1- Create a pod with the name redis and with the image redis.

```
eman@ubuntu:~$ kubectl run redis --image=redis
pod/redis created
eman@ubuntu:~$ kubectl get pod redis
NAME     READY    STATUS     RESTARTS    AGE
redis    1/1      Running    0           18s
eman@ubuntu:~$ kubectl describe pod redis
Name:              redis
```

2- Create a pod with the name redis and with the image redis.

```
eman@ubuntu:~$ vi q2.yaml
eman@ubuntu:~$ kubectl apply -f q2.yaml
pod/nginx created
eman@ubuntu:~$ cat q2.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx
spec:
  containers:
  - name: nginx
    image: nginx123
eman@ubuntu:~$ kubectl get pod nginx
NAME     READY    STATUS              RESTARTS    AGE
nginx    0/1      ImagePullBackOff    0           22s
eman@ubuntu:~$ docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
Digest: sha256:9d6b58feebd2dbd3c56ab5853333d627cc6e281011cfd6050fa4bcf2072c9496
Status: Image is up to date for nginx:latest
docker.io/library/nginx:latest
```

3-What is the nginx pod status?

```
Events:
  Type      Reason      Age                     From               Message
  ----      ------      ----                    ----               -------
  Normal    Scheduled   5m1s                    default-scheduler  Successfully assigned default/nginx to minikube
  Normal    Pulling     118s (x5 over 4m59s)    kubelet            Pulling image "nginx123"
  Warning   Failed      116s (x5 over 4m56s)    kubelet            Failed to pull image "nginx123": Error response from daemon: pull
 access denied for nginx123, repository does not exist or may require 'docker login': denied: requested access to the resource i
s denied
  Warning   Failed      116s (x5 over 4m56s)    kubelet            Error: ErrImagePull
  Warning   Failed      55s (x15 over 4m56s)    kubelet            Error: ImagePullBackOff
  Normal    BackOff     4s (x19 over 4m56s)     kubelet            Back-off pulling image "nginx123"
eman@ubuntu:~$ kubectl get pod nginx
NAME     READY    STATUS              RESTARTS    AGE
nginx    0/1      ImagePullBackOff    0           5m8s
eman@ubuntu:~$
```

4-Change the nginx pod image to "nginx" check the status again

```
eman@ubuntu:~$ vi q2.yaml
eman@ubuntu:~$ kubectl apply -f q2.yaml
pod/nginx configured
eman@ubuntu:~$ cat q2.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx
spec:
  containers:
  - name: nginx
    image: nginx
eman@ubuntu:~$ kubectl get pod nginx
NAME     READY    STATUS      RESTARTS    AGE
nginx    1/1      Running     0           13m
```

5-How many ReplicaSets exist on the system?

```
eman@ubuntu:~$ kubectl get replicaset
No resources found in default namespace.
eman@ubuntu:~$
```

6- create a ReplicaSet with
name= replica-set-1
image= busybox
replicas= 3

```
eman@ubuntu:~$ vi q7.yaml
eman@ubuntu:~$ kubectl apply -f q7.yaml
replicaset.apps/replica-set-1 created
eman@ubuntu:~$ kubectl get replicaset
NAME            DESIRED    CURRENT    READY    AGE
replica-set-1   3          3          0        13s
```

```
eman@ubuntu:~$ cat q7.yaml
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: replica-set-1
spec:
  replicas: 3
  selector:
    matchLabels:
      app: busybox-app
  template:
    metadata:
      labels:
        app: busybox-app
    spec:
      containers:
      - name: replica-set-1
        image: busybox
        command: ["sh", "-c", "while true; do sleep 3600; done"]
eman@ubuntu:~$
```

7-Scale the ReplicaSet replica-set-1 to 5 PODs

```
eman@ubuntu:~$ kubectl get replicasets.apps
NAME                DESIRED   CURRENT   READY   AGE
replica-set-1       5         5         5       4m56s
eman@ubuntu:~$ kubectl get pods
NAME                  READY   STATUS    RESTARTS   AGE
nginx                 1/1     Running   0          6h35m
redis                 1/1     Running   0          6h45m
replica-set-1-h2qjd   1/1     Running   0          5m1s
replica-set-1-jnfnb   1/1     Running   0          5m1s
replica-set-1-rr6pr   1/1     Running   0          4m30s
replica-set-1-zb9l9   1/1     Running   0          5m1s
replica-set-1-zt5gw   1/1     Running   0          4m30s
eman@ubuntu:~$
```

8-How many PODs are READY in the replica-set-1?
5 pod

9-Delete any one of the 5 PODs then check How many PODs exist now?

```
eman@ubuntu:~$ kubectl get  pods
NAME                      READY    STATUS     RESTARTS    AGE
nginx                     1/1      Running    0           7h21m
redis                     1/1      Running    0           7h31m
replica-set-1-h2qjd       1/1      Running    0           50m
replica-set-1-jnfnb       1/1      Running    0           50m
replica-set-1-rr6pr       1/1      Running    0           49m
replica-set-1-zb9l9       1/1      Running    0           50m
replica-set-1-zt5gw       1/1      Running    0           49m
eman@ubuntu:~$ kubectl delete pod
poddisruptionbudgets.policy  pods                            podtemplates
eman@ubuntu:~$ kubectl delete pods replica-set-1-h2qjd
pod "replica-set-1-h2qjd" deleted
eman@ubuntu:~$ kubectl get  pods
NAME                      READY    STATUS     RESTARTS    AGE
nginx                     1/1      Running    0           7h22m
redis                     1/1      Running    0           7h32m
replica-set-1-jnfnb       1/1      Running    0           51m
replica-set-1-qvx5q       1/1      Running    0           51s
replica-set-1-rr6pr       1/1      Running    0           51m
replica-set-1-zb9l9       1/1      Running    0           51m
replica-set-1-zt5gw       1/1      Running    0           51m
```

9-Why are there still 5 PODs, even after you deleted one?
because the ReplicaSet ensures that the desired number of Pods is always maintained, as specified in
the YAML file.

10-How many Deployments and ReplicaSets exist on the system?

```
eman@ubuntu:~$ kubectl get replicasets.apps
NAME            DESIRED    CURRENT    READY     AGE
replica-set-1   5          5          5         63m
eman@ubuntu:~$ kubectl get deployments
No resources found in default namespace.
eman@ubuntu:~$ kubectl get all
NAME                          READY    STATUS     RESTARTS    AGE
pod/nginx                     1/1      Running    0           7h34m
pod/redis                     1/1      Running    0           7h44m
pod/replica-set-1-f8mk2       1/1      Running    0           11m
pod/replica-set-1-jnfnb       1/1      Running    0           63m
pod/replica-set-1-kmx24       1/1      Running    0           8m38s
pod/replica-set-1-zb9l9       1/1      Running    0           63m
pod/replica-set-1-zt5gw       1/1      Running    0           63m

NAME                 TYPE        CLUSTER-IP    EXTERNAL-IP   PORT(S)    AGE
service/kubernetes   ClusterIP   10.96.0.1     <none>        443/TCP    40h

NAME                          DESIRED    CURRENT    READY     AGE
replicaset.apps/replica-set-1 5          5          5         63m
```

11-create a Deployment with
name= deployment-1
image= busybox
replicas= 3

```
eman@ubuntu:~$ cat q12.yaml
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: deployment-1
spec:
  replicas: 3
  selector:
    matchLabels:
      app: busybox-app
  template:
    metadata:
      labels:
        app: busybox-app
    spec:
      containers:
      - name: deployment-1
        image: busybox
        command: ["sh", "-c", "while true; do sleep 3600; done"]
eman@ubuntu:~$ nano q12.yaml
eman@ubuntu:~$ kubectl apply  -f q12.yaml
deployment.apps/deployment-1 created
```

12-How many Deployments and ReplicaSets exist on the system now?

```
eman@ubuntu:~$ kubectl get replicasets.apps
NAME                        DESIRED   CURRENT   READY   AGE
deployment-1-77496499c4     3         3         3       5m37s
replica-set-1               5         5         5       91m
eman@ubuntu:~$ kubectl get deployments.apps
NAME            READY   UP-TO-DATE   AVAILABLE   AGE
deployment-1    3/3     3            3           5m41s
eman@ubuntu:~$
```

13-How many pods are ready with the deployment-1?

```
eman@ubuntu:~$ kubectl get pods
NAME                      READY   STATUS     RESTARTS   AGE
deployment-1-4jz9r        1/1     Running    0          6m7s
deployment-1-7m58l        1/1     Running    0          6m7s
deployment-1-cv7z4        1/1     Running    0          6m7s
```

14-Update deployment-1 image to nginx then check the ready pods again

```
eman@ubuntu:~$ nano q12.yaml
eman@ubuntu:~$ kubectl apply -f q12.yaml
deployment.apps/deployment-1 configured
eman@ubuntu:~$ kubectl get pods
NAME                             READY   STATUS             RESTARTS   AGE
deployment-1-77496499c4-rtjfh    1/1     Terminating        0          11m
deployment-1-77496499c4-srswc    1/1     Running            0          11m
deployment-1-77496499c4-wb959    1/1     Running            0          11m
deployment-1-7d675474d-9fmqh     1/1     Running            0          13s
deployment-1-7d675474d-qk5zt     0/1     ContainerCreating  0          1s
nginx                            1/1     Running            0          8h
redis                            1/1     Running            0          8h
replica-set-1-f8mk2              1/1     Running            0          45m
replica-set-1-jnfnb              1/1     Running            0          98m
replica-set-1-kmx24              1/1     Running            0          43m
replica-set-1-zb9l9              1/1     Running            0          98m
replica-set-1-zt5gw              1/1     Running            0          97m
```

15-Run kubectl describe deployment deployment-1 and check events

```
  Labels:   app=busybox-app
  Containers:
   deployment-1:
    Image:        nginx
    Port:         <none>
    Host Port:    <none>
    Command:
      sh
      -c
      while true; do sleep 3600; done
    Environment:    <none>
    Mounts:         <none>
  Volumes:          <none>
  Node-Selectors:   <none>
  Tolerations:      <none>
Conditions:
  Type           Status  Reason
  ----           ------  ------
  Available      True    MinimumReplicasAvailable
  Progressing    True    NewReplicaSetAvailable
OldReplicaSets:  deployment-1-77496499c4 (0/0 replicas created)
NewReplicaSet:   deployment-1-7d675474d (3/3 replicas created)
Events:
  Type    Reason            Age    From                  Message
  ----    ------            ----   ----                  -------
  Normal  ScalingReplicaSet  14m    deployment-controller  Scaled up replica set deployment-1-77496499c4 from 0 to 3
  Normal  ScalingReplicaSet  3m1s   deployment-controller  Scaled up replica set deployment-1-7d675474d from 0 to 1
  Normal  ScalingReplicaSet  2m49s  deployment-controller  Scaled down replica set deployment-1-77496499c4 from 3 to 2
  Normal  ScalingReplicaSet  2m49s  deployment-controller  Scaled up replica set deployment-1-7d675474d from 1 to 2
  Normal  ScalingReplicaSet  2m38s  deployment-controller  Scaled down replica set deployment-1-77496499c4 from 2 to 1
  Normal  ScalingReplicaSet  2m38s  deployment-controller  Scaled up replica set deployment-1-7d675474d from 2 to 3
  Normal  ScalingReplicaSet  2m25s  deployment-controller  Scaled down replica set deployment-1-77496499c4 from 1 to 0
```

15-What is the deployment strategy used to upgrade the deployment-1?

```
deployment-1-7d675474d from 1 to 0
eman@ubuntu:~$ kubectl describe deployments.apps deployment-1 | grep "StrategyType"
StrategyType:          RollingUpdate
eman@ubuntu:~$ 
```

16-Rollback the deployment-1
What is the used image with the deployment-1?

```
eman@ubuntu:~$ kubectl rollout  undo deployment/deployment-1
deployment.apps/deployment-1 rolled back
eman@ubuntu:~$ kubectl describe deployments.apps deployment-1 | grep "Image"
    Image:        busybox
eman@ubuntu:~$ 
```

17-Create a deployment using nginx image with latest tag only and remember to mention tag i.e nginx:latest and name it as nginx-deployment. App labels should be app: nginx-app and type: front-end. The container should be named as nginx-container; also make sure replica counts are 3.

```
eman@ubuntu:~$ vi q18.yaml
eman@ubuntu:~$ kubectl apply -f q18.yaml
deployment.apps/nginx-deployment created
eman@ubuntu:~$ cat q18.yaml
```

```
eman@ubuntu:~$ cat q18.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx-app
      type: front-end
  template:
    metadata:
      labels:
        app: nginx-app
        type: front-end
    spec:
      containers:
      - name: nginx-container
        image: nginx:latest
eman@ubuntu:~$
```

```
eman@ubuntu:~$ kubectl get  all
NAME                                        READY     STATUS     RESTARTS     AGE
pod/deployment-1-77496499c4-75dk9           1/1       Running    0            9m46s
pod/deployment-1-77496499c4-rdckk           1/1       Running    0            8m33s
pod/deployment-1-77496499c4-vgch9           1/1       Running    0            10m
pod/nginx                                   1/1       Running    0            8h
pod/nginx-deployment-69b966d577-7fl5t       1/1       Running    0            104s
pod/nginx-deployment-69b966d577-f2b4g       1/1       Running    0            104s
pod/nginx-deployment-69b966d577-tg4wn       1/1       Running    0            104s
pod/redis                                   1/1       Running    0            8h
pod/replica-set-1-f8mk2                      1/1       Running    0            63m
pod/replica-set-1-jnfnb                      1/1       Running    0            115m
pod/replica-set-1-kmx24                      1/1       Running    0            60m
pod/replica-set-1-zb9l9                      1/1       Running    0            115m
pod/replica-set-1-zt5gw                      1/1       Running    0            115m


NAME                 TYPE         CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
service/kubernetes   ClusterIP    10.96.0.1     <none>         443/TCP    41h


NAME                                READY    UP-TO-DATE    AVAILABLE    AGE
deployment.apps/deployment-1        3/3      3             3            29m
deployment.apps/nginx-deployment    3/3      3             3            104s


NAME                                            DESIRED    CURRENT    READY    AGE
replicaset.apps/deployment-1-77496499c4         3          3          3        29m
replicaset.apps/deployment-1-7d675474d          0          0          0        17m
replicaset.apps/nginx-deployment-69b966d577     3          3          3        104s
replicaset.apps/replica-set-1                   5          5          5        115m
```