Task Docker and Kubernetes

1- I created a docker compose file for install nginx as port no 80 .

```
version: '3'

services:
  nginx:
    image: nginx:latest # pulling nxinx latest image from doc
kerhuB
    ports:
      - "80:80" # define port
    volumes:
      - ./nginx_logs:/var/log/nginx # bindigs volumn here
    networks:
      nginx_net:
        ipv4_address: 172.20.8.2 #creating desired network

networks:
  nginx_net:
    driver: bridge
    ipam:
      config:
        - subnet: 172.20.8.0/24 #adapting bridge network with
/34
```

```
- docker-compose up -d
# Nginx is Running sucessfully
```

2-

Steps 1: Create a namespace for our Task

```
- kubectl create namespace production
```

step 2: I created a file in my linux machine (ubuntu 20.04 and docker 27.0.3) name ass java-app.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: java-app
  namespace: production # declear namespace here
spec:
  replicas: 1
  selector:
    matchLabels:
      app: java-app
  template:
    metadata:
      labels:
        app: java-app
    spec:
      containers:
      - name: java-app
        image: openjdk:11-jre-slim
        command: ["java", "-Xmx1000M", "-jar", "/app.jar"]
        resources:
          requests:
            memory: "1000Mi"
            cpu: "1000m"
          limits:
            memory: "1500Mi"
            cpu: "2000m"
      - name: java-app-logrotate
        image: alpine:3.14
        command: ["/bin/sh", "-c", "while true; do sleep 360
0; done"]
```

```
      - name: java-app-fluentd
        image: fluent/fluentd:v1.14
      - name: mongos
        image: mongo:4.4
```

Step 3: there might me several reason for randomly restarting pods. In below Lets figure out some possible reasons with solutions

- [ ] **Memory Limit Exceeded**
- [ ] **CPU Limit Exceeded**
- [ ] **Application Errors**
- [ ] **Java Heap Size Configuration**

note: There might be some other reasons also

Memory Limit : we set the memory limit 1500Mi but we are using 951Mi although memory we are using below than 1500Mi . In some cases containers might push the limit and it might be a reson of random restarting .

CPU limit : We set the application CPU limit of 2000m but in our cases we are using 3m for application + 1m for ogrotate + 1m for fluentd+ 4m for mongos = 9m . although its below but its might be a reason

Application Errors : The application may be terminating the process due to runtime failures.

Java heap Size Configuration: 1000M is the Xmx setting. The Java process may be stopped, restarting the pod, if the real memory use goes over this limit.

Commands that I use to check everything

```
- kubectl get pods -n production # check all pods status
- kubectl describe pod java-app-7d9d44ccbf-lmvbc -n productio
n # check the full deatils of  pods
- kubectl logs java-app-7d9d44ccbf-lmvbc -c java-app -n produ
ction # check all logs of our java applications
- kubectl top pod java-app-7d9d44ccbf-lmvbc -n production # c
hecking monitor usages
```

```
- Additionally for a better check we can command out the
- ["java", "-Xmx2000M", "-jar", "/app.jar"] this line
# this can give us a btter views we just cancled the memory l
imit here
```