



DEVOPS – FINAL PROJECT

INSTRUCTOR: ALI KAHOOT



SYED SHAYAAN HASNAIN AHMAD

SECTION B DEVOPS

20I-0647

PHASE 1 (30)

- Created Docker files for each of the services
- Dockerised the micro services
- Build the images
- Push the images
- Create Docker-compose file
- Run command docker-compose up that starts all the services defined in the `docker-compose.yml` file.

```
C:\Users\iamsy\Desktop\doctor-appointment-system>docker build -t shayaan1/ap
pointments ./appointments
[+] Building 0.0s (0/0)                                docker:default
2023/12/14 15:16:37 http2: server: error reading preface from client //./pip
[+] Building 99.0s (5/9)                                [+] Building 101.9s (5/9)
    [+] Building 102.9s (5/9)                                docker:
default
=> [internal] load build definition from Dockerfile
.1s
=> => transferring dockerfile: 393B
.0s
=> [internal] load .dockerignore
.1s
=> => transferring context: 2B
.0s
=> [internal] load metadata for docker.io/library/python:3.9
.2s
=> [auth] library/python:pull token for registry-1.docker.io
.0s
=> [1/4] FROM docker.io/library/python:3.9@sha256:b2e47a7eca3178e4ce6c095d3
a2d1cd05bfa616efe7f2047c95fffe159e00166
.5s
=> => resolving docker.io/library/python:3.9@sha256:b2e47a7eca3178e4ce6c095d3
```

What's Next?

View a summary of image vulnerabilities and recommendations → `docker scout quickview`

```
C:\Users\iamsy\Desktop\doctor-appointment-system>docker build -t shayaan1/doctors ./doctors
```

```
[+] Building 29.7s (10/10) FINISHED
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 393B
=> [internal] load metadata for docker.io/library/python:3.9
=> [auth] library/python:pull token for registry-1.docker.io
=> [1/4] FROM docker.io/library/python:3.9@sha256:b2e47a7eca3178e4ce6c095d3a2d1cd05bfa616efe7f2047c95fffe159e00166
=> [internal] load build context
=> => transferring context: 649B
=> CACHED [2/4] WORKDIR /app
=> [3/4] COPY app.py .
=> [4/4] RUN pip install flask
=> exporting to image
=> => exporting layers
=> => writing image sha256:2ae5e2583addbcaa5dd1a4220195d4a42e424ba2068dba7c0c0942e924b87853
=> => naming to docker.io/shayaan1/doctors
```

What's Next?

View a summary of image vulnerabilities and recommendations → `docker scout quickview`

```
C:\Users\iamsy\Desktop\doctor-appointment-system>
```

```
C:\Users\iamsy\Desktop\doctor-appointment-system>docker build -t shayaan1/frontend ./frontend
```

```
[+] Building 31.5s (8/10)
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 410B
=> [internal] load metadata for docker.io/library/node:14
=> [auth] library/node:pull token for registry-1.docker.io
=> CACHED [1/5] FROM docker.io/library/node:14@sha256:a158d3b9b4e3fa813fa6c8c590b8f0a860e015ad4e59bbce5744d2f6fd8461aa
=> [internal] load build context
Building 43.5s (11/11) FINISHED                                docker:default
=> [internal] load .dockerignore                                1.3s
=> => transferring context: 2B                                0.0s2 => [internal] load build definition from Dockerfile
=> => transferring dockerfile: 410B                                0.1s
```

```

C:\Users\iamsy\Desktop\doctor-appointment-system>docker push shayaan1/appointments
Using default tag: latest
The push refers to repository [docker.io/shayaan1/appointments]
7d70cbf061ad: Pushed
e81f753930d9: Pushed
d4294e5c95d0: Pushed
d5ad3ac69862: Mounted from library/python
4929be171cab: Mounted from library/python
f021e1878a27: Mounted from library/python
a04a14a911a5: Mounted from library/python
80bd043d4663: Mounted from library/python
30f5cd833236: Mounted from library/python
7c32e0608151: Mounted from library/python
7cea17427f83: Mounted from library/python
latest: digest: sha256:d1e90cc8252d8bff072b507cd9b8b6313c23db7e94d10cbb0a038fe24d0f0b33 size: 2631

C:\Users\iamsy\Desktop\doctor-appointment-system>docker push shayaan1/doctors
Using default tag: latest
The push refers to repository [docker.io/shayaan1/doctors]
4ca2ad143545: Pushed
7aede2fdcb00: Pushed
d4294e5c95d0: Mounted from shayaan1/appointments
d5ad3ac69862: Mounted from shayaan1/appointments
4929be171cab: Mounted from shayaan1/appointments
f021e1878a27: Mounted from shayaan1/appointments
a04a14a911a5: Mounted from shayaan1/appointments
80bd043d4663: Mounted from shayaan1/appointments
30f5cd833236: Mounted from shayaan1/appointments
7c32e0608151: Mounted from shayaan1/appointments
7cea17427f83: Mounted from shayaan1/appointments
latest: digest: sha256:7dc5e71754560c3101b33c6f9cda5790080b30473c2e0f056ef9aba2927ca085 size: 2631

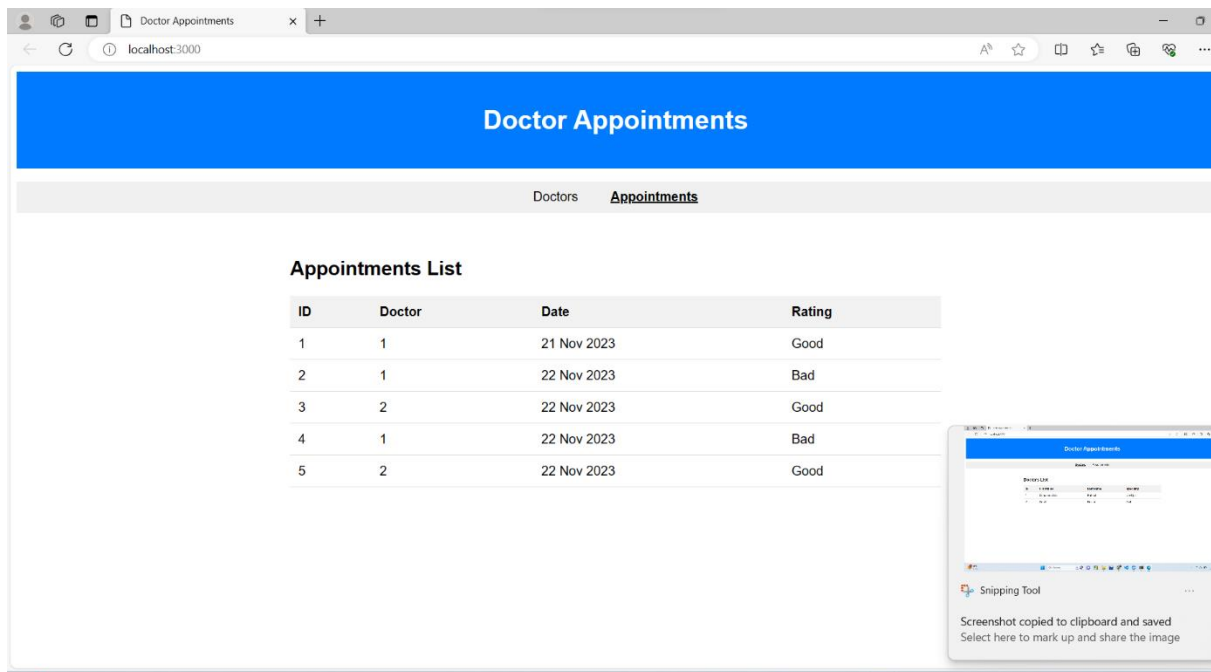
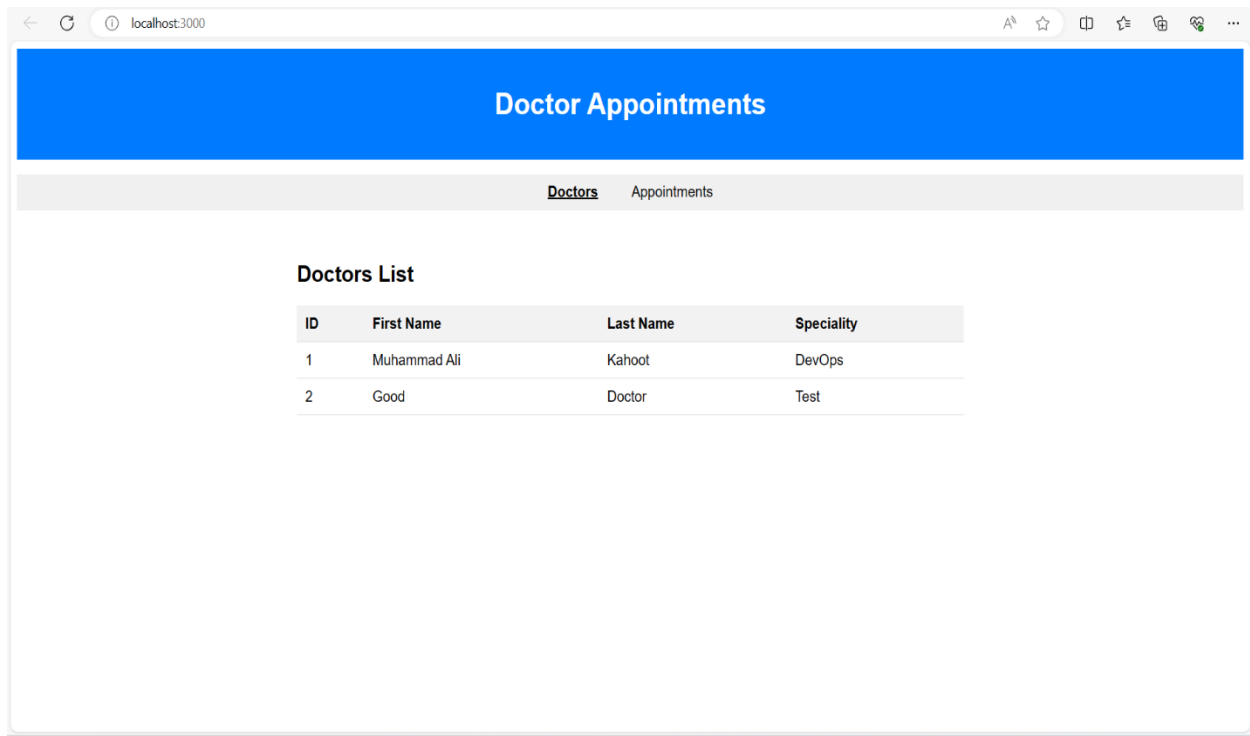
C:\Users\iamsy\Desktop\doctor-appointment-system>docker push shayaan1/frontend
Using default tag: latest
The push refers to repository [docker.io/shayaan1/frontend]
a576a9d97d44: Pushed
15d314e6eccf: Pushed
58bad2e7c538: Pushed
e22882083c49: Pushed

```

```

=> => transferring context: 2B 0.0s
=> [frontend internal] load build definition from Dockerfile 0.2s
=> => transferring dockerfile: 410B 0.0s
=> [frontend internal] load metadata for docker.io/library/node:14 1.4s
=> [frontend auth] library/node:pull token for registry-1.docker.io 0.0s
=> [frontend 1/5] FROM docker.io/library/node:14@sha256:a158d3b9b4e3 0.0s
=> [frontend internal] load build context 0.0s
=> => transferring context: 224B 0.0s
=> CACHED [frontend 2/5] WORKDIR /usr/src/app 0.0s
=> CACHED [frontend 3/5] COPY package*.json ./ 0.0s
=> CACHED [frontend 4/5] RUN npm install 0.0s
=> CACHED [frontend 5/5] COPY . . 0.0s
=> [frontend] exporting to image 0.0s
=> => exporting layers 0.0s
=> => writing image sha256:317acb71be864478a13229ae2cf0119debe6072c7 0.0s
=> => naming to docker.io/library/doctor-appointment-system-frontend 0.0s
[+] Running 4/4
 ✓ Network doctor-appointment-system_default Created 0.4s
 ✓ Container doctor-appointment-system-doctors-1 Created 0.5s
 ✓ Container doctor-appointment-system-appointments-1 Created 0.6s
 ✓ Container doctor-appointment-system-frontend-1 Created 0.5s
Attaching to doctor-appointment-system-appointments-1, doctor-appointment-system-doctors-1, doctor-appointment-system-frontend-1
doctor-appointment-system-doctors-1 | * Serving Flask app 'app'
doctor-appointment-system-doctors-1 | * Debug mode: off
doctor-appointment-system-doctors-1 | WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server in
stead.
doctor-appointment-system-doctors-1 | * Running on all addresses (0.0.0.0)
doctor-appointment-system-doctors-1 | * Running on http://127.0.0.1:9090
doctor-appointment-system-doctors-1 | * Running on http://172.18.0.2:9090
doctor-appointment-system-doctors-1 | Press CTRL+C to quit
doctor-appointment-system-appointments-1 | * Serving Flask app 'app'
doctor-appointment-system-appointments-1 | * Debug mode: off
doctor-appointment-system-appointments-1 | WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server in
stead.
doctor-appointment-system-appointments-1 | * Running on all addresses (0.0.0.0)
doctor-appointment-system-appointments-1 | * Running on http://127.0.0.1:7070
doctor-appointment-system-appointments-1 | * Running on http://172.18.0.3:7070
doctor-appointment-system-appointments-1 | Press CTRL+C to quit
doctor-appointment-system-frontend-1 | Running on http://0.0.0.0:3000

```



PHASE 2 (30):

Add CI/CD to the repo, can use Jenkins or Github Actions, which will

- Pipeline should run on **Pull Request & on main branch**
- **For versioning, you can use the commit hash or semantic versioning or any other way (but dont use latest tag)**
- Build & push docker images with respective version of the microservices to dockerhub
- Use path based filtering so that if there is a change in the **appointments** folder, only the pipeline will build appointments microservice.
- **Which means there should be separate pipelines for all microservices and if a change is in one microservice, only that pipeline should be triggered**
- Update docker-compose file to update the image tag to the one that is built in this pipeline and push back to repo

✓ Change for all made Frontend Service #14: Commit bc36c04 pushed by syedshayaan1	main	3 minutes ago 2m 40s	...
✓ Change for all made Appointments Service #45: Commit bc36c04 pushed by syedshayaan1	main	3 minutes ago 51s	...
✓ Change for all made Doctors Service #27: Commit bc36c04 pushed by syedshayaan1	main	3 minutes ago 43s	...

build-and-push
succeeded now in 45s

Search logs

> ✓ Set up job

> ✓ Run actions/checkout@v2

> ✓ Run docker/setup-buildx-action@v1

> ✓ Run docker/login-action@v1

> ✓ Run docker/build-push-action@v2

> ✓ Push and Update Docker Compose

> ✓ Post Run docker/build-push-action@v2

> ✓ Post Run docker/login-action@v1

> ✓ Post Run docker/setup-buildx-action@v1

> ✓ Post Run actions/checkout@v2

> ✓ Complete job

2s

0s

3s

1s

30s

1s

0s

0s

1s

0s

1s

Docker hub repos:

<https://hub.docker.com/repository/docker/shayaan1/frontend-bc36c04d5ee86248e42c8377feab1976a0e6458c>

<https://hub.docker.com/repository/docker/shayaan1/appointments-bc36c04d5ee86248e42c8377feab1976a0e6458c>

<https://hub.docker.com/repository/docker/shayaan1/doctors-bc36c04d5ee86248e42c8377feab1976a0e6458c/general>


GITHUB REPO: <https://github.com/syedshayaan1/finalprojectdevops.git>

ADDED KAHOOTALI AS COLLABORATOR


PHASE 3 (30)

```
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops> kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
appointments-864f8677fd-s58gt       1/1     Running   0           10m
appointments-864f8677fd-wbjhr       1/1     Running   0           10m
doctors-c78db448f-289bd             1/1     Running   0           10m
doctors-c78db448f-wdzh             1/1     Running   0           10m
frontend-6b6766cfc7-5c8bz          1/1     Running   0           10m
frontend-6b6766cfc7-9r2wp          1/1     Running   0           10m
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops> kubectl get deployments
error: the server doesn't have a resource type "deployments"
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops> kubectl get deployments
NAME      READY   UP-TO-DATE   AVAILABLE   AGE
appointments  2/2     2             2           11m
doctors      2/2     2             2           11m
frontend     2/2     2             2           10m
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops> kubectl get services
NAME      TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
appointments  ClusterIP   10.109.172.228  <none>        7070/TCP   11m
doctors      ClusterIP   10.107.74.224  <none>        9090/TCP   11m
frontend     ClusterIP   10.99.240.6    <none>        3000/TCP   10m
kubernetes   ClusterIP   10.96.0.1      <none>        443/TCP    13m
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
```


<div> kubernetes </div> <div> <div>default</div> <div>Search</div> </div> <div> <div>Workloads</div> <div> <div>Workloads</div> <div>Cron Jobs</div> <div>Daemon Sets</div> <div>Deployments</div> <div>Jobs</div> <div>Pods</div> <div>Replica Sets</div> <div>Replication Controllers</div> <div>Stateful Sets</div> <div>Service</div> <div>Ingresses</div> <div>Ingress Classes</div> <div>Services</div> <div>Config and Storage</div> <div>Config Maps</div> <div>Persistent Volume Claims</div> <div>Secrets</div> <div>Storage Classes</div> <div>Cluster</div> <div>Cluster Role Bindings</div> <div>Cluster Roles</div> <div>Events</div> <div>Namespaces</div> </div> </div>									
Pods									
	Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)	Created ↑
	frontend-6b676dc7-5cd8z	shayaan1/frontend:f1e56b89014a47d567d32b06747542ef6785909	app: frontend pod-template-hash: 6b676dc7	minikube	Running	0	-	-	4 minutes ago
	frontend-6b676dc7-9z2wp	shayaan1/frontend:f1e56b89014a47d567d32b06747542ef6785909	app: frontend pod-template-hash: 6b676dc7	minikube	Running	0	-	-	5 minutes ago
	doctors-c78db448f-289od	shayaan1/doctors:f1e56b89014a47d567d32b06747542ef6785909	app: doctors pod-template-hash: c78db448f	minikube	Running	0	-	-	5 minutes ago
	doctors-c78db448f-wdzhn	shayaan1/doctors:f1e56b89014a47d567d32b06747542ef6785909	app: doctors pod-template-hash: c78db448f	minikube	Running	0	-	-	5 minutes ago
	appointments-864f8677fd-s58gt	shayaan1/appointments:e9ca86731a5d5a1a382aa769399ec21c89a49cea	app: appointments pod-template-hash: 864f8677fd	minikube	Running	0	-	-	5 minutes ago
	appointments-864f8677fd-wcjw	shayaan1/appointments:e9ca86731a5d5a1a382aa769399ec21c89a49cea	app: appointments pod-template-hash: 864f8677fd	minikube	Running	0	-	-	5 minutes ago
Replica Sets									
	Name	Images	Labels	Pods	Created ↑				
	frontend-6b676dc7	shayaan1/frontend:f1e56b89014a47d567d32b06747542ef6785909	app: frontend pod-template-hash: 6b676dc7	2 / 2	5 minutes ago				
	doctors-c78db448f	shayaan1/doctors:f1e56b89014a47d567d32b06747542ef6785909	app: doctors pod-template-hash: c78db448f	2 / 2	5 minutes ago				
	appointments-864f8677fd	shayaan1/appointments:e9ca86731a5d5a1a382aa769399ec21c89a49cea	app: appointments pod-template-hash: 864f8677fd	2 / 2	5 minutes ago				

kubernetes

default

 Search

+



Workloads

Workloads

Cron Jobs

Daemon Sets

Deployments

Jobs

Pods

Replica Sets

Replication Controllers

Stateful Sets

Service

Ingresses

Ingress Classes

Services

Config and Storage

Config Maps

Persistent Volume Claims

Secrets

Storage Classes

Cluster

Cluster Role Bindings

Cluster Roles

Events

Namespaces

Running 3

Deployments




Running 6

Pods





Running 3

Replica Sets

Deployments

Name	Images	Labels	Pods	Created ↑
 frontend	shayaan1/frontend:f1e56b89014a47d567d32b06747542ef6785909	-	2 / 2	6 minutes ago
 doctors	shayaan1/doctors:f1e56b89014a47d567d32b06747542ef6785909	-	2 / 2	6 minutes ago
 appointments	shayaan1/appointments:e9ca86731a5d5a1a382aa769399ec21c89a49cea	-	2 / 2	7 minutes ago

Pods

Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)	Created ↑
 frontend-6b676dc7-5cd8z	shayaan1/frontend:f1e56b89014a47d567d32b06747542ef6785909	app: frontend pod-template-hash: 6b676dc7	minikube	Running	0	-	-	5 minutes ago
 frontend-6b676dc7-9z2wp	shayaan1/frontend:f1e56b89014a47d567d32b06747542ef6785909	app: frontend pod-template-hash: 6b676dc7	minikube	Running	0	-	-	5 minutes ago
 doctors-c78db448f-289od	shayaan1/doctors:f1e56b89014a47d567d32b06747542ef6785909	app: doctors pod-template-hash: c78db448f	minikube	Running	0	-	-	6 minutes ago
 doctors-c78db448f-wdzhn	shayaan1/doctors:f1e56b89014a47d567d32b06747542ef6785909	app: doctors pod-template-hash: c78db448f	minikube	Running	0	-	-	6 minutes ago

BONUS 1 AND 2

```
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops> kubectl logs doctors-c78db448f-289bd
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:9090
* Running on http://10.244.0.28:9090
Press CTRL+C to quit
10.244.0.1 - - [15/Dec/2023 23:19:02] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:02] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:12] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:12] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:22] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:22] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:32] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:32] "GET /healthz HTTP/1.1" 200 -
```

```
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops> kubectl logs -c initfrontend frontend-6b6766fc7-5c8bz
syed shayaan hasnain
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops> kubectl exec -it doctors-c78db448f-289bd -- cat /user/details.txt
Hi, this is Shayaan. Im currently pushing Bachelors in Computer Science from Fast Islamabad. I am passionate about cricket and fitness.
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
```

```
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops>
PS C:\Users\DELL 5490\OneDrive\Desktop\finalprojectdevops> kubectl logs appointments-864f8677fd-s58gt
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:7070
* Running on http://10.244.0.27:7070
Press CTRL+C to quit
10.244.0.1 - - [15/Dec/2023 23:18:27] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:18:27] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:18:38] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:18:38] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:18:47] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:18:47] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:18:58] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:18:58] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:07] "GET /healthz HTTP/1.1" 200 -
10.244.0.1 - - [15/Dec/2023 23:19:07] "GET /healthz HTTP/1.1" 200 -
```