



Inspiring Excellence

Name: Rafiul Bari Chowdhury

ID: 22301481

Course Title: Computer Networks

Course Code : CSE421

Section : 22

Submitted to : BIJS

Assignment No: 02

Answer to the Q. No-01

a) i) Given,

Default IP 109.0.8.253

Number of hosts 2045

We need to calculate the number of host bits

$$2^h - 2 \geq 2045$$

$$2^h \geq 2047$$

$$2^{11} \geq 2047$$

host bit = 11 prefix length = $32 - 11 = 21$

Subnet mask 255.255.248.0

Network starts at 109.0.8.253

Network starts at 109.0.8.0

Network ends at 109.0.15.255

ii) Usable hosts = $2^{11} - 2 = 2046$

b) Base Network : 109.0.8.0/21

LAN with 500 hosts,

$$2^9 - 2 = 510 \Rightarrow 123 \text{ subnets}$$

Subnet allocated : 109.0.8.0/23

LAN with 255 host

$$2^8 - 2 = 254 \text{ (not enough)}$$

$$2^9 - 2 = 510 \Rightarrow 123 \text{ subnets}$$

Subnet allocation : 109.0.10.0/23

Switched network with 4 routers,

$$2^3 - 2 = 6 \Rightarrow 129 \text{ interfaces}$$

Subnet allocation : 109.0.12.0/29

WAN point-to-point link

$$2^2 - 2 = 2 \Rightarrow 130 \text{ links}$$

Subnet allocated : 109.0.12.8/30

$$2^1 = 2 - 1 = 1 \text{ link}$$

Final VLSM Summary

Subnet

LAN (500 hosts) 109.0.8.0/23

LAN (255 hosts) 109.0.10.0/23

Router Switch 109.0.12.0/29

WAN link 109.0.12.8/30

Ans. To The Q. No.-02

a) Traceroute sends packets with increasing TTL values. Each router that decrements TTL to zero replies with ICMP time Exceeded. When it reaches destination it replies with ICMP Port unreachable (UDP traceroute) which indicates destination is reached and traceroute stops.

GDIS =

OFDS = $\frac{GDIS}{8}$ =

(mA) OFDS = $\frac{GDIS}{8}$ = tra 720

b) 12 fragments with total length = 1945 bytes

Header

(at end 002) = 25 bytes

Last fragment (data ²²⁵) = 900 bytes

1) Data in one large fragment:

$$1945 - 25 = 1920 \text{ bytes}$$

Total data = 12 x 1920

= 23040 storefronts

$$23040 + 900 = 23940 \text{ bytes}$$

Adding header:

$$23940 + 25 = 23965 \text{ bytes}$$

11) offset unit = 8 bytes

Bytes before 2nd last = 11×1920

= 21130

$$\text{Offset} = \frac{21120}{8} = 2640 \text{ (Ans.)}$$

III) Identifying the last fragment is depending on these two.

- * The last fragment has MF = 0
- * All other fragments have MF = 1

c) The ~~BRACU~~ BRACU router is unable to send the packet through the internet because the internet network uses private IP addresses, which are not routable on the public internet. Since the internal network has 500 hosts, the solution is to configure Network Address Translation - specifically Port Address Translation. This way multiple hosts share one public IP.

To The Q. No. - 3
transport task Ans

a) i) The algorithm used is the Distance vector routing algorithm based on Bellman-Ford.

ii) Router T ignores updates

from router U

and uses only routers V and Y to update rule is

$$D_T(D) = \min [C(T, V) + D_V(D), C(T, Y) + D_Y(D)]$$

The distance to V remains 2

" " " to V becomes ∞

" " " to X $2+3=5$

" " " to Y $7+6=13$

" " " to Z $7+12=19$

The updated row for router T:

T	U	V	W	X	Y	Z
0	2	4 ∞	6 5	6 13	7	∞ 19

b) Distance vector sends its full routing table periodically to neighbours while Link state sends only link updates when there is changes.

c) Distance vector converges slowly due to hop-by-hop updates, routing loops, and count-to-infinity, whereas Link state converges faster due to global topology knowledge.

: T network Ans. to Q. No. - 4

a)

S	Y	X	W	V	U	T
∞	fixed	variable	∞	∞	∞	0

ip route 43.11.192.0 255.255.255.128

191.10.55.129

b) at other interface old IP address

ip route 21.1.64.0 255.255.255.192

112.24.205.2 10

Key difference is multi access

requires next-hop IP, not exit interface

c) static routes can be identified with S marking in routing table.

Gateway of last resort is not set

Ans. To The Q. No. - 05

a) Stateless DHCPv6 uses SLAAC for address assignment and DHCPv6 only for extra parameters, while stateful DHCPv6 assigns and tracks IPv6 addresses. Stateless is used for simpler networks. Stateful is used where centralized control is needed.

b) The IPv6 flow label identifies packets belonging to the same flow to enable efficient QoS handling.

c) Tunneling is used when IPv6 traffic must pass through an IPv4 network. Dual-stack routers are placed at the tunnel endpoints.

30-01-2021 Ans. To The Q. No.- 6

a) A MAC address is a physical, locally used address, while an IP address is a logical, routable address.

b) If host A wants to communicate with host M and host is on different subnet and host A sends ARP request for the gateway. After receiving the ARP reply, Host A stores the gateway's MAC address and sends the data frame to the router, which then forwards the packet toward host M.

c) Initial MAC address Tables

SW1	MAC Address	Port
	00.00.01.AR.40.00	
	00.00.01.AR.40.00	Fa 0/1
	00.04.9A.10.C6.78	Fa 0/2

SW2	MAC Address	Port
	Empty	Empty

After Host B sends ARP request
 for Host C's MAC Address
 After ARP request
 SW1

MAC Address	Port
00.00.01.AR.40.00	
00.00.01.AR.40.00	Fa 0/1
00.04.9A.10.C6.78	Fa 0/2
00.04.9A.10.C6.78	Fa 0/3

SW2

00.04.9A.10.C678	Fa 0/2	SW2
00.04.9A.10.C678	Fa 0/3	SW2
10.07	2A.00.00-15.00.00	SW2
10.07	8F.00.01-AP-10.00	SW2

SW2

Mac Address	Port	SW2
00.04.9A.10.C678	Fa 0/1	SW2

Transfer 9RA abgab e trah retzA

merdebA SAM 2' trah retzA
transfer 9RA retzA
SW2

trah	merdebA SAM
10.07	2A.00.00-15.00.00
10.07	8F.00.01-AP-10.00
10.07	8F.00.01-AP-10.00