LAB 5

COURSE: COMPUTER NETWORKS

IPV4 ADDRESS AND NETWORK DEVICES

Name:	ID:

Objective

Part 1: Convert IPv4 Addresses from Dotted Decimal to Binary

Part 2: Use Bitwise ANDing Operation to Determine Network Addresses

Part 3: Identify IPv4 Addresses and Apply Network Address Calculations

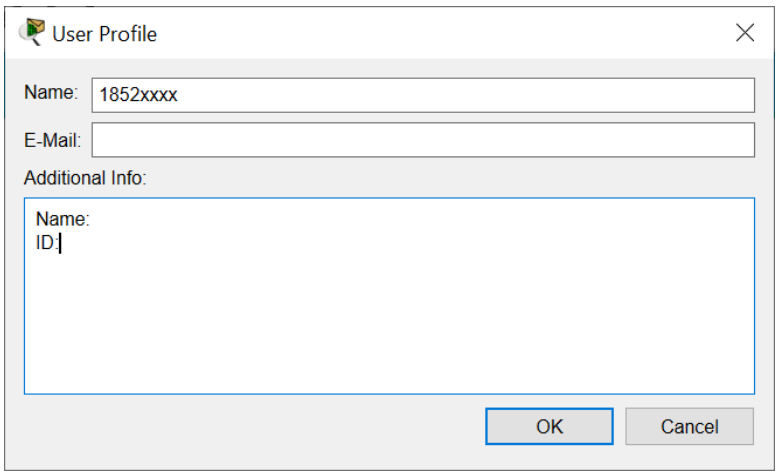
Part 4: Classify IPv4 Addresses

Part 5: Connect the network devices.

Part 6: Wireless configuration.

Submitted file.

- Files to be submitted: Lab5a_ID.pka, Lab5b_ID.pka and Lab5_ID.pdf
- Name on the User profile must be changed to your ID.



Part 1: Convert IPv4 Addresses from Dotted Decimal to Binary

Step 1: Convert decimal numbers to their binary equivalent.

Fill in the following table by converting the decimal number to an 8-bit binary number. The first number has been completed for your reference. Recall that the

eight binary bit values in an octet are based on the powers of 2, and from left to right are 128, 64, 32, 16, 8, 4, 2, and 1.

Decimal	Binary
192	11000000
168	10101000
10	00001010
255	11111111
2	00000010

Step 2: Convert the IPv4 addresses to their binary equivalent.

An IPv4 address can be converted using the same technique you used above. Fill in the table below with the binary equivalent of the addresses provided. To make your answers easier to read, separate the binary octets with a period.

Decimal	Binary
192.168.10.10	11000000.10101000.00001010.00001010
172.16.18.183	10101100.0001000.00010010.10110111
10.86.252.17	00001010.01010110.11111100.00010001
255.255.255.128	11111111.11111111.11111111.10000000
255.255.192.0	11111111.11111111.11000000.00000000

Part 2: Use Bitwise ANDing Operation to Determine Network Addresses

In Part 2, you will use the bitwise ANDing operation to calculate the network address for the provided host addresses. You will first need to convert an IPv4 decimal address and subnet mask to their binary equivalent. Once you have the binary form of the network address, convert it to its decimal form.

Note: The ANDing process compares the binary value in each bit position of the 32-bit host IP with the corresponding position in the 32-bit subnet mask. If there two 0s or a 0 and a 1, the ANDing result is 0. If there are two 1s, the result is a 1, as shown in the example here.

Step 1: Determine the number of bits to use to calculate the network address.

Description	Decimal	Binary
IP Address	192.168.10.131	11000000.10101000.00001010.10**111111**
Subnet Mask	255.255.255.192	11111111.11111111.11111111.11**000000**
Network Address	192.168.10.128	11000000.10101000.00001010.10000000

In the example above, how many bits are used to calculate the network address?

_____

Step 2: Use the ANDing operation to determine the network address.

a. Enter the missing information into the table below:

Description	Decimal	Binary
IP Address	172.16.145.29	10101100.00010000.10010001.00011101
Subnet Mask	255.255.0.0	11111111.11111111.00000000.00000000
Network Address	172.16.0.0	10101100.00010000.00000000.00000000

b. Enter the missing information into the table below:

Description	Decimal	Binary
IP Address	192.168.10.10	11000000.10101000.00001010.00001010
Subnet Mask	255.255.255.0	11111111.11111111.11111111.00000000
Network Address	192.168.10.0	11000000.10101000.00001010.00000000

Part 3: Apply Network Address Calculations

Using command **ipconfig** to show the IP address of your computer and identify the IP address of your phone.

What is IP address for your PC? **10.238.18.246** _____

What is the network address for your PC? **10.238.0.0** _____

What is IP address for your friend's PC/your phone? **10.238.22.71** _____

What is the network address for your friend's PC/your phone? **10.238.0.0**_____

Will your PCs and your phone be able to communicate directly with each other? **N**

What is the default gateway address for your PC? **10.238.0.1** _____

Part 4: Classify IPv4 Addresses

Step 1: Analyze the table shown below and identify the type of address (network, host, multicast, or broadcast address).

The first row shows an example of how the table should be completed.

- Network: all bit host = 0
- Broadcast: all bit host = 1
- Host: both 0 and 1
- Multicast: 224-239

IP Address	Subnet Mask	Address Type
10.1.1.1	255.255.255.252	Host
192.168.33.63	255.255.255.192	Broadcast
239.192.1.100	255.252.0.0	Multicast
172.25.12.52	255.255.255.0	Host
10.255.0.0	255.0.0.0	Network
172.16.128.48	255.255.255.240	Network
209.165.202.159	255.255.255.224	Broadcast
172.16.0.255	255.255.0.0	Host

Step 2: Analyze the table shown below and identify whether the address/prefix pair is a valid host address.

IP Address/Prefix	Valid Host Address?	Reason
172.16.255.0/16	Yes	Host Address
192.31.7.255/24	No	Broadcast
64.102.255.255/14	Yes	Host Address
224.0.0.5/16	No	Multicast

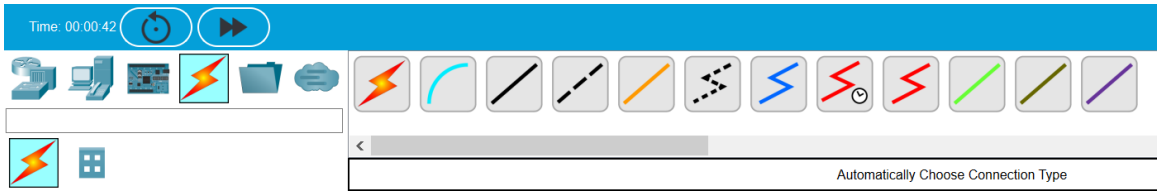
Note: Before doing Part 5 and part 6, the students need to download and install Cisco Packet Tracer.

Students enroll the course “Packet Tracer” at and download Cisco packet tracer https://www.netacad.com/courses/packet-tracer

Part 5: Connecting network devices

Open file: *Lab5a- Connect a Wired and Wireless LAN.pka* and work with the instruction inside the simulation file.

Connecting devices: The instruction gives the table of connection type as table below; students need to choose the right cable type to connect the interfaces.



Device	Interface	Cable type	Connected device	Connects To
Cloud	Eth6	Copper Straight-Through	Router 0	Fa0/0
	Coax7	Coaxial	Cable Modem	Port0
Cable Modem	Port0	Coaxial	Cloud	Coax7
	Port1	Copper Straight-Through	WirelessRouter	Internet
Router0	Console	Console	Configuration Terminal	RS232
	Fa0/0	Copper Straight-Through	Cloud	Eth6
	Fa0/1	Copper Cross-Over	netacad.pka	Fa0
	Ser0/0/0	Serial	Router1	Ser0/0
Router1	Ser0/0	Serial	Router0	Ser0/0/0

	Fa1/0	Fiber	Switch	Fa0/1
WirelessRouter	Internet	Copper Straight-Through	Cable Modem	Port 1
	Eth1	Copper Straight-Through	Family PC	Fa0

After finishing the lab, students save the file with filename: Lab5a_ID.pka

Part 6: Wireless configuration

Open file: *Lab5b - Configure a Wireless Network.pka* and work with the instruction inside the simulation file.

After finishing the lab, students save the file with filename: Lab5b_ID.pka