

Name:

Dawood Sarfraz

Roll no:

20P-0153

Section:

BSCS-5B

Computer Networks Lab:

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FAST-NUCES Peshawar Campus

Step 1: Sub-net the 192.168.100.0/24 network into the appropriate number of sub-nets.

1. Based on the topology, how many sub-nets are needed?
5 Four for the LAN, and one for the link between the routers.
2. How many bits must be borrowed to support the number of sub-nets in the topology table?
3
3. How many sub-nets does this create?
8
4. How many usable hosts does this create per sub-net?
30

Note: If your answer is less than the 25 hosts required, then you borrowed too many bits.

4. Calculate the binary value for the first five sub-nets. The first two sub-nets have been done for you.

Subnet	Network Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
0	192.168.100.	0	0	0	0	0	0	0
1	192.168.100.	0	0	1	0	0	0	0
2	192.168.100.	0	1	0	0	0	0	0
3	192.168.100.	0	1	1	0	0	0	0
4	192.168.100.	1	0	0	0	0	0	0

5. Calculate the binary and decimal value of the new subnet mask.

First Octet	Second Octet	Third Octet	Mask Bit 7	Mask Bit 6	Mask Bit 5	Mask Bit 4	Mask Bit 3	Mask Bit 2	Mask Bit 1	Mask Bit 0
11111111	11111111	11111111	1	1	1	0	0	0	0	0
First Decimal Octet	Second Decimal Octet	Third Decimal Octet	Fourth Decimal Octet							
255.	255.	255.	224							

6. Fill in the Sub-net Table, listing the decimal value of all available sub-nets, the first and last usable host address, and the broadcast address. Repeat until all addresses are listed.

Note: You may not need to use all rows.

Sub-net Table

Subnet Number	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
0	192.168.100.0	192.168.100.1	192.168.100.30	192.168.100.31
1	192.168.100.32	192.168.100.33	192.168.100.62	192.168.100.63
2	192.168.100.64	192.168.100.65	192.168.100.94	192.168.100.95
3	192.168.100.96	192.168.100.97	192.168.100.126	192.168.100.127
4	192.168.100.128	192.168.100.129	192.168.100.158	192.168.100.159
5	192.168.100.160	192.168.100.161	192.168.100.190	192.168.100.191
6	192.168.100.192	192.168.100.193	192.168.100.222	192.168.100.223
7	192.168.100.224	192.168.100.225	192.168.100.254	192.168.100.255

a.

Step 2: Assign the sub-nets to the network shown in the topology.

- a. Assign Sub-net 0 to the LAN connected to the Gigabit Ethernet 0/0 interface of R1: 192.168.100.0 /27

1. Assign Sub-net 1 to the LAN connected to the Gigabit Ethernet 0/1 interface of R1: 192.168.100.32 /27
2. Assign Sub-net 2 to the LAN connected to the Gigabit Ethernet 0/0 interface of R2: 192.168.100.64 /27
3. Assign Sub-net 3 to the LAN connected to the Gigabit Ethernet 0/1 interface of R2: 192.168.100.96 /27
4. Assign Sub-net 4 to the WAN link between R1 to R2: 192.168.100.128 /27

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	192.168.100.1	255.255.255.224	N/A
	G0/1	192.168.100.33	255.255.255.224	N/A
	S0/0/0	192.168.100.129	255.255.255.224	N/A
R2	G0/0	192.168.100.65	255.255.255.224	N/A
	G0/1	192.168.100.97	255.255.255.224	N/A
	S0/0/0	192.168.100.158	255.255.255.224	N/A
S1	VLAN 1	192.168.100.2	255.255.255.224	192.168.100.1
S2	VLAN 1	192.168.100.34	255.255.255.224	192.168.100.33
S3	VLAN 1	192.168.100.66	255.255.255.224	192.168.100.65
S4	VLAN 1	192.168.100.98	255.255.255.224	192.168.100.97
PC1	NIC	192.168.100.30	255.255.255.224	192.168.100.1
PC2	NIC	192.168.100.62	255.255.255.224	192.168.100.33
PC3	NIC	192.168.100.94	255.255.255.224	192.168.100.65
PC4	NIC	192.168.100.126	255.255.255.224	192.168.100.97

Topology B:

Implement Task 4 (Lab 10) in Packet Tracer and Assign IP Addresses to Network Devices and Verify Connectivity.

Step 1: Determine the number of sub-nets in Network Topology C.

- a. How many sub-nets are there?
 - a. 6
- b. How many bits should you borrow to create the required number of sub-nets?
 - a. 3
- c. How many usable host addresses per sub-net are in this addressing scheme?
 - a. 30
- d. What is the new sub-net mask in dotted decimal format?
 - a. 255.255.255.224
- e. How many sub-nets are available for future use?
 - a. 2

Step 2: Record the sub-net information.

Fill in the following table with the sub-net information:

		First Usable Host Address	
Sub-net Number	Sub-net Address		Last Usable Host Address
0	192.168.10.0	192.168.10.1	192.168.10.30
1	192.168.10.32	192.168.10.33	192.168.10.62
2	192.168.10.64	192.168.10.65	192.168.10.94
3	192.168.10.96	192.168.10.97	192.168.10.126
4	192.168.10.128	192.168.10.129	192.168.10.158

5	192.168.10.160	192.168.10.1 61	192.168.10.190
6	192.168.10.192	192.168.10.1 93	192.168.10.222
7	192.168.10.224	192.168.10.2 25	192.168.10.254

Step 3: Assign addresses to network devices in the sub-nets.

- a. Fill in the following table with IP addresses and sub-net masks for the router interfaces:

Answers Note: These are suggested IP addresses based on using the first 6 sub-nets from the table above as assigned to each segment.

Device	Interface	IP Address	
R1	Gigabit Ethernet 0/1	192.168.10.1	25
	Serial 0/0/0	192.168.10.33	25
	Serial 0/0/1	192.168.10.65	25
R2	Gigabit Ethernet 0/1	192.168.10.97	25
	Serial 0/0/0	192.168.10.34	25
	Serial 0/0/1	192.168.10.129	25
R3	Gigabit Ethernet 0/1	192.168.10.161	25
	Serial 0/0/0	192.168.10.66	25
	Serial 0/0/1	192.168.10.130	25

- b. Fill in the following table with the IP addresses and sub-net masks for devices in the LAN as displayed in topology.

Answers Note: These are suggested IP addresses based on using the first 6 sub-nets from the table above as assigned to each segment.

Device	Interface	IP Address	Sub-net Mask	Def
PC-A	NIC	192.168.10.30	255.255.255.224	192.168.10.1
PC-B	NIC	192.168.10.29	255.255.255.224	192.168.10.1
S1	VLAN 1	192.168.10.2	255.255.255.224	192.168.10.1
PC-C	NIC	192.168.10.126	255.255.255.224	192.168.10.97
PC-D	NIC	192.168.10.125	255.255.255.224	192.168.10.97
S2	VLAN 1	192.168.10.98	255.255.255.224	192.168.10.97

PC-E	NIC	192.168.10.190	255.255.255.224	192.168.10.161
PC-F	NIC	192.168.10.189	255.255.255.224	192.168.10.161
S3	VLAN 1	192.168.10.162	255.255.255.224	192.168.10.161