Create env file
19         run: |
```

5. Launch 2 ec2 instances (for prod and staging) with inbound rules allowed at port 8000 from anywhere ipv4



Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
Jatin_CICD_Prod	i-0569f8c8862e76f01	Running	t2.micro	2/2 checks passed	View alarms +	eu-west-2c	ec2-35-179-178-62.eu-...	35.179.178.62	-
Jatin_CICD_Staging	i-0d95bf4ab00b61de1	Running	t2.micro	2/2 checks passed	View alarms +	eu-west-2c	ec2-13-40-177-193.eu-...	13.40.177.193	-

6. SSH into ec2 instance and create a flaskapp.service under the systemd directory (configure for both the environments)

```
sudo nano /etc/systemd/system/flaskapp.service
```

[Unit]

Description=Gunicorn instance to serve Flask App

After=network.target

[Service]

User=ubuntu

Group=ubuntu

WorkingDirectory=/home/ubuntu/app

Environment="PATH=/home/ubuntu/app/venv/bin:/usr/local/bin:/usr/bin"

EnvironmentFile=/home/ubuntu/app/.env

# FIX IS HERE:

# 1. Point to the 'venv' gunicorn

# 2. Bind to 0.0.0.0:5000 (Required for browser access)

ExecStart=/home/ubuntu/app/venv/bin/gunicorn --workers 3 --bind 0.0.0.0:5000 app:app

Restart=always

[Install]




















WantedBy=multi-user.target

7. Update the required dependencies in the requirements.txt file on the visual studio
8. Create a MongoDB cluster with traffic allowed from all ip addresses.

9. On the GitHub repository add below secrets from settings > secrets and variables > actions > New Repository Secret (for SECRET\_KEY use any random string, I used 123456)

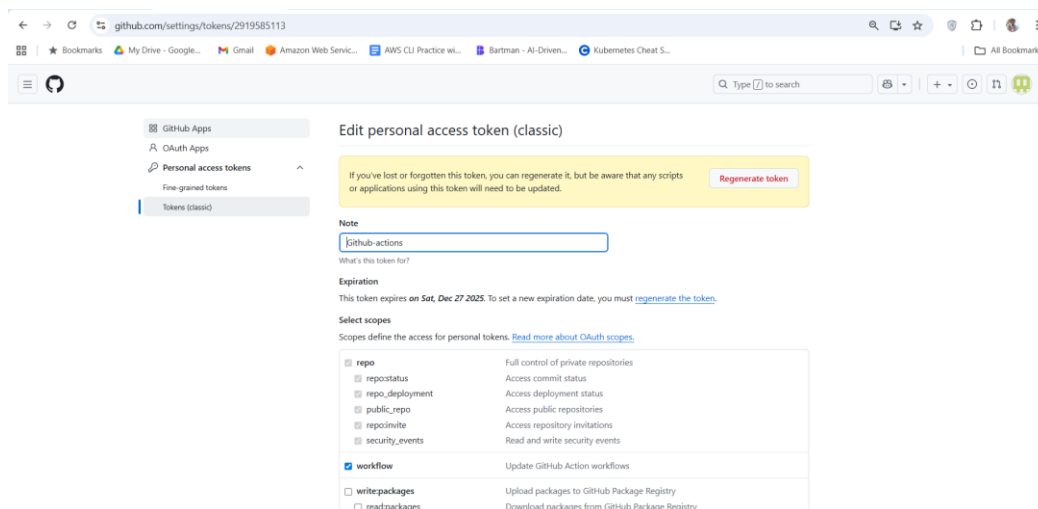
Repository secrets

New repository secret

Name 	Last updated
 MONGO_URI	17 hours ago  
 PROD_EC2_HOST	18 hours ago  
 PROD_EC2_KEY	18 hours ago  
 SECRET_KEY	18 hours ago  
 STAGING_EC2_HOST	18 hours ago  
 STAGING_EC2_KEY	18 hours ago  

10. Now in the visual studio make any changes in any file (make sure you have switched to the staging branch using “git switch staging”).

11. You will need to create a Personal Access Token from GitHub with permission to workflow and repository and configure it on your local machine.



git remote set-url origin https://<your-PAT>@github.com/jatinggg/flask\_Practice.git

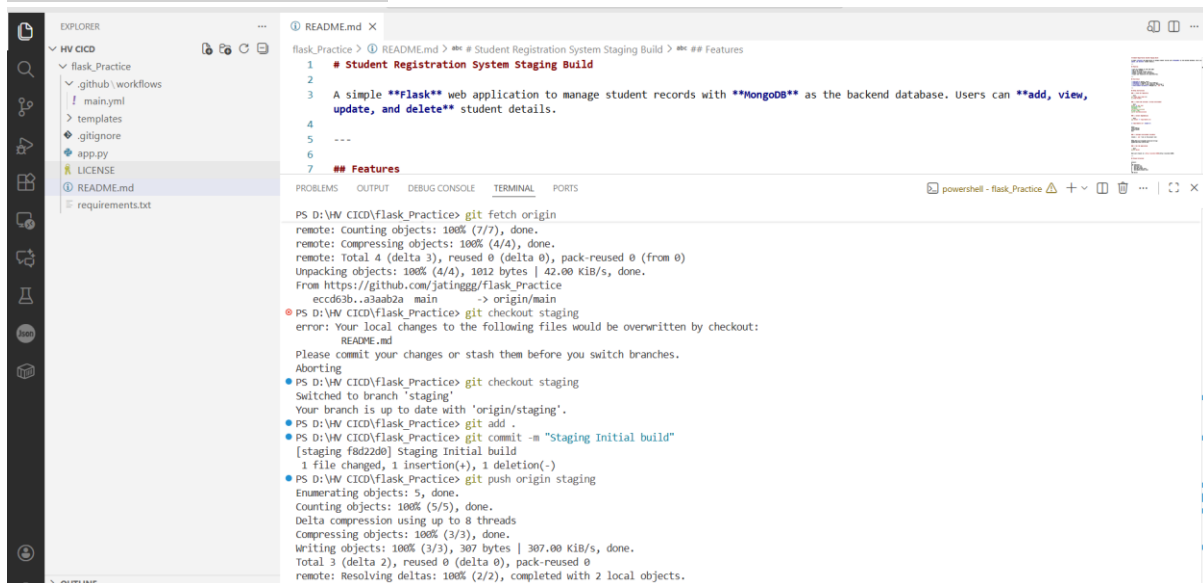
12. Now run below commands to trigger the CI/CD pipeline build

git checkout staging

git add .

git commit -m "Staging Initial build"

## git push origin staging



```
flask_Practice > README.md > ## Student Registration System Staging Build
1  ## Student Registration System Staging Build
2
3  A simple **Flask** web application to manage student records with **MongoDB** as the backend database. Users can **add, view,
4  update, and delete** student details.
5  ---
6
7  ## Features

PS D:\VM\CICD\flask_Practice> git fetch origin
remote: Counting objects: 100% (7/7), done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 4 (delta 3), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (4/4), 1012 bytes | 42.00 KiB/s, done.
From https://github.com/jatinggg/flask_Practice
eccd3b..a3aab2a  main       -> origin/main

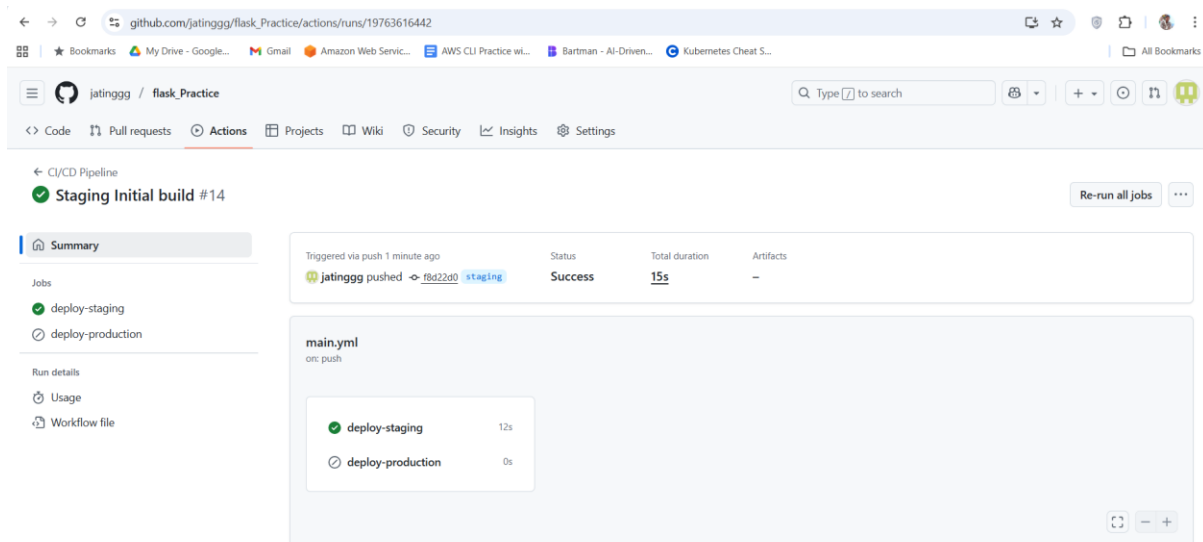
PS D:\VM\CICD\flask_Practice> git checkout staging
error: Your local changes to the following files would be overwritten by checkout:
  README.md
Please commit your changes or stash them before you switch branches.
Aborting

PS D:\VM\CICD\flask_Practice> git checkout staging
Switched to branch 'staging'
Your branch is up to date with 'origin/staging'.

PS D:\VM\CICD\flask_Practice> git add .
PS D:\VM\CICD\flask_Practice> git commit -m "Staging Initial build"
[staging f0d22d0] Staging Initial build
 1 file changed, 1 insertion(+), 1 deletion(-)

PS D:\VM\CICD\flask_Practice> git push origin staging
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), 307 bytes | 307.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
```

## 13. Verify the build from the Github Actions console



github.com/jatinggg/flask\_Practice/actions/runs/19763616442

Code Pull requests Actions Projects Wiki Security Insights Settings

CI/CD Pipeline

Staging Initial build #14

Summary

Jobs

- deploy-staging
- deploy-production

Run details

Usage

Workflow file

Triggered via push 1 minute ago

jatinggg pushed -> f0d22d0 staging

Status Success

Total duration 15s

Artifacts -

main.yml

on: push

- deploy-staging 12s
- deploy-production 0s

14. SSH into the Staging server and look under the root directory you can find the app.zip artifact and this file will be used to push the changes to the prod server once it has been tested.

eu-west-2.console.aws.amazon.com/ec2-instance-connect/ssh/home?addressFamily=ipv4&connType=standard&instance

BookmarksMy Drive - Google...GmailAmazon Web Servic...AWS CLI Practice wi...Bartman - AI-Driven...Kuberne

awsSearch[Alt+S]

Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-1015-aws x86\_64)

\* Documentation: <https://help.ubuntu.com>

\* Management: <https://landscape.canonical.com>

\* Support: <https://ubuntu.com/pro>

System information as of Fri Nov 28 12:26:41 UTC 2025

System load: 0.0

Processes: 113

Usage of /: 35.6% of 6.71GB

Users logged in: 0

Memory usage: 37%

IPv4 address for enx0: 172.31.3.29

Swap usage: 0%

Expanded Security Maintenance for Applications is not enabled.

9 updates can be applied immediately.

To see these additional updates run: `apt list --upgradable`

Enable ESM Apps to receive additional future security updates.

See <https://ubuntu.com/esm> or run: `sudo pro status`

\*\*\* System restart required \*\*\*

Last login: Thu Nov 27 20:08:29 2025 from 49.43.41.217

ubuntu@ip-172-31-3-29:~\$ ls -la

. .. .bash\_history .bash\_logout .bashrc .cache .profile .ssh .sudo\_as\_admin\_successful app app.zip

ubuntu@ip-172-31-3-29:~\$

i-0d95bf4ab00b61de1 (Jatin\_CICD\_Staging)

PublicIPs: 13.40.177.193 PrivateIPs: 172.31.3.29

CloudShellFeedbackConsole Mobile App

15. You can now access the application at the staging server at port 8000

Student Registration

Not secure 13.40.177.193:8000

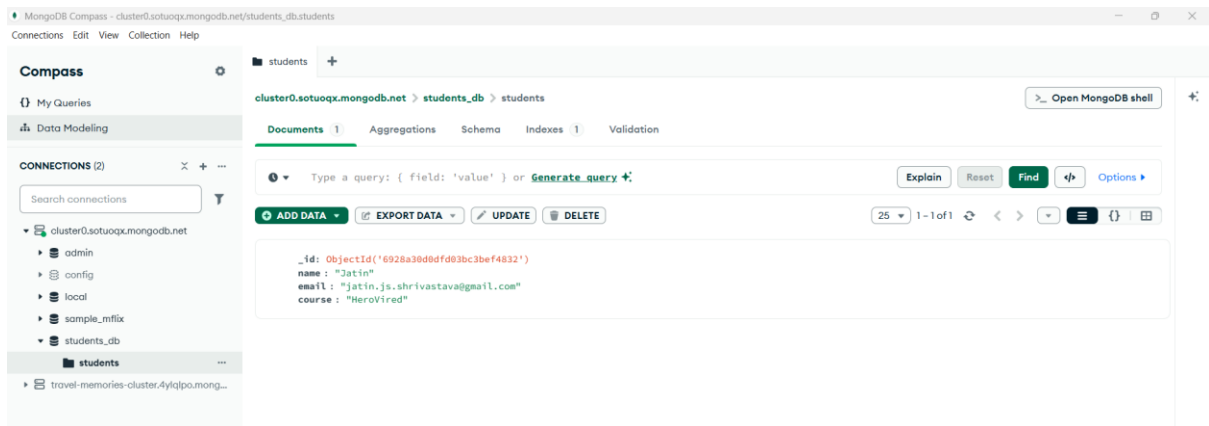
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All Bookmarks

## Student Registration System

<a href="#">Home</a> <a href="#">Add Student</a>			
Name	Email	Course	Actions
Jatin	jatin.js.shrivastava@gmail.com	HeroVired	<a href="#">Edit</a> <a href="#">Delete</a>

you can also verify this data in the mongodb compass



16. Now that we have verified the application and it has passed all the test cases on the staging server, we can push the code to the prod server.

In the visual studio switch to the main branch and run following commands:

```
git fetch origin
```

```
git pull origin main
```

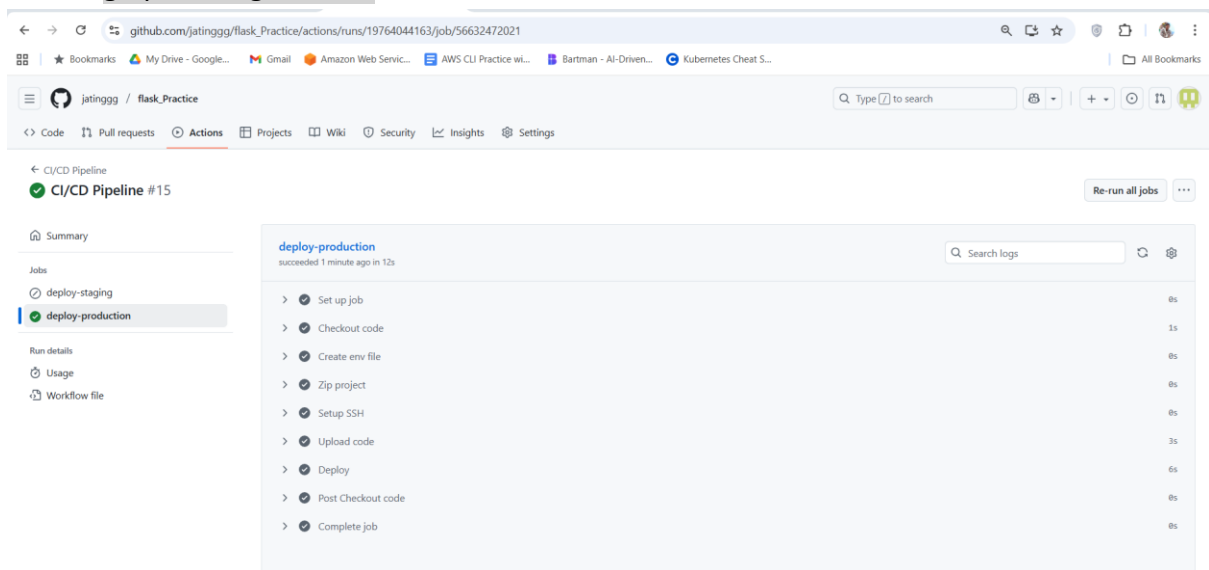
```
git checkout main
```

```
git commit -m "push to prod"
```

```
git merge origin/staging
```

```
git tag v1.0.1
```

```
git push origin v1.0.1
```



17. You can now access the application on the Prod server at port 8000.



Student Registration System Prod			
Home	Add Student		
Name	Email	Course	Actions
Jatin	jatin.js.shrivastava@gmail.com	HeroVired	<a href="#">Edit</a> <a href="#">Delete</a>
Jatin-Prod	jatin.js.shrivastava-Prod@gmail.com	HeroVired-prod	<a href="#">Edit</a> <a href="#">Delete</a>

