CSE421 Assignment 05 [MSMA | 2024 Fall]

Total points 87.5/100

Answer all the questions in this form. **You can submit only once even if you submit by mistake. So, make sure that your answers are put correctly by refreshing the page.**
Deadline: December 22, 2024 (Sunday) 11:59:59pm

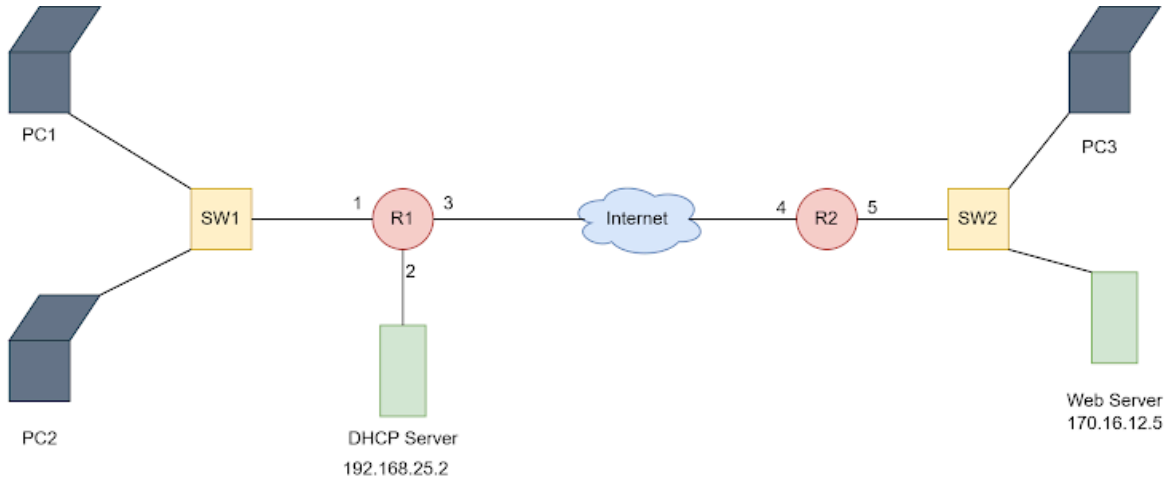
[This is optional] Submit your workings through a pdf file. Naming Format: ID_Name

Add file

✓ **Q1. Which options of the following are correct? *** 5/5

- [ ] Interfaces of a router can never act as both input port and output port
- [x] Switching fabric is part of a router ✓
- [ ] Internet follows Virtual Circuit network
- [x] ICMP is a helping protocol ✓

Answer rest of the questions based on the following topology.



✓ **Q2. Both PC1 and PC2 are the part of 192.168.2.0/24 network and they will get their IP address with the help of DHCP. Select the correct option.** *5/5

- ○ No DHCP relay needed for the PCs to get IP configuration
- ◉ DHCP relay is needed to be set in port 1 ✓
- ○ DHCP relay is needed to be set in port 2
- ○ DHCP relay is needed to be set in port 3

✗ **Q3. What will be the destination IP address when the DHCP Discover packet is going from PC1 to R1? (Format: 10.10.10.10)** *…/5

255.255.255.0 ✗

Correct answer

255.255.255.255

✓ **Q4. What will be the destination IP address when the DHCP Discover packet is going from R1 to DHCP Server? (Format: 10.10.10.10)** *5/5

192.168.25.2 ✓

✗ **Q5. If both PC1 and PC2 want to go to internet at the same time how will that be done if R1 has only one public IP address? (Only one word answer)** *2.5/5

NAT ✗

Correct answer

PAT

✓ **Q6. The web server doesn't have any dedicated public IP address. How will the devices outside of its network request to the server? (Only two words answer)** *5/5

Port Forwarding ✓

Answer Q7 to Q10 based on the following scenario and the above topology

PC1 got IP address **192.168.2.9** and PC2 got IP address **192.168.2.5** through DHCP. Both R1 and R2 are the border gateway routers and have only one public IP address each for going to internet. R1 has **209.20.50.19** in its NAT pool and R2 has **209.10.90.5** in its NAT pool.

PC1 has requested for a webpage from the webserver. The source port address is **60000** and the destination port address is **80**. Immediately, **PC2** also requested for a webpage from the webserver using the port address **60000**.

✓ **Q7. What will be the source socket address when the packet is going from PC2 to R1? (Format: 10.10.10.10:100)** *5/5

192.168.2.5:60000 ✓

✓ **Q8. What will be the source socket address when the packet is going from R1 to Webserver? (Format: 10.10.10.10:100)** *5/5

209.20.50.19:60001 ✓

✓ **Q9. What will be the destination socket address when the packet is going from PC2 to R2? (Format: 10.10.10.10:100)** *5/5

209.10.90.5:80 ✓

✓ **Q10. What will be the destination socket address when the packet is going from R2 to Webserver? (Format: 10.10.10.10:100)** *5/5

170.16.12.5:80 ✓

Answer Q11 to Q15 based on the following scenario and the above topology

The request packet R1 got from PC1 is **X** bytes. However, the MTU of link between R1 and Internet is less than X bytes. So, the packet got fragmented into **21 fragments** and one of them is **half of MTU**. The last byte number of the **8th fragment is 6791** and the fragment offset of the **10th** fragment is **945**. The header size is **one-seventh** of the MTU.

✓ **Q11. Calculate the size of MTU. *** 10/10

896 ✓

Feedback

*945*8-6792=768*

let, mtu = x, header = x/7
768 +x/7 = x
x= 896

✓ **Q12. Calculate the size of original packet. *** 10/10

15808 ✓

Feedback

header = 128 one seventh of mtu
data in a full fragment = 768
last fragment size = 896/2=448
*original packet size = 768*20+(448-128) + 128 =15808*

✓ **Q13. Calculate the starting byte number of data. *** 10/10

648 ✓

Feedback

*starting = 6792-8*768=648*

✓ **Q14. Calculate the fragment offset of the 15th fragment. *** 10/10

1425 ✓

Feedback

*(648+768*14)/8=1425*

✗ **Q15. If all the fragments arrive at R2 and R2 needs to pass the fragments using a link having MTU of 632 bytes, calculate the number of fragments that will be created in total for the original datagram.** *5/10

32 ✗

Correct answer

41

Feedback

new mtu = 632
max data in new fragments = 632-128=504

data in previous full fragments = 768
one full fragment will be divided into 768/504 = 2 (ceil value)

There were 20 full fragments, they will be divided into 40 fragments.

Now, the last fragment that came of R1 had data = 448-128=320
for this we need, 320/504= 1 fragment.

Total number of fragments R2 will create = 40+1 =41