

## DMVA4

### Question 1:

```
(base) romericodavid@Romericos-Air ~ % netstat -r
Routing tables

Internet:
Destination      Gateway          Flags            Netif Expire
default          fios_quantum_gatw UGScg           en0
127              localhost        UCS              lo0
localhost        localhost        UH              lo0
169.254          link#12          UCS              en0
192.168.1        link#12          UCS              en0
192.168.1.1/32   link#12          UCS              en0
fios_quantum_gatw 18:78:d4:64:62:d9 UHLWIir        en0 1192
family-room.fios-r cc:75:e2:a8:3b:f5 UHLWII         en0 502
basement.fios-rout 70:4f:b8:84:37:45 UHLWII         en0 984
50rokuselectseries 64:57:25:64:db:11 UHLWII         en0 956
iphone.fios-router ce:18:68:bd:ba:39 UHLWI          en0 706
levoit-purifier.fi 30:c9:22:43:b5:6c UHLWI          en0 1178
192.168.1.212    32:4a:a:4c:6e:95 UHLWI          en0 385
192.168.1.215    22:2c:b6:4a:70:fd UHLWI          en0 492
192.168.1.231    4a:83:c0:a3:49:a8 UHLWI          en0 423
192.168.1.242    ca:ba:99:71:b2:49 UHLWI          en0 636
ipad.fios-router.h 16:9a:c2:59:7d:e9 UHLWI          en0 1155
192.168.1.254/32 link#12          UCS              en0
192.168.1.255    ff:ff:ff:ff:ff:ff UHLWbI         en0
224.0.0/4        link#12          UmCS            en0
mdns.mcast.net    1:0:5e:0:0:fb    UHMLWI         en0
239.255.255.250  1:0:5e:7f:ff:fa  UHMLWI         en0
255.255.255.255/32 link#12          UCS              en0

Internet6:
Destination      Gateway          Flags            Netif Expire
default          fe80::%utun0     UGcIg           utun0
default          fe80::%utun1     UGcIg           utun1
default          fe80::%utun2     UGcIg           utun2
```

a) The IPv4 address of the router (default gateway) is **192.168.1.1**. This can be inferred from the fact that the default route (default) points to fios\_quantum\_gatw, and by convention in most home networks, the router is assigned .1 in the subnet (e.g., 192.168.1.1).

Regarding the network prefix, most home networks use a standard subnet mask of 255.255.255.0, which corresponds to a /24 prefix length. This means the first 24 bits are the network portion, and the last 8 bits are for host addresses. So for 192.168.1.1, the network prefix is 24 bits.

#### Explanation:

- A typical home network address, such as 192.168.1.x, usually falls under the private Class C range. By default, Class C networks have a subnet mask of 255.255.255.0 (or /24).
- In binary, the subnet mask 255.255.255.0 is 11111111.11111111.11111111.00000000. Counting the consecutive 1s gives us 24 bits of network prefix.

b) An example of a multicast IPv4 address from the table is **239.255.255.250**.

#### How we know it's multicast:

IPv4 multicast addresses are defined in the range 224.0.0.0 through 239.255.255.255. Any address in that range (referred to as Class D addresses) is reserved for multicast. Since 239.255.255.250 falls within this range, it is recognized as a multicast address.

### Question 2:

a) No, the AP is not the ultimate receiver of this frame. In an IEEE 802.11 data frame, the “To DS” and “From DS” flags indicate the direction the frame is traveling relative to the Distribution System (DS, typically the wired network). Here, the flags show it is a frame “from DS to a STA via AP,” meaning the AP received the frame from the wired network (the DS) and is now sending it

out over wireless to a specific station (STA). The AP is acting as a forwarding device, not the final destination. The ultimate receiver is the station (the wireless client) identified by the Receiver/Destination address fields.

b) The IP header shows:

- Version: 4
- Header Length: 20 bytes (indicated by “Header Length: 20 bytes”)
- Total Length: 493 bytes

The “Total Length” field in the IP header includes both the IP header and the IP payload. To find the payload size, we can subtract the IP header length from the total length:

IP Payload Length = Total Length – IP Header Length

IP Payload Length = 493 bytes – 20 bytes = 473 bytes.

c) The TCP flags set are: **FIN**, PSH, ACK.

The purpose of the FIN (Finish) flag in TCP is to indicate that the sender has finished sending data and wants to initiate a graceful closure of the connection. When a FIN is received, it tells the other side that no more data will be sent from that endpoint, though it can still receive data until the other side also sends a FIN.