Homework 5: Kubernetes

Correct answers are labeled red bold.
Some necessary explanations are labelled blue.

Q1: At the highest level, Kubernetes is two things:

(This is a multi-answer question. You can select one or more options as the answer.)

- **A. A cluster for running applications.**
- B. A container for running applications.
- **C. An orchestrator of cloud-native microservices apps.**
- D. An orchestrator of hardware distribution for microservices apps.

Q2: What must all communications between components in Control Plane go through?

- A. Etcd. (etcd is the key-value store used to store all cluster data.)
- B. Controller manager. (Controller manager manages various controllers that ensure the desired state of the cluster is maintained.)
- **C. API server.** (In Kubernetes, the API server acts as the central management entity that all other components in the Control Plane communicate with. Every request to change the state of the cluster, retrieve information, or perform operations on the cluster goes through the API server.)
- D. Scheduler. (Scheduler assigns pods to nodes based on resource availability and other constraints.)

Q3: Which of the following will be shared by all the containers in a pod?

(This is a multi-answer question. You can select one or more options as the answer.)

- **A. A hostname.**
- **B. An IP address.** (The IP address assigned to the pod will be shared, but there are still different IP addresses for each container inside the pod.)
- C. A memory address space.
- **D. A volume.**

Q4: Two containers in the same Pod cannot use the same port.

- **A. True.** (Containers in the same Pod need to have separate ports.)
- B. False.

Q5: Which command will POST pod.yml to the API server?

- **A. `kubectl apply -f pod.yml`**
- B. `kubectl post -f pod.yml`
- C. `kubectl app -f pod.yml`
- D. `kubectl manifest -f pod.yml`

Q6: Which command will delete the Pod deployed from pod.yml?

A. `kubectl remove -f pod.yml`
B. `kubectl delete -f pod.yml`
C. `kubectl not -f pod.yml`
D. `kubectl erase -f pod.yml`

Q7: Deployments use _____ to provide self-healing and scaling.

A. ReplicaSet
B. Pod (Pods are the smallest unit of scheduling, which are manipulated by ReplicaSets. Pods cannot provide self-healing and scaling features.)
C. Service (A Service provides networking and load balancing, not self-healing or scaling.)
D. Controller (While Deployments are a type of Controller, the specific mechanism that provides self-healing and scaling in Deployments is the ReplicaSet.)

Q8: What is the Kubernetes default Service type?

A. NodeIP
B. ClusterIP
C. PodIP
D. PortIP

Q9: What is the purpose of the NodePort Service?

A. It enables access from outside of the cluster. (A NodePort Service exposes a service to the outside world by opening a specific port on all nodes in the cluster. This allows external traffic to access the service via the node's IP and the NodePort.)
B. It enables access from inside of the cluster. (This is typically handled by a ClusterIP Service.)
C. It enables access from ClusterIP. (ClusterIP is the default service type that is only accessible within the cluster.)
D. It enables access from PortIP. (There is no PortIP in Kubernetes.)

Q10: The command to **imperatively** create a Kubernetes Service is:

A. `kubectl apply`
B. `kubectl expose` (Using this command to expose a port for existing resources (e.g. replicaset or deployment) is a declarative model.)
C. `kubectl set`
D. `kubectl deploy`