



Lab 1.1.1a Classful A, B, and C Subnetting

Objectives

In this project/lab the student will:

1. Correctly identify the class of an IP address given an address
2. Given an IP address, correctly identify the network portion of the address
3. Given an IP address, correctly identify the host portion of the address

Review: IP Address Classes

(Network 127 is reserved for loopback and internal testing)

Class A	1 – 127	Leading bit pattern 0 0000000.00000000.00000000.00000000
Class B	128 – 191	Leading bit pattern 10 1000000.00000000.00000000.00000000
Class C	192 – 223	Leading bit pattern 110 1100000.00000000.00000000.00000000
Class D	224 – 239	(Reserved for multicast)
Class E	240 – 255	(Reserved for experimental, used for research)

Private Address Space

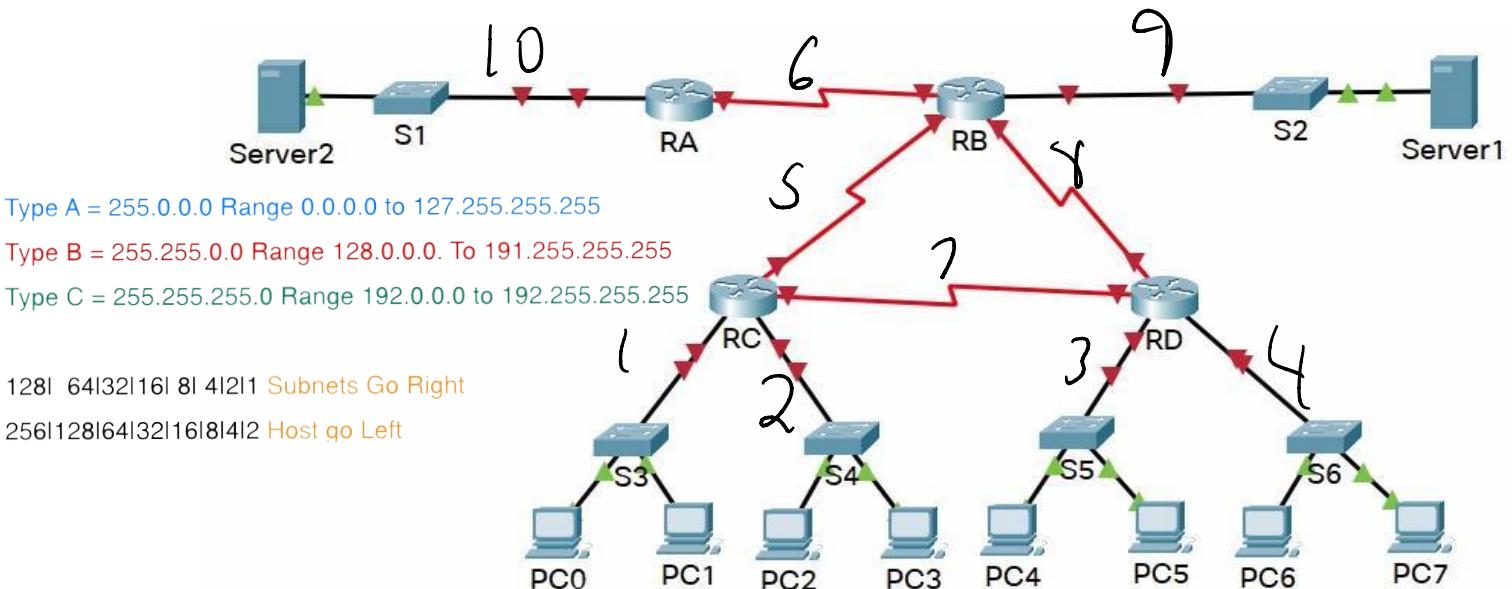
- Class A 10.0.0.0 to 10.255.255.255
Class B 172.16.0.0 to 172.31.255.255
Class C 192.168.0.0 to 192.168.255.255

Default Subnet Masks

- Class A 255.0.0.0
Class B 255.255.0.0
Class C 255.255.255.0

Assignment

For this lab, the student will use Fixed/Constant-Length Subnet Masking for the following network diagram. I suggest having a pencil and paper handy to work out the Subnet calculations.



1. The main network number for this scenario is **101.0.0.0 /8**
 - a. How many subnets do you need? Hint: Count the number of links coming out of the routers. Routers that are connected together count as one subnet, such as RA-RB, RB-RC, RC-RD and RD-RB.

10

- b. How many **Bits** need to be borrowed to accommodate this new subnet scheme? 4

4

- c. What is the new **Custom Subnet Mask** after borrowing the subnet bits?

255.240.0.0 /12

- d. How many **Total Subnets** will be available after borrowing the subnet bits?

16

- e. How many **Usable Hosts** are available after borrowing the subnet bits?

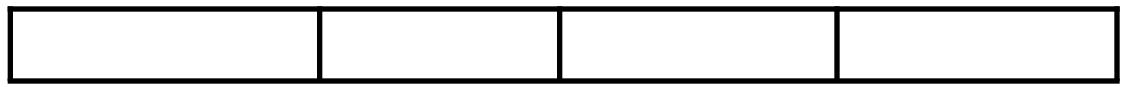
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- f. What is the **Block Size/Network Increment** of all of the new subnets?

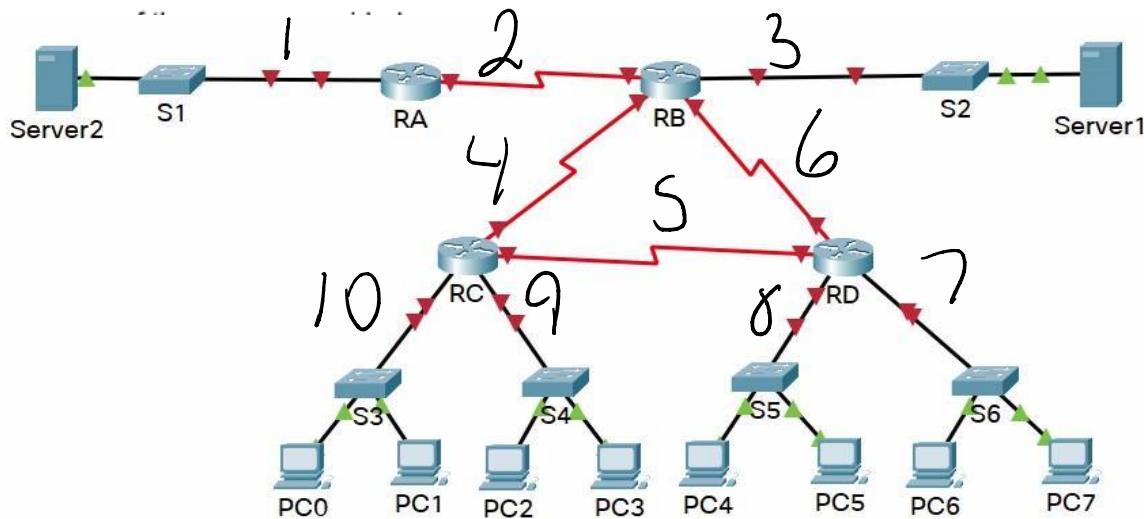
16

g. Document your subnetting scheme in the following table. You may not use all of the spaces provided.

Subnet Network IP	First Host IP	Last Host IP	Broadcast IP
101.0.0.0	101.0.0.1	101.15.255.254	101.15.255.255
101.16.0.0	101.16.0.1	101.31.255.254	101.31.255.255
101.32.0.0	101.32.0.1	101.47.255.254	101.47.255.255
101.48.0.0	101.48.0.1	101.63.255.254	101.63.255.255
101.64.0.0	101.64.0.1	101.79.255.254	101.79.255.255
101.80.0.0	101.80.0.1	101.95.255.254	101.95.255.255
101.96.0.0	101.96.0.1	101.111.255.254	101.111.255.255
101.112.0.0	101.112.0.1	101.127.255.254	101.127.255.255
101.128.0.0	101.128.0.1	101.143.255.254	101.143.255.255
101.144.0.0	101.144.0.1	101.159.255.254	101.159.255.255



g. Document your subnetting scheme in the following table. You may not use all



2. The main network number for this scenario is **145.50.0.0 /16**

f. How many subnets do you need? Hint: Count the number of links coming out of the routers. Routers that are connected together count as one subnet, such as RA-RB, RB-RC, RC-RD and RD-RB.

10

g. How many **Bits** need to be borrowed to accommodate this new subnet scheme?

4

h. What is the new **Custom Subnet Mask** after borrowing the subnet bits?

255.255.240.0/24

i. How many **Total Subnets** will be available after borrowing the subnet bits?

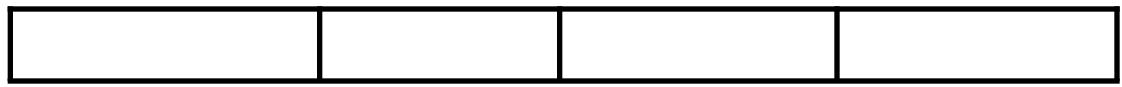
16

j. How many **Usable Hosts** are available after borrowing the subnet bits?

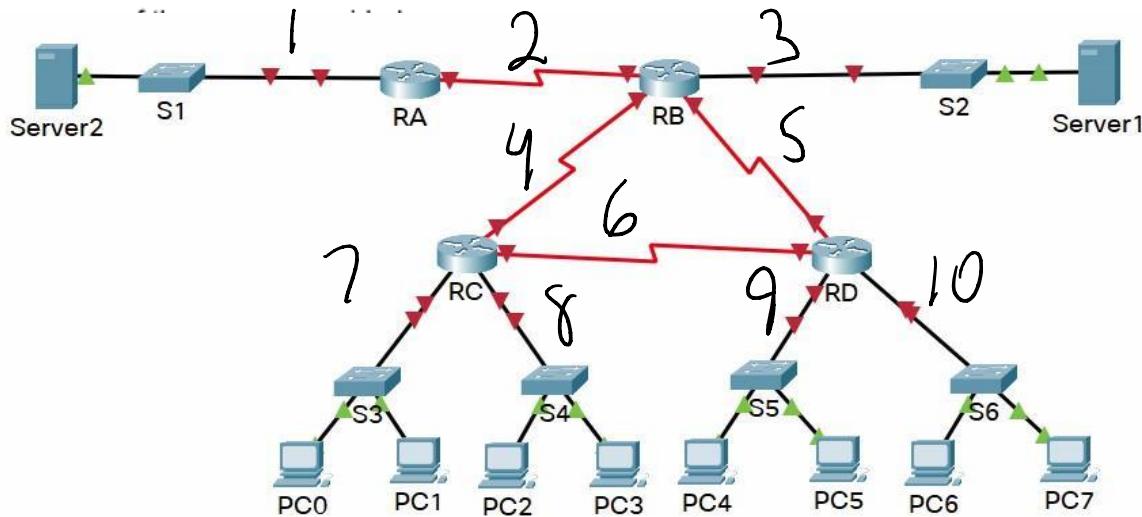
4096.

g. Document your subnetting scheme in the following table. You may not use all of the spaces provided.

Subnet Network IP	First Host IP	Last Host IP	Broadcast IP
145.50.0.0	145.50.0.1	145.50.15.254	145.50.15.255
145.50.16.0	145.50.16.1	145.50.31.254	145.50.31.255
145.50.32.0	145.50.32.1	145.50.47.254	145.50.47.255
145.50.48.0	145.50.48.1	145.50.63.254	145.50.63.255
145.50.64.0	145.50.64.1	145.50.79.254	145.50.79.255
145.50.80.0	145.50.80.1	145.50.95.254	145.50.95.255
145.50.96.0	145.50.96.1	145.50.111.254	145.50.111.255
145.50.112.0	145.50.112.1	145.50.127.254	145.50.127.255
145.50.128.0	145.50.128.1	145.50.143.254	145.50.143.255
145.50.144.0	145.50.144.1	145.50.159.254	145.50.159.255



g. Document your subnetting scheme in the following table. You may not use all



3. The main network number for this scenario is **198.40.16.0 /24**

k. How many subnets do you need? Hint: Count the number of links coming out of the routers. Routers that are connected together count as one subnet, such as RA-RB, RB-RC, RC-RD and RD-RB.

10

l. How many **Bits** need to be borrowed to accommodate this new subnet scheme?

4

m. What is the new **Custom Subnet Mask** after borrowing the subnet bits?

255.255.255.240/28

n. How many **Total Subnets** will be available after borrowing the subnet bits?

16

- o. How many **Usable Hosts** are available after borrowing the subnet bits?

14

g. Document your subnetting scheme in the following table. You may not use all of the spaces provided.

Subnet Network IP	First Host IP	Last Host IP	Broadcast IP
198.40.16.0	198.40.16.1	198.40.16.14	198.40.16.15
198.40.16.16	198.40.16.17	198.40.16.30	198.40.16.31
198.40.16.32	198.40.16.33	198.40.16.46	198.40.16.47
198.40.16.48	198.40.16.49	198.40.16.62	198.40.16.63
198.40.16.64	198.40.16.65	198.40.16.78	198.40.16.79
198.40.16.80	198.40.16.81	198.40.16.94	198.40.16.95
198.40.16.96	198.40.16.97	198.40.16.110	198.40.16.111
198.40.16.112	198.40.16.113	198.40.16.126	198.40.16.127
198.40.16.128	198.40.16.129	198.40.16.142	198.40.16.143
198.40.16.144	198.40.16.145	198.40.16.158	198.40.16.159

