Question 1: Set the node node1.example.com as unavailable and reschedule all the pods running on it.

```
$ kubectl get nodes
$ kubectl drain node1.example.com --ignore-daemonsets
```

नोट:- पहले आप kubelet kubeadm kubectl को specific version से अपडेट करने वाला सवाल कर ले। उसके बाद ये वाला सवाल करें

Question 2: Create a snapshot of the existing etcd instance running at https://127.0.0.1:2379, saving the snapshot to /srv/data/demo-snapshot.db

- CA certificate: /opt/pki/ca/crt
- Client Certificate: /opt/pki/client/etcd-client.crt
- Client Key: /opt/pki/etcd-client.key

Next restore an existing , previous snapshot located at /srv/data/etcd-previoussnapshot.db

```
——------------------------ Create a snapshot of etcd ——-----------------------------------------

$ ETCDCTL_API=3 etcdctl --endpoints=https://127.0.0.1:2379
--cacert=/opt/pki/ca/crt --cert=/opt/pki/client/etcd-client.crt
--key=/opt/pki/etcd-client.key snapshot save /srv/data/demo- snapshot.db

$ ETCDCTL_API=3 etcdctl --endpoints=https://127.0.0.1:2379
--cacert=/opt/pki/ca/crt --cert=/opt/pki/client/etcd-client.crt
--key=/opt/pki/etcd-client.key snapshot status /srv/data/demo- snapshot.db
$ ls /srv/data/

——------------------------------ Restore etcd backup ——------------------------------------------

$ ETCDCTL_API=3 etcdctl --endpoints=https://127.0.0.1:2379 snapshot restore
/srv/data/etcd-previoussnapshot.db
```

Question 3: Create a network policy named “allow-port” in the fubar namespace. Ensure that the new network policy allows pods in namespace project=corp-net to connect to port 9200 of pods in namespace fubar.

Further ensure that the new network policy

- Does not allow access to pods, which do not listen on 9200
- Does not allow access from pods, which are not in namespace corp-net.

Note: Need help :
https://kubernetes.io/docs/concepts/services-networking/network-policies/

```
$ vi network-policy.yml

apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
```

```
metadata:
  name: allow-port
  namespace: fubar
spec:
  podSelector: { }
  policyTypes:
    - Ingress
  ingress:
    - from:
        - namespaceSelector:
            matchLabels:
              project: corp-net
      ports:
        - protocol: TCP
          port: 9200

$ kubectl create -f network-policy.yml
$ kubectl get networkpolicy -n fubar
```

Question 4: Reconfigure the existing deployment front-end and add a port specification named http , exposing port 80/tcp of the existing container nginx.

- Create a new service named front-end-svc exposing the container port http.
- Configure the new service to also expose the individual pods via a NodePort on the nodes on which they are scheduled.

```
——--------------------- Reconfigure the existing deployment——--------------------------------

$ kubectl get deploy
$ kubectl edit deploy front-end
    spec:
      containers:
      - image: nginx
        name: nginx
        ports:
        - containerPort: 80
          name: http

< :wq! >
——------------------- Create a Service Named front-end-svc——----------------------------------

$ kubectl get deploy
$ kubectl expose deploy --name=front-end-svc  front-end --port=80 --target-port=80
--type=NodePort
$ kubectl get pods -o wide
$ kubectl get svc
$ curl http://< front-end-svc-ip >
```

Question 5: Create a new nginx ingress resource as follows:
Name: pong, Namespace: ing-internal
Exposing service hello on the path /hello using service port 5678

Note: Need help:
https://kubernetes.io/docs/concepts/services-networking/ingress/

```
$ vi ingress.yml

apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: pong
  namespace: ing-internal
  annotations:
    nginx.ingress.kubernetes.io/rewrite-target: /
spec:
  ingressClassName: nginx-example
  rules:
  - http:
      paths:
      - path: /hello
        pathType: Prefix
        backend:
          service:
            name: hello
            port:
              number: 5678

$ kubectl create -f ingress.yml
$ kubectl get ingress -n ing-internal
```

Question 6: Scale the deployment presentation to 5 pods.

```
$ kubectl get deployment
$ kubectl describe deployment presentation
$ kubectl scale --replicas=5 deployment presentation
$ kubectl get deploy
```

Question 7: Schedule a pod as follows:

- Name: nginx-prod
- Image: nginx
- Node selector: disk=spinning

```
$ kubectl get nodes --show-labels | grep "disk"

$ vi pod.yml

apiVersion: v1
kind: Pod
metadata:
  name: nginx-prod
spec:
  nodeSelector:
     disk: spinning
  containers:
  - name: nginx
    image: nginx

$ kubectl create -f pod.yml

$ kubectl get pods -o wide
```

Question 8: Check to see how many nodes are ready (not including nodes tainted NoScheduling)
and write the number in /opt/kubenetes/nodes.txt

```
——------------------ We need only ready nodes, not tainted nodes——--------------------------

$ kubectl describe nodes | grep “Taint”

Note: Check numbers of nodes in ready state

$ echo ‘2’ >  /opt/kubenetes/nodes.txt
$ cat /opt/kubenetes/nodes.txt
```

Question 9: Create a pod named kucc8 with a single app container for each of the following images running inside: nginx+redis

```
$ vi pod.yml

apiVersion: v1
kind: Pod
metadata:
  name: kucc8
spec:
  containers:
  - name: nginx
```

```
   image: nginx
 - name: redis
   image: redis

$ kubectl create -f pod.yml
$ kubectl get pods
```

Question 10: Create a persistent volume with name app-config , of capacity 1Gi and access mode ReadOnlyMany, the type of volume is hostPath and its location is /srv/app-config

Need Help: https://kubernetes.io/docs/concepts/storage/persistent-volumes/

```
$ vi pv.yml

apiVersion: v1
kind: PersistentVolume
metadata:
 name: app-config
spec:
 capacity:
  storage: 1Gi
 volumeMode: Filesystem
 accessModes:
  - ReadOnlyMany
 storageClassName: Manual
 hostPath:
  path: /srv/app-config


$ kubectl create -f pv.yml
$ kubectl get pv
$ kubetcl describe pv appconfig
```

Question 11: Create a persistentVolumeClaim:-

- Name: pv-volume
- Class: csi-hostpath-sc
- Capacity: 10Mi

Create a new pod which mounts the PersistentVolumeClaim as a volume:

- Name: web-server
- Image: nginx
- Mount path: /usr/share/nginx/html

Configure the new pod to have ReadWriteOnce access on the volume. Finally, using ‘kubectl edit’ expand the PersistentVolumeClaim to a capacity of 70Mi and record that change.

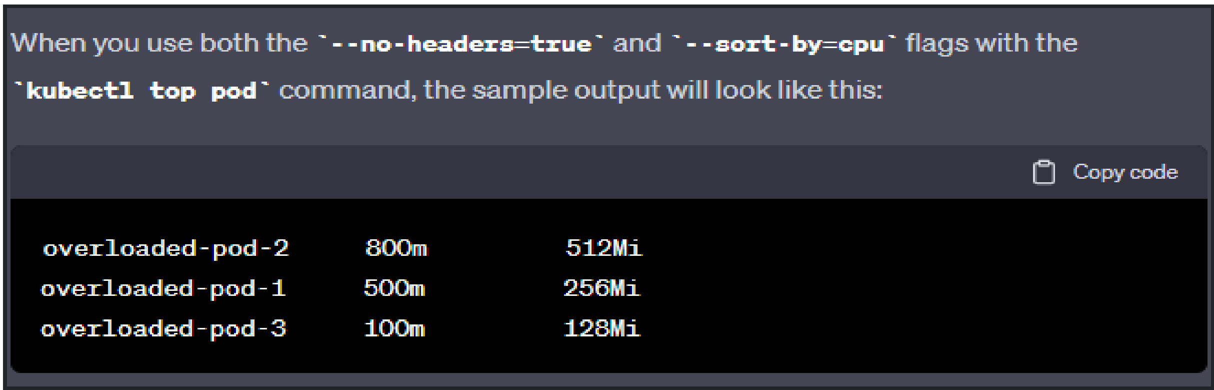
```
——------------------------ Create a PVC named “pv-volume” ——-----------------------------------

$ vi pvc.yml

apiVersion: v1
kind: PersistentVolumeClaim
metadata:
 name: pv-volume
spec:
 accessModes:
   - ReadWriteOnce # As mentioned:  PVC mount in a pod  with RWO volumeMode:
Filesystem
 resources:
   requests:
     storage: 10Mi
 storageClassName: csi-hostpath-sc


$ kubectl create -f pvc.yml
$ kubectl get pvc

——-------------------- Create a pod and mount pvc with RWO mode  --------------------------

$ vi pod.yml

apiVersion: v1
kind: Pod
metadata:
 name: web-server
spec:
 containers:
   - name: nginx-pod
     image: nginx
     volumeMounts:
     - mountPath: "/usr/share/nginx/html"
       name: myvol
 volumes:
   - name: myvol
     persistentVolumeClaim:
       claimName: pv-volume


$ kubectl create -f pod.yml
$ kubectl describe pod web-server

——---------------------------- Expend PVC Capacity to 70Mi ——-----------------------------------

$ kubectl get pvc
$ kubectl describe pvc pv-volume
$ vi pvc.yml

apiVersion: v1
kind: PersistentVolumeClaim
metadata:
 name: pv-volume
spec:
 accessModes:
   - ReadWriteOnce # As mentioned:  PVC mount in a pod  with RWO volumeMode:
Filesystem
 resources:
   requests:
     storage: 70Mi
 storageClassName: csi-hostpath-sc

—------------------------------------------------------------------------------------------------------
Note: You can’t see 10Mi or 70Mi capacity with $ kubectl get pvc or $ kubectl
describe pvc pv-volume . You can only see through $ kubectl edit pvc pv-volume
—------------------------------------------------------------------------------------------------------

$ kubectl apply -f pvc.yml
$ kubectl get pvc
$ kubectl get pods
$ kubectl describe pvc pv-volume
```

Question 12: Monitor the logs of pod foobar and:
Extract log lines corresponding to error file-not-found
Write them to /opt/kutr/foobar

```
$ kubectl get pods
$ kubectl logs foobar | grep ‘file-not-found’ > /opt/kutr/foobar
```

Question 13: From the pod label ‘overloaded-cpu’, find pods running high CPU workload and write the name of the pod consuming most CPU to the file /opt/KUTR00401/KUTR00401.txt

```
—------ when we  use --sort-by=cpu, --no-headers=true output will be —------
$ kubectl top pods -l ‘overloaded-cpu’ --sort-by=cpu --no-headers=true
```

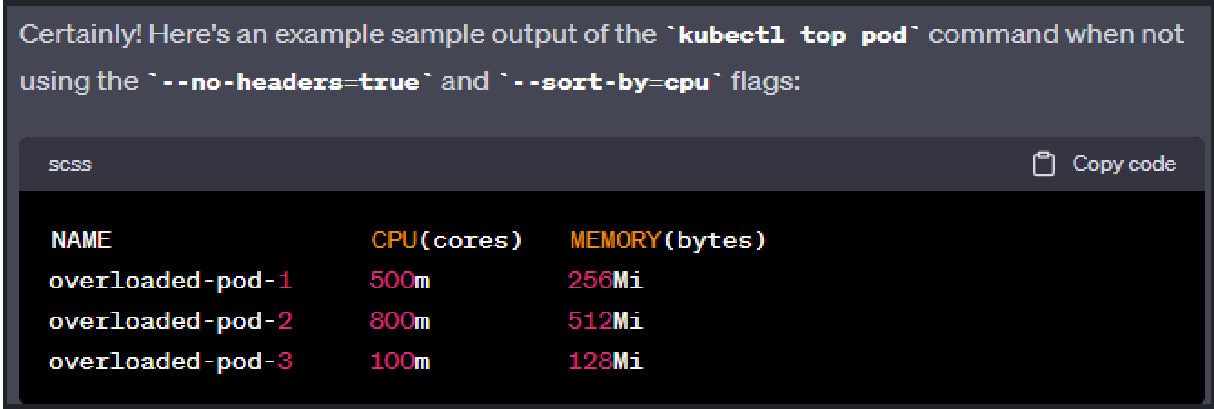


When you use both the `--no-headers=true` and `--sort-by=cpu` flags with the `kubectl top pod` command, the sample output will look like this:

```
overloaded-pod-2      800m         512Mi
overloaded-pod-1      500m         256Mi
overloaded-pod-3      100m         128Mi
```

——---- when we don’t use --sort-by=cpu, --no-headers=true output will be------

```
$ kubectl top pods -l name=overloaded-cpu
```



Certainly! Here's an example sample output of the `kubectl top pod` command when not using the `--no-headers=true` and `--sort-by=cpu` flags:

```
NAME                CPU(cores)   MEMORY(bytes)
overloaded-pod-1    500m         256Mi
overloaded-pod-2    800m         512Mi
overloaded-pod-3    100m         128Mi
```

——---------- so better will be, to check and save name manually——-------------

```
$ echo “overloaded-pod-2”  > /opt/KUTR00401/KUTR00401.txt
```

Question 14: A kubernetes worker node name worker1.example .com is in state NotReady. Investigate why this is the case & perform any appropriate steps to bring the node to a Ready state, ensuring that any changes are made permanent.
[you can ssh to the failed node]

——----------------------- Because of kubelet service down, node worker1.example.com is in state NotReady, We need to restart and enable service ——------------------

```
$ kubectl get nodes -o wide
$ kubectl describe node worker1.example.com
$ ssh worker1.example.com
$ sudo su -
root@worker1 ~# systemctl status kubelet
root@worker1 ~# systemctl restart kubelet
root@worker1 ~# systemctl enable kubelet
root@worker1 ~# systemctl status kubelet
EXIT
```

```
$ kubectl get nodes -o wide
```

Question 15:

- Create a service account named cicd-token in ‘app-team1’ namespace.
- Create a clusterrole which allow to only create resources Deployment, DaemonSet & statefulSet.
- Bind that clusterrole with the service account ‘cicd-token’ create in ‘app-team1’ namespace.

```
——--------------------- Create a service account——-----------------------------------------------


$ kubectl create serviceaccount cicd-token --namespace= app-team1

$ kubectl get serviceaccount -n app-team1
$ kubectl get serviceaccount -n app-team1 | grep cicd-token

——----------------- Create a clusterrole ——-----------------------------------------------------

$ kubectl create clusterrole cr1 --verb=create
--resource=deployments.apps,daemonsets.apps,statefulsets.apps

$ kubectl get clusterrole | grep c-role
$ kubectl describe clusterrole c-role

——---------------Create a clusterrolebinding——-----------------------------------------------
$ kubectl create clusterrolebinding --help

$  kubectl create clusterrolebinding crb1 --clusterrole=clusterrole
--serviceaccount=app-team1:cicd-token

$ kubectl get clusterrolebinding | grep crb1
$ kubectl describe clusterrolebinding crb1
```

Question 16: Upgrade the kubeadm version from 1.22.1 to 1.22.2 along with kubectl & kubelet only on master node (Never update anything on worker nodes.)

```
--First we will check versions, ssh the node, drain the master node, update new
packages, restart, enable kubelet services--

$ kubeadm version
$ kubectl version
$ kubelet --version
$ kubectl drain masternode --ignore-daemonsets

Note:- ------------------------ Neither we need to use $ apt update command, nor we
need to use $ systemctl restart/enable kubelet ——------------------------------------

$ ssh masternode
$ sudo  apt-get install -y  kubeadm:1.22.2 kubelet:1.22.2 kubectl:1.22.2

EXIT

$ kubectl uncordon masternode
$ kubectl get nodes
$ kubectl version
$ kubelet --version
$ kubeadm version
```

Question 17: Create a deployment named ku8s-deploy with httpd image & upgrade the version of this deployment. Ex httpd:2.4 and httpd:latest

```
——---------------- Create a deployment with httpd:2.4 version——-----------------------------

$ kubectl create deploy  --help | less
$ kubectl create deployment ku8s-deploy --image=httpd:2.4 --replicas=3
$ kubectl get deploy
$ kubectl describe deploy ku8s-deploy

——---------------- Update httpd image with latest version——-----------------------------------
$ kubectl set image --help | less
$ kubectl set image deployment ku8s-deploy httpd=httpd:latest
$ kubectl describe deployment ku8s-deploy

——------------------------------------------------------------------------------------------------
——-------------------------Or you can use this method——-----------------------------------------
——------------------------------------------------------------------------------------------------



——-------------------------------------- Create a deployment——--------------------------------------
$ vi deployment.yml

apiVersion: apps/v1
kind: Deployment
metadata:
  name: ku8s-deploy
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: httpd
        image: httpd:2.4


$ kubectl create -f deployment.yml
$ kubectl get pods
$ kubectl get deploy

——---------------- upgrade image version——------------------------------------------------------------

$ vi deployment.yml

apiVersion: apps/v1
kind: Deployment
metadata:
  name: ku8s-deploy
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: httpd
        image: httpd:latest


$ kubectl apply -f deployment.yml
$ kubectl describe deploy ku8s-deploy
$ kubectl get deploy
```