19MAM57 - CLOUD COMPUTING LAB - CAT 2

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DEMONSTRATION OF THE DOCKER FEATURES :

(1) DOCKER BUILD :

(2) IMAGE CATCHING :

(3) CONTAINER DEPLOYMENT :

```
(base) Vivekas-MacBook-Air:classrooom Kavya$ docker run -p 5001:80 classroom:latest
/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: 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
2022/01/28 16:50:40 [notice] 1#1: using the "epoll" event method
2022/01/28 16:50:40 [notice] 1#1: nginx/1.21.6
2022/01/28 16:50:40 [notice] 1#1: built by gcc 10.3.1 20211027 (Alpine 10.3.1_git20211027)
2022/01/28 16:50:40 [notice] 1#1: OS: Linux 5.10.76-linuxkit
2022/01/28 16:50:40 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2022/01/28 16:50:40 [notice] 1#1: start worker processes
2022/01/28 16:50:40 [notice] 1#1: start worker process 34
2022/01/28 16:50:40 [notice] 1#1: start worker process 35
172.17.0.1 - - [28/Jan/2022:16:51:32 +0000] "GET / HTTP/1.1" 200 2703 "-" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like G
ecko) Chrome/97.0.4692.99 Safari/537.36" "-"
172.17.0.1 - - [28/Jan/2022:16:51:33 +0000] "GET /assets/bootstrap/css/bootstrap.min.css HTTP/1.1" 200 162675 "http://localhost:5001/" "Mozilla/5.0 (Macinto
sh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/97.0.4692.99 Safari/537.36" "-"
```

(4) CONTAINER SERVICE EXPOSURE :
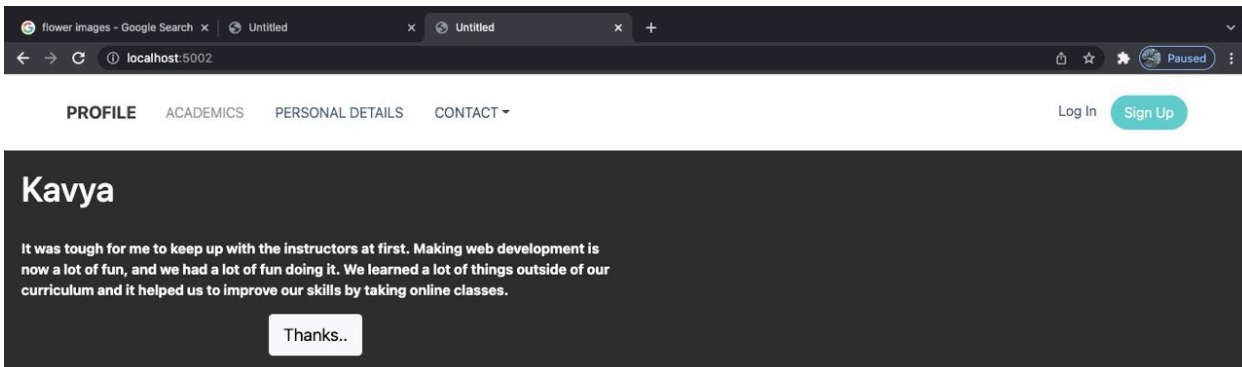
(5) DOCKER LOGS :

```
(base) Vivekas-MacBook-Air:classroom Kavya$ docker logs a6be4df56fcb
/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: 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
2022/01/28 17:25:56 [notice] 1#1: using the "epoll" event method
2022/01/28 17:25:56 [notice] 1#1: nginx/1.21.6
2022/01/28 17:25:56 [notice] 1#1: built by gcc 10.3.1 20211027 (Alpine 10.3.1_git20211027)
2022/01/28 17:25:56 [notice] 1#1: OS: Linux 5.10.76-linuxkit
2022/01/28 17:25:56 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2022/01/28 17:25:56 [notice] 1#1: start worker processes
2022/01/28 17:25:56 [notice] 1#1: start worker process 33
2022/01/28 17:25:56 [notice] 1#1: start worker process 34
172.17.0.1 - - [28/Jan/2022:17:27:34 +0000] "GET / HTTP/1.1" 200 2703 "-" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.
1.15 (KHTML, like Gecko) Version/15.0 Safari/605.1.15" "-"
172.17.0.1 - - [28/Jan/2022:17:27:34 +0000] "GET /assets/css/dh-row-text-image-right-responsive.css HTTP/1.1" 200 285 "http://localhost:500
1/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/15.0 Safari/605.1.15" "-"
172.17.0.1 - - [28/Jan/2022:17:27:34 +0000] "GET /assets/bootstrap/css/bootstrap.min.css HTTP/1.1" 200 162675 "http://localhost:5001/" "Moz
illa/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/15.0 Safari/605.1.15" "-"
172.17.0.1 - - [28/Jan/2022:17:27:34 +0000] "GET /assets/css/Navigation-with-Button.css HTTP/1.1" 200 2620 "http://localhost:5001/" "Mozill
a/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/15.0 Safari/605.1.15" "-"
172.17.0.1 - - [28/Jan/2022:17:27:34 +0000] "GET /assets/css/styles.css HTTP/1.1" 200 0 "http://localhost:5001/" "Mozilla/5.0 (Macintosh; I
ntel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/15.0 Safari/605.1.15" "-"
172.17.0.1 - - [28/Jan/2022:17:27:34 +0000] "GET /assets/bootstrap/js/bootstrap.min.js HTTP/1.1" 200 78468 "http://localhost:5001/" "Mozill
a/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/15.0 Safari/605.1.15" "-"
172.17.0.1 - - [28/Jan/2022:17:27:34 +0000] "GET /assets/img/office-front.jpeg HTTP/1.1" 200 44210 "http://localhost:5001/" "Mozilla/5.0 (M
acintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/15.0 Safari/605.1.15" "-"
172.17.0.1 - - [28/Jan/2022:17:27:37 +0000] "GET /favicon.ico HTTP/1.1" 404 153 "http://localhost:5001/" "Mozilla/5.0 (Macintosh; Intel Mac
 OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/15.0 Safari/605.1.15" "-"
2022/01/28 17:27:37 [error] 33#33: *6 open() "/usr/share/nginx/html/favicon.ico" failed (2: No such file or directory), client: 172.17.0.1,
 server: localhost, request: "GET /favicon.ico HTTP/1.1", host: "localhost:5001", referrer: "http://localhost:5001/"
```

(6) EXECUTE INTO THE CONTAINERS :

```
(base) Vivekas-MacBook-Air:classroom Kavya$ sudo docker exec -it a6be4df56fcb sh
Password:
/ # ls
bin                     etc                     mnt                     run                     tmp
dev                     home                    opt                     sbin                    usr
docker-entrypoint.d     lib                     proc                    srv                     var
docker-entrypoint.sh    media                   root                    sys
/ #
```

DEMONSTRATION OF THE KUBERNETES FEATURES :

(1) CREATE NAMESPACE :

```
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl creat
e -f deployment/docker-namespace.yml
namespace/faf created
```
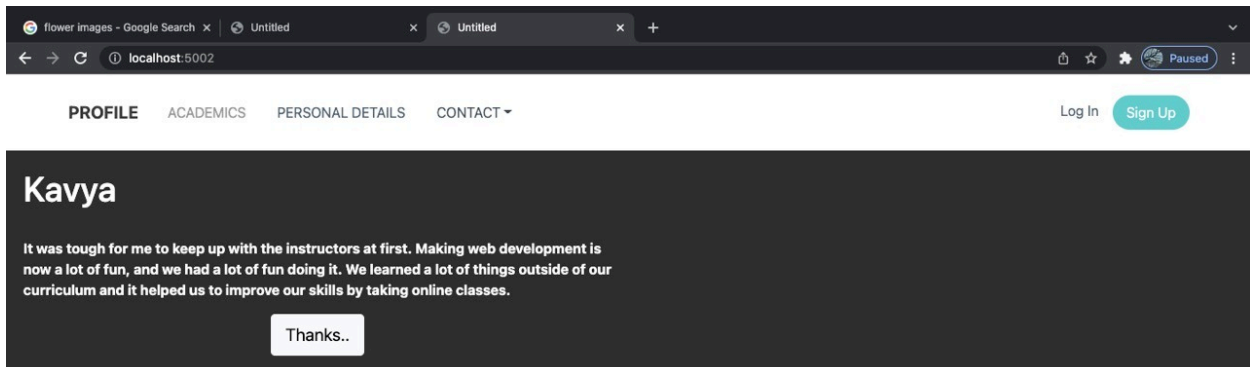
(2) DEPLOY THE POD IN THAT NAMESPACE :

```
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl apply
 -f deployment/docker-deployment.yaml
deployment.apps/faf-deployment configured
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl get d
eployment -n faf
NAME             READY   UP-TO-DATE   AVAILABLE   AGE
faf-deployment   2/2     2            2           21m
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl get p
ods -n faf
NAME                            READY   STATUS    RESTAR
TS   AGE
faf-deployment-544f76fd9f-hzggc   1/1     Running   0
     55s
faf-deployment-544f76fd9f-p5sl2   1/1     Running   0
     58s
```

(3)SETTING THE REPLICA FACTOR :

```
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl apply
 -f deployment/docker-deployment.yaml
deployment.apps/faf-deployment configured
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl get p
ods -n faf
NAME                            READY   STATUS    RESTAR
TS   AGE
faf-deployment-544f76fd9f-p5sl2   1/1     Running   0
     12m
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl apply
 -f deployment/docker-deployment.yaml
deployment.apps/faf-deployment configured
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl get p
ods -n faf
NAME                            READY   STATUS    RESTAR
TS   AGE
faf-deployment-544f76fd9f-p5sl2   1/1     Running   0
     12m
```
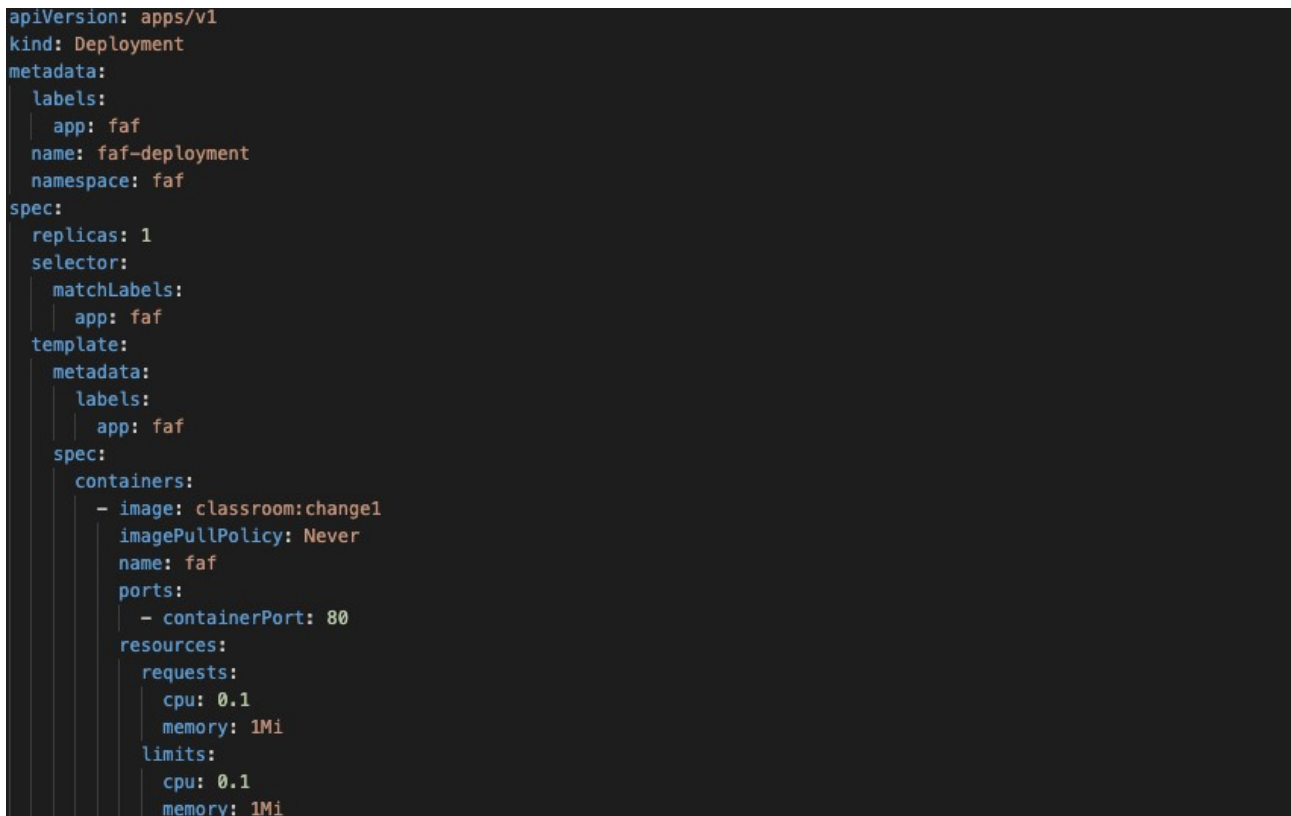
(4)EXPOSE SERVICE AND MAKE IT ACCESSIBLE BY THE OTHER PODS OR FROM THE EXTERNAL :

(5)SET THE RESOURCE LIMIT AND SHOW WHAT HAPPENS WHEN THE LIMIT REACHED,EXCEEDED :

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: faf
  name: faf-deployment
  namespace: faf
spec:
  replicas: 1
  selector:
    matchLabels:
      app: faf
  template:
    metadata:
      labels:
        app: faf
    spec:
      containers:
        - image: classroom:change1
          imagePullPolicy: Never
          name: faf
          ports:
            - containerPort: 80
          resources:
            requests:
              cpu: 0.1
              memory: 1Mi
            limits:
              cpu: 0.1
              memory: 1Mi
```

```
Events:
  Type     Reason              Age                From              Message
  ----     ------              ----               ----              -------
  Normal   Scheduled           2m12s              default-scheduler  Successfully assigned faf/faf-deployment-59499f9945-x57sm to minikube
  Warning  FailedCreatePodSandBox  119s (x4 over 2m11s)  kubelet        Failed create pod sandbox: rpc error: code = Unknown desc = failed to start sandbox container f
or pod "faf-deployment-59499f9945-x57sm": Error response from daemon: OCI runtime create failed: container_linux.go:380: starting container process caused: container init w
as OOM-killed (memory limit too low?): unknown
  Normal   SandboxChanged      118s (x12 over 2m10s)  kubelet        Pod sandbox changed, it will be killed and re-created.
  Warning  FailedCreatePodSandBox  117s (x9 over 2m9s)  kubelet        Failed create pod sandbox: rpc error: code = Unknown desc = failed to start sandbox container f
or pod "faf-deployment-59499f9945-x57sm": Error response from daemon: OCI runtime create failed: container_linux.go:380: starting container process caused: process_linux.go
:393: copying bootstrap data to pipe caused: write init-p: broken pipe: unknown
```
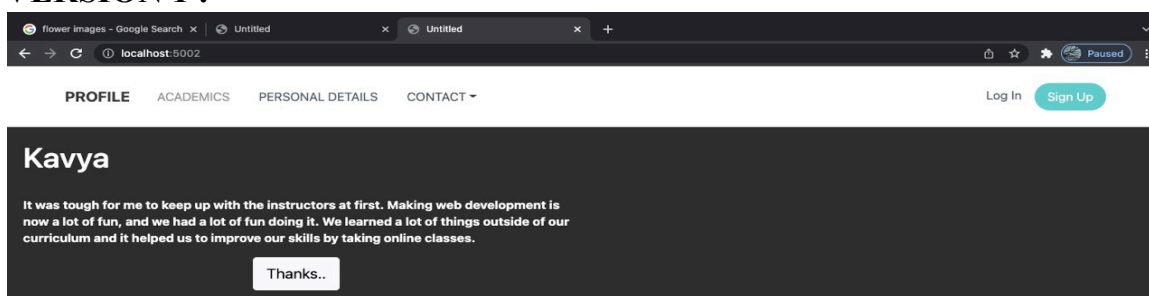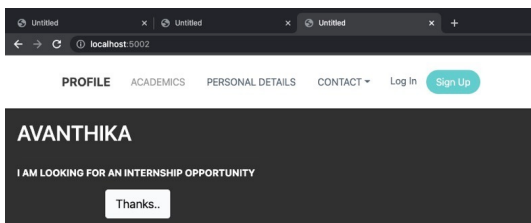
(6) TO MAKE CHANGES IN THE CODE AND DEPLOY IT AGAIN AND THE ROLLBACK STRATEGY :

VERSION 1 :

VERSON 2 :

ROLLOUT STRATEGY :

```
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl rollout history deploy faf-deployment -n faf
deployment.apps/faf-deployment
REVISION  CHANGE-CAUSE
1         <none>
2         <none>
3         <none>
5         <none>
6         <none>

(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl rollout undo deploy faf-deployment --to-revision=2 -n faf
deployment.apps/faf-deployment rolled back
(base) Vivekas-MacBook-Air:classrooom Kavya$ kubectl get service -n faf
NAME          TYPE            CLUSTER-IP      EXTERNAL-IP    PORT(S)          AGE
faf-service   LoadBalancer    10.108.67.235   <pending>      8080:30000/TCP   3h30m
```
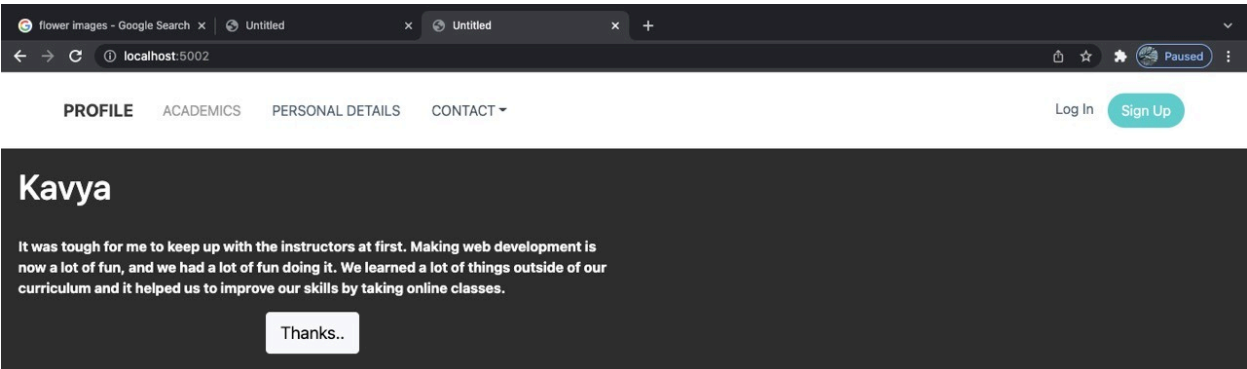

(7)DESCRIPTION OF THE POD AND THE Deployment

```
                         node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type     Reason      Age     From                Message
  ----     ------      ----    ----                -------
  Normal   Scheduled   3m48s   default-scheduler   Successfully assigned faf/faf-deployment-648599699-26ftv to minikube
  Normal   Pulled      3m45s   kubelet             Container image "faf" already present on machine
  Normal   Created     3m45s   kubelet             Created container faf
  Normal   Started     3m45s   kubelet             Started container faf
```

DEPLOYMENT EVENTS :

```
                    node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type    Reason     Age    From               Message
  ----    ------     ----   ----               -------
  Normal  Scheduled  3m48s  default-scheduler  Successfully assigned faf/faf-deployment-648599699-26ftv to minikube
  Normal  Pulled     3m45s  kubelet            Container image "faf" already present on machine
  Normal  Created    3m45s  kubelet            Created container faf
  Normal  Started    3m45s  kubelet            Started container faf
```

```
Events:
  Type    Reason             Age                    From                   Message
  ----    ------             ----                   ----                   -------
  Normal  ScalingReplicaSet  4m57s (x2 over 3h4m)   deployment-controller  Scaled up replica set faf-deployment-648599699 to 1
  Normal  ScalingReplicaSet  4m57s (x2 over 155m)   deployment-controller  Scaled down replica set faf-deployment-545f99c795 to 0
  Normal  ScalingReplicaSet  4m53s (x2 over 3h4m)   deployment-controller  Scaled up replica set faf-deployment-648599699 to 2
  Normal  ScalingReplicaSet  4m53s                  deployment-controller  Scaled down replica set faf-deployment-797d58667 to 1
  Normal  ScalingReplicaSet  4m51s                  deployment-controller  Scaled down replica set faf-deployment-797d58667 to 0
```