Ce 80n - Obrazka - Fall 2010 - Quiz 5
This is a closed book quiz. (20 points)

Name: ___________________________ Student ID: ____________

I. Fill in the blanks: (6 points)

1. By using ____________, IPv6 traffic can be sent over networks that are IPv4-capable only.
2. The main functions of the network layer are ____________ and ____________.
3. IP addresses are composed of 2 parts: the ____________ number and the ____________ number. They could also have a third component which is the ____________ number.

II. Multiple Choice: (3 points)

1. A network uses 16 bits of its address to identify its hosts. The network administrator decides to divide the network into subnets and uses 10 bits out of the 16-bit host number as the subnet number. How many subnets can this network have? How many hosts each subnet can have?
   (a) 2^16 and 2^8
   (b) 2^10 and 2^6
   (c) 2^6 and 2^10
   (d) 2^8 and 2^16
   (e) none of the above

2. For outgoing traffic (that is, traffic from the local network to the Internet), the NAT translation table is used to replace the ____________ address with the address of the ____________.
   (a) destination and NAT device.
   (b) destination and source.
   (c) source and destination.
   (d) source and net device
   (e) none of the above.

3. A IPv4 network uses a subnet mask of 16 bits. That means that the network number and the host number are, respectively:
   (a) 24 bits and 8 bits
   (b) 8 bits and 24 bits
   (c) 16 bits and 16 bits
   (d) 32 bits and 32 bits

III. True or False (7 points)

False 1. Hosts are typically assigned multiple IP addresses whereas routers usually have a single IP addresses.

True 2. NAT was conceived as a solution to the IPv4 address depletion problem.

False 3. Hosts connected to the Internet through a NAT device (or NAT box) must have globally unique IP addresses.
False 4. DHCP assigns static IP addresses.

True 5. DHCP is a client-server protocol.

True 6. IPv6 addresses are 128-bit long.

False 7. IPv4 addresses are 64-bit long.

IV. Suppose your company has already migrated to IPv6 but the rest of the Internet has not. As the network engineer, you need to guarantee that IPv6 traffic originating in your part of the company gets transmitted to other locations of the company that are located in other parts of the world. For example, Host A in one of the company’s location wants to send IPv6 traffic to Host B in a different location. Using the diagram below, draw a representative datagram
(a) exiting Host-A
(b) as handled by router R1
(c) as handled by router R2
(d) entering Host-B

Tunneling:
IPv6 inside IPv4 where needed

Flow: X
Src: A
Dest: D
Data
A-to-B
IPv6

Flow: X
Src: A
Dest: D
Data
A-to-B
IPv4 encapsulating IPv6

Flow: X
Src: A
Dest: D
Data
A-to-B
IPv4 encapsulating IPv6

Flow: X
Src: A
Dest: D
Data
A-to-B
IPv6
I. True or False (7 points)

1. DHCP assigns static IP addresses.

2. NAT was conceived as a solution to the IPv4 address depletion problem.

3. Hosts connected to the Internet through a NAT device (or NAT box) must have globally unique IP addresses.

4. IPv4 addresses are 64-bit long.

5. IPv6 addresses are 128-bit long.

6. DHCP is a client-server protocol.

7. Hosts are typically assigned multiple IP addresses whereas routers usually have a single IP address.

II. Fill in the blanks: (6 points)

1. The main functions of the network layer are ____________ and ____________.

2. IP addresses are composed of 2 parts: the ____________ number and the ____________ number. They could also have a third component which is the ____________ number.

3. By using ____________, IPv6 traffic can be sent over networks that are IPv4-capable only.

III. Multiple Choice: (3 points)

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   (a) $2^{16}$ and $2^8$
   (b) $2^{10}$ and $2^6$
   (c) $2^6$ and $2^{10}$
   (d) $2^8$ and $2^{16}$
   (e) none of the above

3. A IPv4 network uses a subnet mask of 16 bits. That means that the network number and the host number are, respectively:
   (a) 24 bits and 8 bits
   (b) 8 bits and 24 bits
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IV. Suppose your company has already migrated to IPv6 but the rest of the Internet has not. As the network engineer, you need to guarantee that IPv6 traffic originating in your part of the company gets transmitted to other locations of the company that are located in other parts of the world. For example, Host A in one of the company's location wants to send IPv6 traffic to Host B in a different location. Using the diagram below, draw a representative datagram
   (4 points)
   (a) exiting Host-A
   (b) as handled by router R1
   (c) as handled by router R2
   (d) entering Host-B

![Diagram of network traffic flow](image_url)