# ITMO 440/540 - Data Networks

# Assignment 5 - ANSWERS

# Assigned: 09/23/2014 Due: 09/30/2014

### Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Student ID: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Purpose: Practice reading information in data link layer**

**Use the trace printed at the end of this homework assignment to answer the following questions.**

**In Frame 18 find the answers to the following questions:**

1. What is the name of the data link protocol? **Ethernet II** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What is the source data link address? (copy the numeric characters) **00:27:0e:0e:3c:21** \_\_\_\_\_\_\_\_

3. What is the destination data link address? **ff:ff:ff:ff:ff:ff** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Is there an IP message encapsulated in this Frame? **No** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The name of the protocol that is encapsulated in the data link protocol is the Address Resolution Protocol (ARP). Answer the following questions by copying the information in the ARP message that is encapsulated in Frame 18.

5. Is this ARP message a request or a response? **Request** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. What is the ‘Sender MAC Address’? **00:27:0e:0e:3c:21** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What is the ‘Sender IP Address’? **10.200.0.23**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. What is the ‘Target MAC Address’? **00:00:00\_00:00:00**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. What is the ‘Target IP Address’? **10.200.20.22** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. How many bytes are in this frame? **60** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**In Frame 19 find the answers to the following questions:**

1. What is the name of the data link protocol? **Ethernet II** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What is the source data link address? **00:27:0e:0f:6a:53** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What is the destination data link address? **00:27:0e:0e:3c:21** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Is there an IP message encapsulated in this Frame? **No** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The protocol that is encapsulated inside the data link protocol is called the Address Resolution Protocol (ARP). Answer the following questions by copying the information in the ARP message that is encapsulated in Frame 19.

5. Is this ARP message a request or a reply? **Reply** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. What is the ‘Sender MAC Address’? **00:27:0e:0f:6a:53**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What is the ‘Sender IP Address’? **10.200.0.22**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. What is the Target MAC Address? **00:27:0e:0e:3c:21**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. What is the Target IP Address? **10.200.20.23** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. How many bytes are in this frame? **60** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. Why is the ‘Target MAC’ address in the ARP message in Frame 19 the same as the source datalink address in Frame 18?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Look in Frame 64 to find the answers to the following questions.

1. What is the datalink protocol in this frame? **IEEE 802.3 Ethernet** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Underneath the name of the datalink protocol you will find a protocol named the Logical-Link Control protocol (LLC). This is also a datalink protocol. copy the five fields that are listed below this protocol:

**DSAP: Spanning Tree BPDU (0x42)**

**IG Bit: Individual**

**SSAP: Spanning Tree BPDU (0x42)**

**CR Bit: Command**

**Control field: U, func=UI (0x03)**

*These fields identify the Destination Service Access Point; and the Source Service Access Point; as well as some flags that tell whether the Frame is a command or a response, whether it is for an individual or a group, and that the frame is an un-numbered information frame. The IEEE 802.3 datalink allows you to create different types of data links.*

3. Is there an IP layer in this frame? **No** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. What is the name of the protocol encapsulated in the data-link headers? **Spanning Tree Protocol** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What type of Bridge PRotocol Data Unit (BPDU) is this message? **Configuration** \_\_\_\_\_\_\_\_\_\_\_

6. What is the Root Identifier? **32768 / 0 / 00:06:d7:1b:bd:40** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What is the Port Identifier? **0x8025** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Frame 18: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface** 0

Ethernet II, Src: IntelCor\_0e:3c:21 (00:27:0e:0e:3c:21), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

Destination: Broadcast (ff:ff:ff:ff:ff:ff)

Source: IntelCor\_0e:3c:21 (00:27:0e:0e:3c:21)

Type: ARP (0x0806)

Padding: 000000000000000000000000000000000000

Address Resolution Protocol (request)

Hardware type: Ethernet (1)

Protocol type: IP (0x0800)

Hardware size: 6

Protocol size: 4

Opcode: request (1)

Sender MAC address: IntelCor\_0e:3c:21 (00:27:0e:0e:3c:21)

Sender IP address: 10.200.0.23 (10.200.0.23)

Target MAC address: 00:00:00\_00:00:00 (00:00:00:00:00:00)

Target IP address: 10.200.20.22 (10.200.20.22)

**Frame 19: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0**

Ethernet II, Src: IntelCor\_0f:6a:53 (00:27:0e:0f:6a:53), Dst: IntelCor\_0e:3c:21 (00:27:0e:0e:3c:21)

Destination: IntelCor\_0e:3c:21 (00:27:0e:0e:3c:21)

Source: IntelCor\_0f:6a:53 (00:27:0e:0f:6a:53)

Type: ARP (0x0806)

Padding: 000000000000000000000000000000000000

Address Resolution Protocol (reply)

Hardware type: Ethernet (1)

Protocol type: IP (0x0800)

Hardware size: 6

Protocol size: 4

Opcode: reply (2)

Sender MAC address: IntelCor\_0f:6a:53 (00:27:0e:0f:6a:53)

Sender IP address: 10.200.20.22 (10.200.20.22)

Target MAC address: IntelCor\_0e:3c:21 (00:27:0e:0e:3c:21)

Target IP address: 10.200.0.23 (10.200.0.23)

**Frame 26: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0**

Ethernet II, Src: IntelCor\_0f:6d:00 (00:27:0e:0f:6d:00), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

Destination: Broadcast (ff:ff:ff:ff:ff:ff)

Source: IntelCor\_0f:6d:00 (00:27:0e:0f:6d:00)

Type: ARP (0x0806)

Padding: 000000000000000000000000000000000000

Address Resolution Protocol (request)

Hardware type: Ethernet (1)

Protocol type: IP (0x0800)

Hardware size: 6

Protocol size: 4

Opcode: request (1)

Sender MAC address: IntelCor\_0f:6d:00 (00:27:0e:0f:6d:00)

Sender IP address: 10.200.20.24 (10.200.20.24)

Target MAC address: 00:00:00\_00:00:00 (00:00:00:00:00:00)

Target IP address: 10.200.20.22 (10.200.20.22)

**Frame 27: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0**

Ethernet II, Src: IntelCor\_0f:6a:53 (00:27:0e:0f:6a:53), Dst: IntelCor\_0f:6d:00 (00:27:0e:0f:6d:00)

Destination: IntelCor\_0f:6d:00 (00:27:0e:0f:6d:00)

Source: IntelCor\_0f:6a:53 (00:27:0e:0f:6a:53)

Type: ARP (0x0806)

Padding: 000000000000000000000000000000000000

Address Resolution Protocol (reply)

Hardware type: Ethernet (1)

Protocol type: IP (0x0800)

Hardware size: 6

Protocol size: 4

Opcode: reply (2)

Sender MAC address: IntelCor\_0f:6a:53 (00:27:0e:0f:6a:53)

Sender IP address: 10.200.20.22 (10.200.20.22)

Target MAC address: IntelCor\_0f:6d:00 (00:27:0e:0f:6d:00)

Target IP address: 10.200.20.24 (10.200.20.24)

**Frame 51: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface 0**

Ethernet II, Src: IntelCor\_0f:6c:4d (00:27:0e:0f:6c:4d), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

Destination: Broadcast (ff:ff:ff:ff:ff:ff)

Source: IntelCor\_0f:6c:4d (00:27:0e:0f:6c:4d)

Type: ARP (0x0806)

Address Resolution Protocol (request)

Hardware type: Ethernet (1)

Protocol type: IP (0x0800)

Hardware size: 6

Protocol size: 4

Opcode: request (1)

Sender MAC address: IntelCor\_0f:6c:4d (00:27:0e:0f:6c:4d)

Sender IP address: 10.200.20.23 (10.200.20.23)

Target MAC address: 00:00:00\_00:00:00 (00:00:00:00:00:00)

Target IP address: 10.200.201.242 (10.200.201.242)

**Frame 52: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0**

Ethernet II, Src: Dell\_71:90:af (78:2b:cb:71:90:af), Dst: IntelCor\_0f:6c:4d (00:27:0e:0f:6c:4d)

Destination: IntelCor\_0f:6c:4d (00:27:0e:0f:6c:4d)

Source: Dell\_71:90:af (78:2b:cb:71:90:af)

Type: ARP (0x0806)

Padding: 000000000000000000000000000000000000

Address Resolution Protocol (reply)

Hardware type: Ethernet (1)

Protocol type: IP (0x0800)

Hardware size: 6

Protocol size: 4

Opcode: reply (2)

Sender MAC address: Dell\_71:90:af (78:2b:cb:71:90:af)

Sender IP address: 10.200.201.242 (10.200.201.242)

Target MAC address: IntelCor\_0f:6c:4d (00:27:0e:0f:6c:4d)

Target IP address: 10.200.20.23 (10.200.20.23)

**Frame 64: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0**

IEEE 802.3 Ethernet

Logical-Link Control

DSAP: Spanning Tree BPDU (0x42)

IG Bit: Individual

SSAP: Spanning Tree BPDU (0x42)

CR Bit: Command

Control field: U, func=UI (0x03)

Spanning Tree Protocol

Protocol Identifier: Spanning Tree Protocol (0x0000)

Protocol Version Identifier: Spanning Tree (0)

BPDU Type: Configuration (0x00)

BPDU flags: 0x00

Root Identifier: 32768 / 0 / 00:06:d7:1b:bd:40

Root Path Cost: 0

Bridge Identifier: 32768 / 0 / 00:06:d7:1b:bd:40

Port identifier: 0x8025

Message Age: 0

Max Age: 20

Hello Time: 2

Forward Delay: 15

**Frame 91: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0**

IEEE 802.3 Ethernet

Logical-Link Control

DSAP: Spanning Tree BPDU (0x42)

IG Bit: Individual

SSAP: Spanning Tree BPDU (0x42)

CR Bit: Command

Control field: U, func=UI (0x03)

Spanning Tree Protocol

Protocol Identifier: Spanning Tree Protocol (0x0000)

Protocol Version Identifier: Spanning Tree (0)

BPDU Type: Configuration (0x00)

BPDU flags: 0x00

Root Identifier: 32768 / 0 / 00:06:d7:1b:bd:40

Root Path Cost: 0

Bridge Identifier: 32768 / 0 / 00:06:d7:1b:bd:40

Port identifier: 0x8025

Message Age: 0

Max Age: 20

Hello Time: 2

Forward Delay: 15