Assignment 2

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Course: CSE421

Section: 23

Answer to the ques. no - 1

(i)

Given,

network 3.255.192.0/19 where 19 is the prefix.

∴ Host bits are = 32 - 19

= 13 bit

∴ Maximum subnet bits = host bits - 2

= 13 - 2

= 11

∴ Maximum number of subnets = 2^{11}

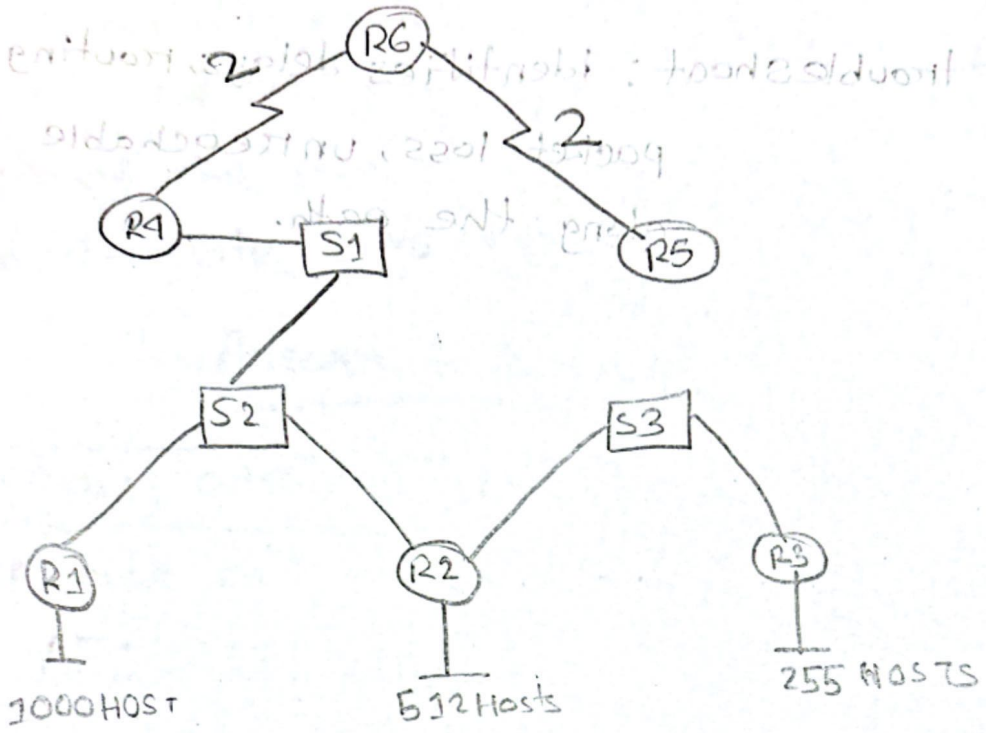
= 2048 subnets

2048

(ii)

Given,

3.255.192.0/19



R1: 1000 +2 → 1002

R2: 512 +2 → 519

R3: 255 +2 → 252

WAN1: 2+2 → 4

WAN2: 2+2 → 4

WAN3: 2+2 → 4

WAN4: 2+2 → 4

WAN5: 2+2 → 4

		hostbit	Submask generator
1002	1024	10	3rd, 4
519	1024	10	3rd, 4
252	256	8	3rd, 1
4	4	2	4th, 4

R1: 3.255.192.0/26

R2: 3.255.196.0/22

R3: 3.255.200.0/29

WAN1: 3.255.202.0/30

WAN2: 3.255.202.4/30

WAN3: 3.255.202.8/30

WAN4: 3.255.202.12/30

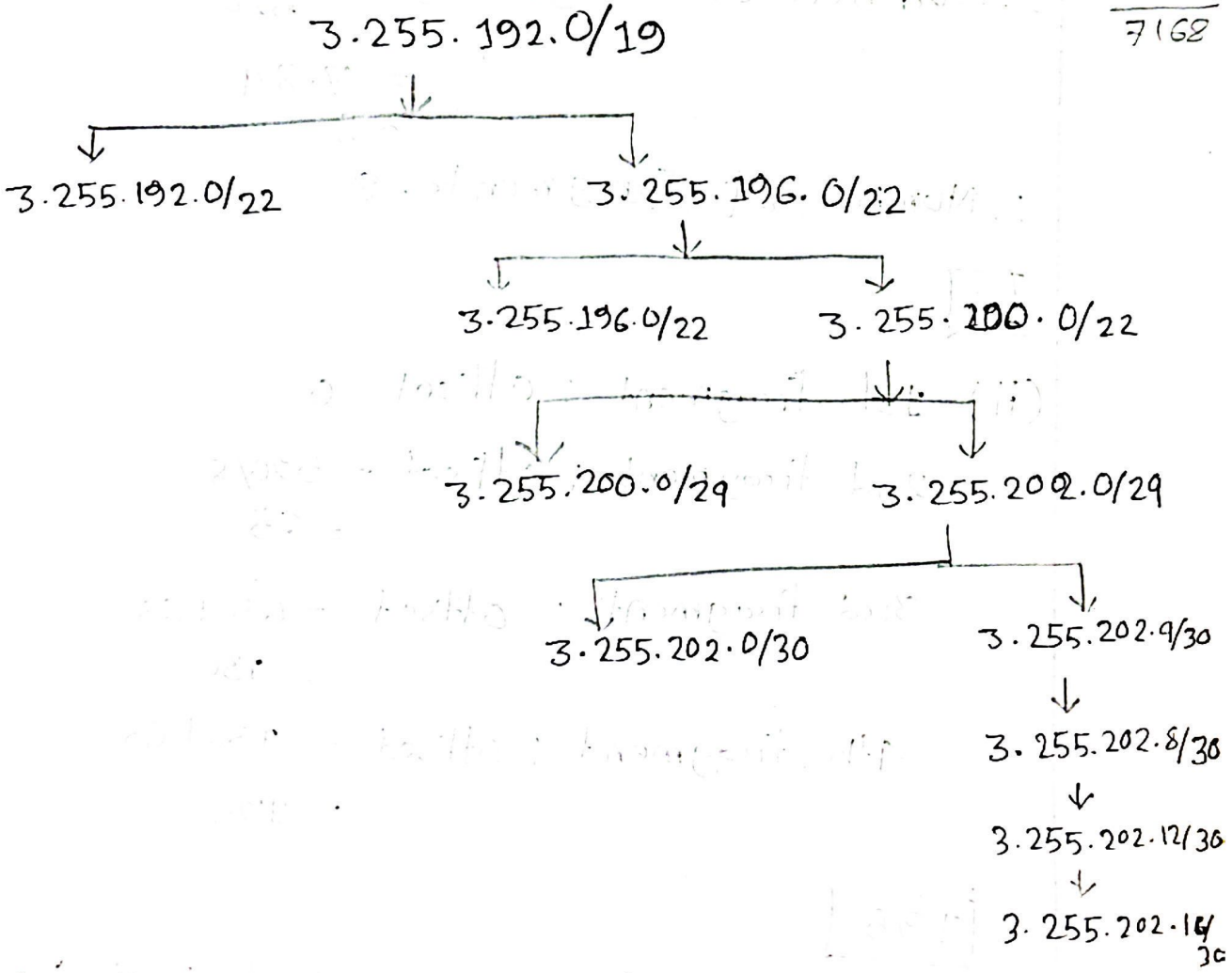
WAN5: 3.255.202.16/30

13

$2^{13} = 8192$

$- \quad 1024$

7168



Answer to the ques. no-2

(i) LAN related to R2:

LAN5: 198. 44. 128.0/20

LAN6: 198. 44. 144.0/20

LAN7: 198. 44. 160. 0/20

LAN8 : 198. 44. 176. 0/20

128 → 1000 0000

144 → 100 10000

160 → 10 100 000

176 → 10 110000

So the range ~~will~~ that covers all 4 LANs :

198. 44. 128.0 → 198. 44. 191. 255

command on R1 for S0[.2] hop:

```
ip route 198.44.128.0 255.255.192.0 20.2.1.2
```

Network: 198. 44. 128. 0

(ii)

```
ip route 0.0.0.0 0.0.0.0 20.2.2.2 10
```

Answer to the ques. no-3

(i) Given,

Original data size = 4080 bytes

MTU = 540 bytes

header size = 20 bytes

∴ Max data part fragment = 540 − 20

= 520

∴ Number of fragments = $\frac{4080}{520}$

= 7.89

≈ 8

∴ Number of fragments : 8

8

(ii) 1st fragment : offset = 0

2nd fragment : offset = 520/8

= 65

3rd fragment : offset = 65 + 65

= 130

4th fragment : offset = 130 + 65

= 195

∴ **195**

(iii) MF of 4th = 1 as not last fragment.

∴ **1**

Answer to the ques. no-9

DHCP offer from coffee shop to phone:

Source Mac: Router's mac address

Destination mac: Mobile's mac address

Content: offered IP address, subnet mask, default gateway, DNS servers, lease time, DHCP server ID.

Phone will send a DHCP request:

Source Mac: Mobile's Mac

Destination mac: Broadcast (FF:FF:FF:FF:FF:FF)

Content: Requests the offered IP and identifies the chosen DHCP server.

Answer to the ques. no - 5

Using temporary IP-Port mappings:

R1 use NAT and translate Dipu's private address 192.168.1.2:49153 to 173.253.138.221:49153. The packet will travel through internet using that IP port address. After reaching R2 it will again use NAT and map the public IP port 201.113.13.221:8080 to 192.168.1.2:80 and send to web server. R2 also saves the NAT table for the replies. This is how the communication will go on without fixed public IP.

Answer to the ques. no - 6

Hello protocol

R3 sends hello messages out of all interfaces. So and S1 which are the active links receive replies. From that hello, R3 learns about the neighbour interfaces and establish adjacencys The hello packets servers as a keep alive function to monitor the state of the neighbour.

Answer to the ques. no - 7

Not in syllabus.

Answer to the ques. no-8

Flooding

S1 will send message to all other device in the same LAN except the sending device. The destination device will replie. with the mac and port address and switch will update the mac table. It is done by broadcast frame.

S3 mac address table:

Mac	interface	TTL
PC2	F0	60
PC6	F3	60
PC4	F1	60

S4 macaddress table:

Mac	interface	TTL
PC2	F0	60
PC6	F1	60

Answere to the ques.no-9

LSP provide **more accurate and fastere routing.**

LSP have lowere AD as it maintain up to date topology map of the network. Routers use optimal path using dijkstra's algo. also converge fastere network change. Updates are event-driven reducing loop's and stale information.

On the other hand, RIP rely on neighbour information tables and use hop count as the sole metric. Converge slowly and have routing loops. Periodic updates can carry out dated routes.

Answere to the ques. no-10

To remove stale or outdated IP to MAC mapping.

ARP mapping changes so TTL ensures stale or incorrect entries are removed automatically. So that ARP table is up to dates and size doesn't increase.

ARR is link-layere protocol **limited to the local network.**

ARP works at the link layere and it valid only within a local network and the requests are broadcast frames and routere do not forwared broadcast by default. ARP protocol varies from routere to routere.

Answer to the ques. no-11

adding extension headers.

In IPv6 header there is no option field so IPV6 use separate headers placed in between IPV6 header and the payload so that the total length of the packet increases, but the main 40-byte IPV6 header remains fixed.

Answer to the ques no-12

(i) **Locally administered.**

Given mac address:

AF:CC:FE:12:23:40

$AF:(10101111)_2$

The second least significant bit of the first octat is 1.

So, it is locally administered.

(ii) **same accross different networks.**

MAC address is hardware-based and is uniquely given to each device on any network. so it travels with the network and remains same for different IP address.

Answer to the ques. no-13

Traceroute shows : List of hops, IP addresses, RTTs, packet loss,

Help troubleshoot : identifies delays, routing loops, packet loss, unreachable routers along the path.