CCGC5002 Software Defined Network, Mid Term Winter 2023

Full name:

ID:

Time: 60 minutes

Total: 25 marks

Instructions: please upload your solutions in word or pdf format in a single file within the deadline. In addition, email your solution as an attachment to your Professor (Muhammad.alam@humber.ca) by the deadline. Number your answers. There are 9 questions in total.

Format: Open book

1. You are a cloud service provider. One of your clients requested to block/drop tcp traffic to one of the servers they are using. You found that the server ip is 192.0.2.1 and the id of the SDN switch the server connected is 2. Write the OpenFlow specific flow in JSON format that you would want to add to the SDN switch to fulfill client's request. [3 marks]

2. You are a cloud administrator and you are looking to create 6 equal size Virtual Private Cloud (VPC) for a client. Given network id 192.168.15.0/25, how can you allocate the blocks of ips to the 6 VPCs? What would be the new subnet mask, network id and broadcast ip for each of the VPCs? [6 marks]

3. You are a cloud service provider and one of your client's network generates massive traffic all the time. What can you do to have reduced number of flows in the SDN switches at a time? [2 marks]

4. You are a cloud software developer and you forgot to configure priority of the flows for the SDN switches ie. the priority is set to zero for all flows. However, there are 2 category of flows and one category of flows need to be executed before the other category of flows. How can you handle this situation without modifying the priority field in the flows? [2 marks]

5. What sort of network topology will the following code build? What line should you add to make it a ring topology? [2 marks]

```
s1 = self.addSwitch('s1')
s2 = self.addSwitch('s2')
s3 = self.addSwitch('s3')

h1 = self.addHost('h1', mac="00:00:00:00:11:11", ip="192.168.1.1/24")
h2 = self.addHost('h2', mac="00:00:00:00:11:12", ip="192.168.1.2/24")
h3 = self.addHost('h3', mac="00:00:00:00:11:13", ip="192.168.1.3/24")

self.addLink(h1, s1)
self.addLink(h2, s2)
self.addLink(h3, s3)

self.addLink(s1, s2)
self.addLink(s2, s3)
```

6. A SDN switch fails to connect all its channels due to controller failure. Will it be able to handle packet (i.e., forward to appropriate port) based on Mac address? [2 marks]

7. Discuss few Symmetric messages of the OpenFlow Protocol. [3 marks]

8. What are the three fundamental principles that motivated the build of Ethane Architecture by Scott Shenker and his team? [3 marks]

9. You are a cloud test engineer and a client of yours does not want to pay for load balancing service before having more information about the Web server he is running within a single VM only. What sort of test would you perform to dimension this client's server to convince him and to recommend when additional resources could be beneficial to have for the client? [2 marks]