CS3251 - Spring 2020

HW 2

Due February 21, 23:59 (please see late policy spelled out in syllabus). Please show all your work to receive full credit. Answers without work leading up to them will not receive any credit. Please submit PDF or Word file using Canvas.

Question 1.

a) A routing table contains the following entries:

Address	Interface
209.100.0.0/16	2
209.100.0.0/30	1
209.100.17.0/24	3
Otherwise	4

Where will IP datagrams addressed to the following IP addresses be routed. ***Explain your answer.***

i) 209.100.34.101
ii) 209.100.17.5
iii) 209.100.0.1
iv) 209.100.0.20
v) 209.101.27.10

b) A routing table has the following entries:

Prefix	Interface
130.207.0.0/16	A
130.207.208.0/20	B
130.207.210.0/23	C
Otherwise	D

i. A packet arrives for address: 130.207.211.1. Where should it be routed?
ii. What about a packet for 130.207.240.15?
iii. The network operator would like to add the following route:
Prefix: 130.207.216.0/21 Interface: B.
Is a new entry in the table needed? Why or why not?

Question 2

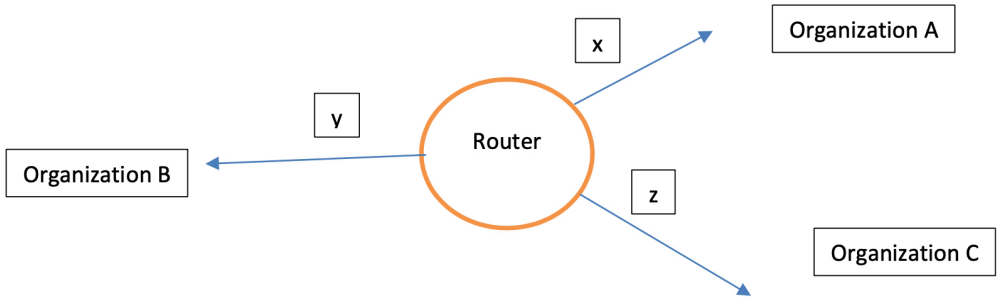
An ISP allocates the following addresses to three organizations A, B, and C.

- Organization A gets the IP addresses in the range 68.35.0.0 to 68.35.0.31
- Organization B gets the IP addresses in the range 68.35.0.0 to 68.35.1.255 – except it does not get addresses within that range allocated to A
- Organization C gets the IP addresses in the range 68.35.0.0 to 68.35.63.255 – expect it does not get addresses within this range that have already been allocated to organizations A and B.

a) Which organization do the following addresses belong to: A, B, C or none of them? Explain your answer.

68.35.1.0
68.35.0.1
68.35.255.4
68.35.32.5
68.35.17.17

b) The ISP has a router with three interfaces labelled x, y, and z as shown in the figure below. Packets destined to organization A need to go to interface x, packets destined for organization B need to go to interface y, and packets destined for organization C need to go to interface z. Show the forwarding table that accomplishes this forwarding in the ISP's router.

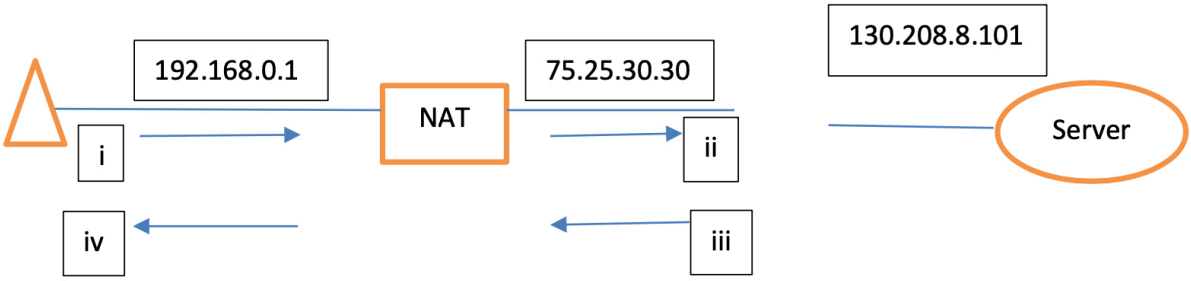


Question 3

A user has a device attached to their home network. The device is allocated IP addresses 192.168.0.1. The user's ISP allocates the IP address 75.25.30.30 to the user. The user's home router performs Network Address Translation.

An application on device A (Triangle) begins to download a large file from a server whose IP address is 130.208.8.101 using TCP. The local port number at device A is 23567 and the server port number is 234.

This is shown in the figure below.



For each of the packet directions i, ii, iii, iv show the source IP address, destination IP address, source port number, destination port number. Also show the corresponding NAT table. *For numbers that are not given in the question you may come up with your own numbers if needed.*