

Lab 7: NAT, Ethernet and ARP

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Exercise 1

Question 1

Subnet	Number	Netmask
Subnet1	10.0.1.0	255.255.255.0
Subnet2	10.0.2.0	255.255.255.0
Subnet3	10.0.3.0	255.255.255.0

Interface	IP Address
H1	10.0.1.1
H2	10.0.1.2
H3	10.0.2.1
H4	10.0.2.2
R1a	10.0.1.3
R1b	10.0.3.1
R1c	10.0.2.3
NAT-i	10.0.3.2

Question 4

FTP does not work because FTP is built on a client-server model architecture using separate connections between client and server, but the NAT here translates in single direction, hence FTP doesn't work through this NAT.

Exercise 2

Question 2

Source IP address: 192.168.1.100

Destination IP address: 64.233.169.104

Source Port: 4335

Destination Port: 80

Question 3

Time: 7.158797

Source IP address: 64.233.169.104

Destination IP address: 192.168.1.100

Source Port: 80

Destination Port: 4335

Question 7

Source IP address: 71.192.34.104

Destination IP address: 64.233.169.104

Source Port: 4335

Destination Port: 80

Only the Source IP address has changed, others are unchanged

Question 9

Only Checksum is changed, others are unchanged

Because the source IP address has changed, the checksum should be changed

Question 11

Source IP address: 64.233.169.104

Destination IP address: 71.192.34.104

Source port: 80

Destination port: 4335

Destination IP addresses are different, other fields are same

Question 13

For TCP SYN:

Source IP address: 71.192.34.104

Destination IP address: 74.125.91.113

For TCP SYN/ACK:

Source IP address: 74.125.91.113

Destination IP address: 71.192.34.104

The source IP address of SYN is changed and the destination address of SYN/ACK is changed

Question 14

NAT translation table	
WAN sider address	LAN sider address
71.192.34.104, 4335	192.168.1.100, 4335

Exercise 3

Question 2

00:06:25:da:af:73

No, the address is not the Ethernet address of gaia.cs.umass.edu

The Linksys router has this address

Question 4

54 bytes from the very start of the Ethernet frame (54 – 56 are request method, GET)

There are no preamble bytes

There are 14 bytes in frame header

The remainder of the bytes before G is Ethernet, IP and TCP headers

Question 5

00:06:25:da:af:73

No, the two addresses are not same

LinksysG_da has this address

Exercise 4

Question 1

Source address: 00:d0:59:a9:3d:68

Destination address: ff:ff:ff:ff:ff:ff

The destination address is a broadcast address, and the message sent to a broadcast address may be received by all network-attached hosts

Question 6

```
▼ Address Resolution Protocol (reply)
  Hardware type: Ethernet (1)
  Protocol type: IPv4 (0x0800)
  Hardware size: 6
  Protocol size: 4
  Opcode: reply (2)
  Sender MAC address: LinksysG_da:af:73 (00:06:25:da:af:73)
  Sender IP address: 192.168.1.1
  Target MAC address: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)
  Target IP address: 192.168.1.105
```

It is in the target IP address which is 192.168.1.105

Question 7

```
00 d0 59 a9 3d 68 00 06 25 da af 73 08 06 00 01 ..Y.=h.. %.s....
08 00 06 04 00 02 00 06 25 da af 73 c0 a8 01 01 ..... %.s....
00 d0 59 a9 3d 68 c0 a8 01 69 00 00 00 00 00 00 ..Y.=h.. .i.....
00 00 00 00 00 00 00 00 00 00 00 00 .....
```

Bytes 20-21: Opcode (arp.opcode)

20 bytes from the very beginning of the Ethernet frame

Question 10

```
▼ Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)
  > Destination: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)
  > Source: LinksysG_da:af:73 (00:06:25:da:af:73)
    Type: ARP (0x0806)
    Padding: 00000000000000000000000000000000
```

Hexadecimal value for the source address: 00:06:25:da:af:73

Hexadecimal value for the destination address: 00:d0:59:a9:3d:68