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## Part 1

### 1. List the MAC Address of PC and laptop nodes

PC-1 IP: 192.168.1.2 MAC Address: 0030.F2BC.D75B

MAC Address	0030.F2BC.D75B
IP Configuration	
<input type="radio"/> DHCP	
<input checked="" type="radio"/> Static	
IPv4 Address	192.168.1.2
Subnet Mask	255.255.255.0

PC-0 IP: 192.168.1.1 MAC Address: 0001.6451.140E

MAC Address	0001.6451.140E
IP Configuration	
<input type="radio"/> DHCP	
<input checked="" type="radio"/> Static	
IPv4 Address	192.168.1.1
Subnet Mask	255.255.255.0

Laptop-1 IP: 192.168.1.3 MAC Address: 000C.CF54.ADB8

MAC Address	000C.CF54.ADB8
IP Configuration	
<input type="radio"/> DHCP	
<input checked="" type="radio"/> Static	
IPv4 Address	192.168.1.3
Subnet Mask	255.255.255.0

### 2. Are the MAC Addresses Unique?

Yes, they are unique.

### 3. Why are they unique/not unique?

Since MAC addresses are assigned by manufacturers and each manufacturer has a unique identifier, even if two NICs from different manufacturers have the same MAC address, they will not conflict in the same network. Thus, the MAC address is a unique identifier for the device in the network and is used to ensure that packets are sent to the correct device.

#### 4. Research how MAC Addresses are assigned to devices and summarise in a few sentence here.

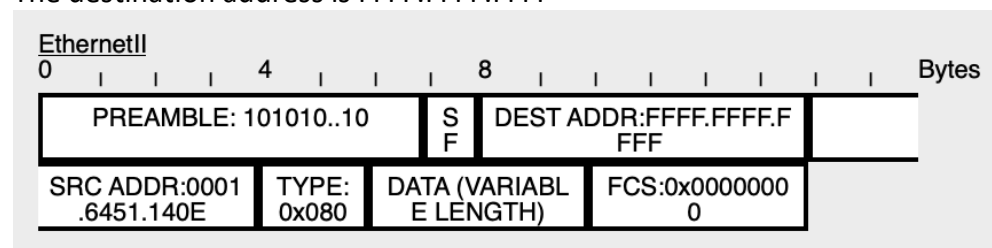
The MAC address is assigned by the manufacturer of the Network Interface Card and recorded into the device hardware, so the device is shipped with a unique MAC address.

## Part 2

### 1. Identify the source and destination mac addresses

The source address is 0001.6451.140E

The destination address is FFFF.FFFF.FFFF



### 2. What device (if any) does the destination mac address refer to

Destination MAC Address refer to every device on the network.

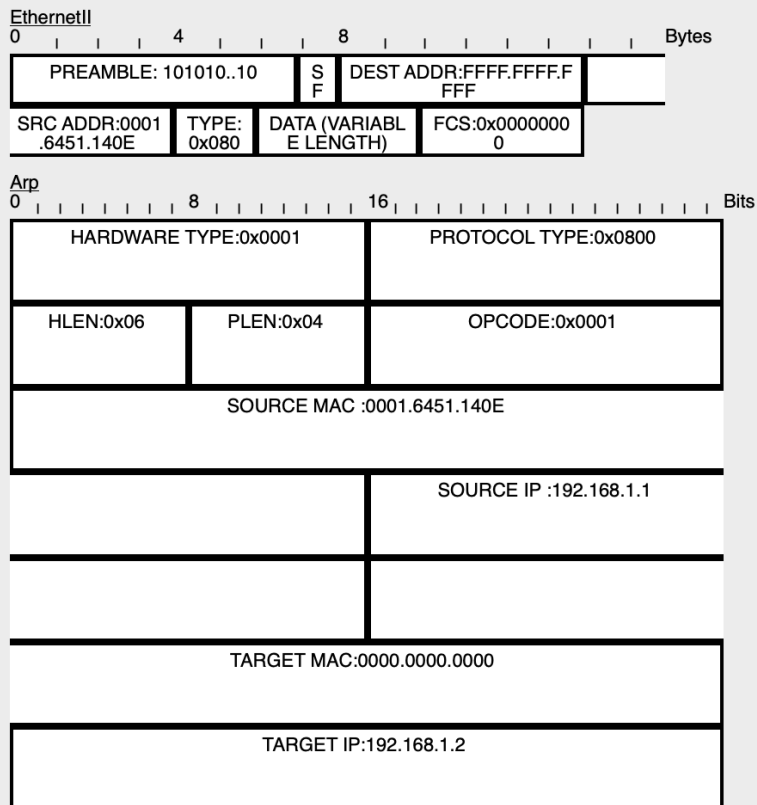
### 3. List the addresses that you can identify and what type of address they are.

source MAC Address: 0001.6451.140E

source IP Address: 192.168.1.1

target IP Address: 192.168.1.2

#### PDU Formats



#### 4. What device does the target IP address correspond to.

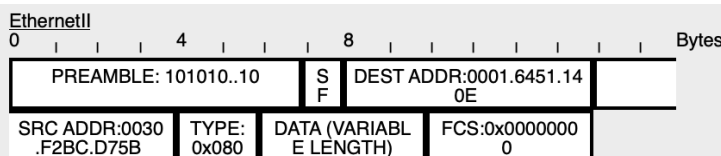
The target IP Address correspond to PC-1 which has IP 192.168.1.2

### Part 3

#### 1. Identify the source and destination mac addresses.

The source MAC Address is 0030.F2BC.D75B

The destination MAC Address is 0001.6451.140E



#### 2. What device does the destination mac address refer to

The destination MAC Address refer to PC-0 with IP Address 192.168.1.1

#### 3. List the addresses that you can identify and what type of address they are.

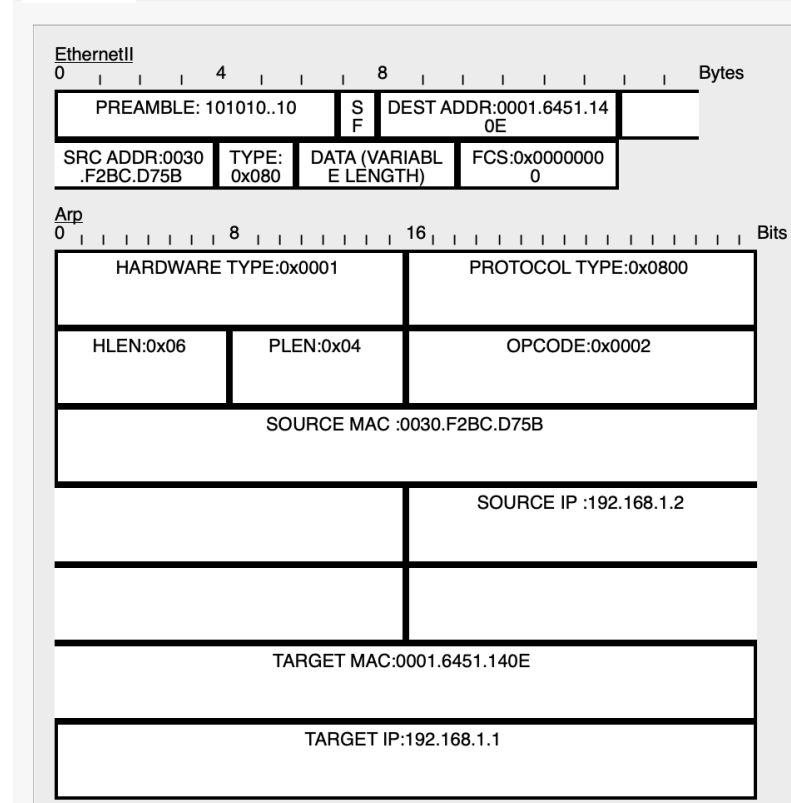
Source MAC Address: 0030.F2BC.D75B

Target MAC Address: 0001.6451.140E

Source IP Address: 192.168.1.2

Target IP Address: 192.168.1.1

PDU Formats



**4. What device does the Source MAC address correspond to.**

The source MAC Address correspond to PC-1 with IP Address 192.168.1.2

## Part 4

**1. How many types of arp message are there, and what are they?**

There are two types of arp, which are request arp and reply arp.

**2. What are the 4 address fields of an ARP messages?**

The four address fields include source MAC Address, target MAC Address, source IP Address and target IP Address.

**3. What size (in bits) is each of these fields?**

Source MAC Address and target MAC Address: 48 bits.

Source IP Address and target IP Address: 32 bits.

**4. How do these fields differ between a request and reply ARP message?**

In a request ARP, the target MAC Address is 0000.0000.0000

In a reply ARP, the target MAC Address is precise.

**5. Why is the request ARP message sent to Laptop-1?**

Because it is a broadcast, so the request ARP message should be sent to every device on the network which contains Laptop-1.

**6. What does Laptop-1 do in response to the message?**

Laptop-1 did nothing to respond.

**7. Draw the sequence of ARP messages used to resolve an IP Address to a MAC Address. Indicate if the messages are broadcast or unicast.**

- a) PC-0 send an ARP message to switch with target IP Address. This message is broadcast.
- b) Switch send several ARP messages to every device on the network with target IP Address. This message is broadcast.
- c) PC-1 receive an ARP message and reply an ARP message with the MAC Address to switch. This message is unicast.
- d) Switch send the ARP message to PC-0 with the MAC Address. This message is unicast.