CSE 421 Assignment 2

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Section: 22

Dept: CSE

Ans to ques Q1

I) Ans: Address: 32.99.125.255/17

∴ Host bits = 32-17 = 15

∴ Total hosts = 2^{15} = 32768

= (32766) + 1 host bit + 1 broadcast bit

II) Ans: Total network bits = 17 = 8+8+1

∴ Third octate has only 1 MSB and the rest are 0, so 127.

∴ Broadcast address: 32.99.127.255.

III) Ans: Network address is: 32.99.128.0/17

			Host bits	Subnet
LAN A: 2000+2 = 2002 hosts	= 2048 − 1000 (3rd oct.)	0000 0000 (4th oct.)	$\log_2(2048) = 11$	8 (3rd Oct.)
LAN B: 1024+2 = 1026 hosts	= 2048 − 1000	0000 0000	$\log_2(2048) = 11$	8 (3rd Oct.)
LAN C: 3+2 = 5 hosts	= 8 −		1000 = $\log_2(8) = 3$	8 (4th Oct.)
WAN Links: 1+2 = 3 hosts	= 4 −		100 = $\log_2(4) = 2$	4 (4th Oct.)
WAN 2: 1+2 = 3 "	= 4 −		100 = $\log_2(4) = 2$	4 (4th Oct.)

Now: LAN A starting address: 32.99.128.0/21

∴ Next subnet: 32.99.136.0/21

∴ LAN B starting address: 32.99.136.0/21

∴ Next subnet: 32.99.144.0/29

∴ LAN C start address: 32.99.144.0/29

∴ Next subnet: 32.99.144.8/30

∴ WAN 1 start address: 32.99.144.8/30

∴ WAN 2 " : 32.99.144.12/30

(Ans)

Ans to ques: Q2

I) Ans: To allow outside user to initiate a connection to an internal server, we need port forwarding. Port forwarding is forwarding a request from one adress and port number combination to another. The public IP 203.0.113.10:21 will be forwarded to 10.0.0.50:21.

II) Ans: The network setup is using PAT (Port Address Translation) as many employees must be able to browse using one public IP and the network must multiplex flows using port numbers. PAT maps multiple local addresses to a single global address (NAT overload) using source port numbers to distinguish flows.

Ans to ques: 03

I) Ans: Total length = 6421, Data ~~length~~ header = 6 × 4 (IPv4)

∴ Data size = 6421 - 24
= 6397

Maximum data size = 1624

∴ Fragments = $\frac{6397}{1624}$ = 3.93 ≈ 4

∴ 4 fragments will be created.

II) Ans: ~~6397 × 0.93 =~~

Data size = 6397

Last fragment size ratio = (3.93 - 3)
~~= 0.93~~ = 0.07

∴ ~~Last packet size =~~

II) Ans: Data size = 6397
= 1624 + 1624 + 1624 + 1525

∴ Last packet size = 1525 bytes (Ans)

III) Ans: Packet sent ~~upto~~ last packet = 1624 × 3 = 4872

∴ 4th packet offset = 4872/8 = 609.

(Ans)

iv) Ans: At the destination host, IPv4 reassembles all the fragments belonging to Source IP, destination IP, protocol and each fragments offset to calculate where the payload fits in the original data stream where the MF (More Fragments) flag ~~we~~ whether more fragments are to be received. If MF bit = 0, then the receiver buffers fragments, orders them by offset to reconstruct the original data and send it to the upper layer. If some fragments don't arrive, the host discards the entire data.

v) Ans: MF or More Fragments means whether more fragments are to arrive, if so then MF bit = 1 otherwise MF = 0. This is significant as it tells the receiver host if the full data has arrived for reassembly.

Ans: to ques: Q5 [Section-B: any 2 ques]

I) Ans: Link State Routing protocol reaches convergence much faster than Distance Vector routing protocol, so routers R1, R4 and ISP router will converge faster.

Routers use 'Hello packets to keep track of their neighbors. Distance Vector routers (R1, R2 and R3) keep on receiving routing updates from neighbouring routers.

Ans: to Ques: Q6

I) Ans: 2001:0db8:85a3::8a2e:0370:7334

II) Ans: 2607:0:0:805::200e

III) Ans: 3ffe:1900:4545:1003:1200:a0f8:fe21:67cf

Section: C - B Answers

Ans to quess Q7

I) Ans: If the switches don't know the destination MAC address for PC D, then it floods the packet to all the exit interfaces except the incoming interface.

So the source MAC : PC A MAC address.

Destination MAC : FF-FF-FF-FF-FF-FF

II) Ans: Flooding the packet using broadcast is limited to LAN only. The destination IP of PC D is through the router, so the router will not forward ARP broadcast packets.

III) Ans: If PC A receives an ARP reply, it saves the mapping of the MAC address for PC D and its interface name to the ARP table.

Ans to ques@10

The function of the loopback address is to let a host send traffic to itself for testing the TCP/IP stack. It also lets troubleshooting local networking and also verify if an interface is up running locally. A message is addressed to loop back in the device itself.

A loopback address used in IPv4 is 127.0.0.0/8

~~IPv6 is ::1/128~~

IPv6 is ::1/128

(Ans)

Ans to ques 8 (1)

I) Ans: As all the switch tables contain information about all the devices, when PC A sends a packet to PC C, as the packet is received by switch S2, the switch looks up the MAC address for PC C in its switch table. If the switch S2 finds the correct outgoing port, then it forwards that packet to that port only.

II) Ans: The switches are called self learning devices it can automatically built switch table by reading the source MAC and associating it with the incoming interface port. Switches build and update switch tables automatically, initially by flooding when the destination MAC address is not present in the switch table, after getting an ARP reply then it saves the incoming packet port interface and destination/source ip address.