

# Subnetting

## Problem 11

Number of needed usable hosts **8,000**

Network Address **135.70.0.0**

Address class B

Default subnet mask 255.255.0.0

Custom subnet mask 255.255.224.0

Total number of subnets 8

Total number of host addresses 8192

Number of usable addresses 8190

Number of bits borrowed 3

What is the 6th  
subnet range? 135.70.160.0 -> 135.70.223.255

What is the subnet number  
for the 7th subnet? 135.70.224.0

What is the subnet  
broadcast address for  
the 3rd subnet? 135.70.45.255

What are the assignable  
addresses for the 5th  
subnet? 135.70.128.1 -> 135.70.159.254

Show your work for Problem 11 in the space below.

Hosts	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1
Subnets	2	4	8											
Binary	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000	11000000000000000000000000000000
135	70	0	0	0	0	0	0	0	0	0	0	0	0	0
+ 128	0	135	70	0	0	0	0	0	0	0	0	0	0	0
64	-	135	70	32	0	0	0	0	0	0	0	0	0	0
32	1	0	135	70	64	0	0	0	0	0	0	0	0	0
224	-	1	35	70	96	0	0	0	0	0	0	0	0	0
Subnet	-	-	135	70	128	0	0	0	0	0	0	0	0	0
8192	-	0	0	135	70	128	0	0	0	0	0	0	0	0
8192	-	1	0	135	70	160	0	0	0	0	0	0	0	0
Hosts	-	-	-	135	70	224	0	0	0	0	0	0	0	0

# Subnetting

## Problem 12

Number of needed usable hosts **45**

Network Address **198.125.50.0**

Address class C

Default subnet mask 255.255.255.0

Custom subnet mask 255.255.255.192

Total number of subnets 4

Total number of host addresses 64

Number of usable addresses 62

Number of bits borrowed 2

What is the 2nd subnet range? 192.125.50.64 → 192.125.50.127

What is the subnet number for the 2nd subnet? 192.125.50.64

What is the subnet broadcast address for the 4th subnet? 192.125.50.255

What are the assignable addresses for the 3rd subnet? 192.125.50.129 → 192.125.50.190

Show your work for Problem 12 in the space below.

125	128	64	32	16	8	4	2
2	4	9	16	32	64	128	256
128	44	32	16	8	4	2	1
148	125	50	0	0	0	0	0
128	64	0	142.125.50.0	to 142.125.50.62			
	-2		142.125.50.64	to 142.125.50.122			
+ 64	<u>67</u>		142.125.50.128	to 142.125.50.191			
142	Holds	0	142.125.50.142	to 142.125.50.255			
Schrod			142.125.50.142	to 142.125.50.62			

# Custom Subnet Masks

## Problem 7

Number of needed subnets **2000**

Number of needed usable hosts **15**

Network Address **178.100.0.0**

Address class **B**

Default subnet mask **255.255.0.0**

Custom subnet mask **255.255.255.224**

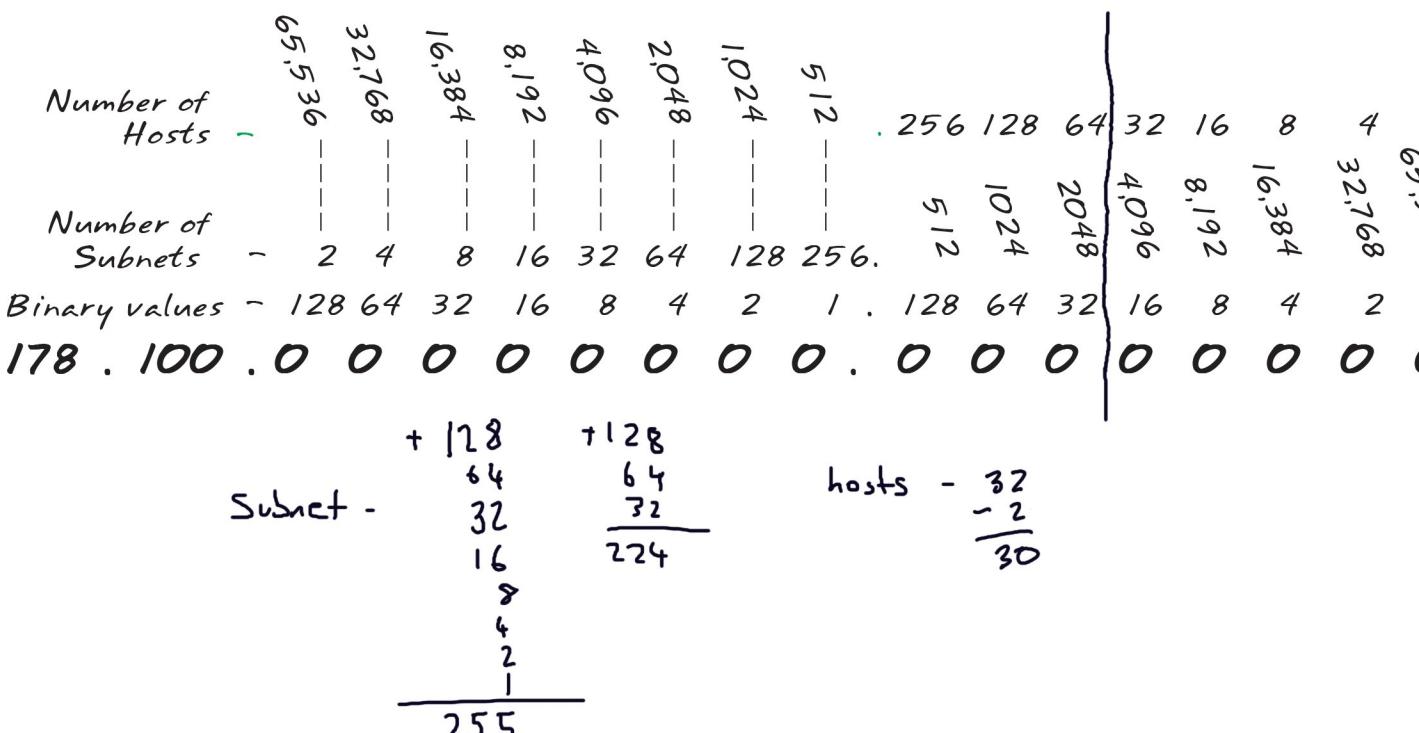
Total number of subnets **2048**

Total number of host addresses **32**

Number of usable addresses **30**

Number of bits borrowed **11**

Show your work for **Problem 7** in the space below.



## Custom Subnet Masks

## Problem 15

Number of needed usable hosts **50**

Network Address 172.59.0.0

Address class B

Default subnet mask 255.255.0.0

Custom subnet mask 255.255.255.192

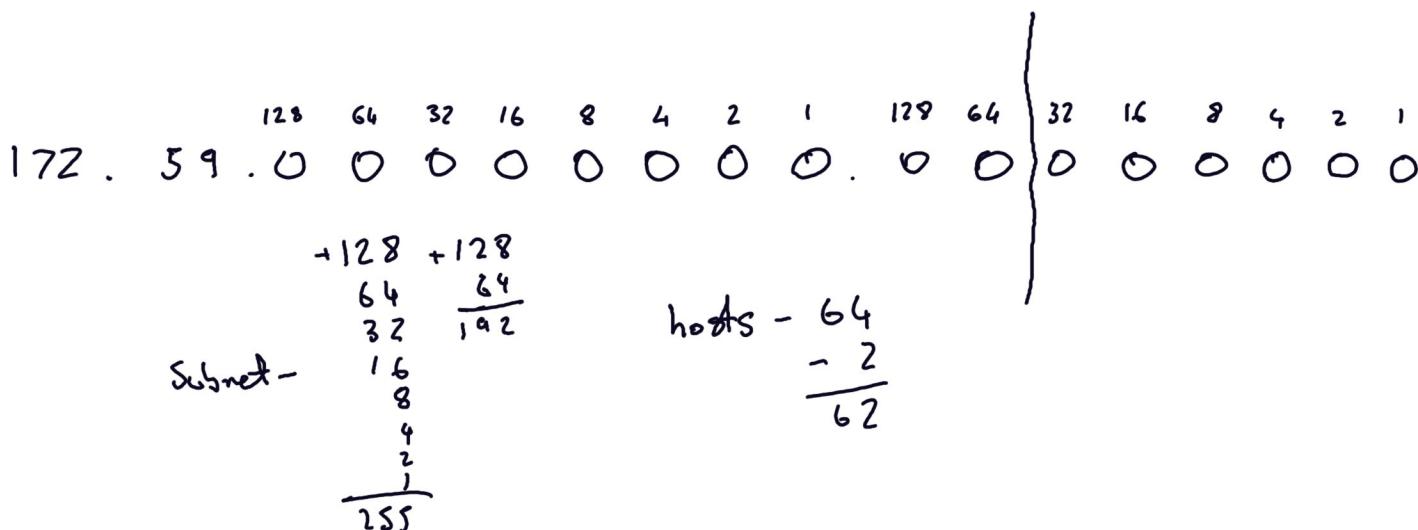
Total number of subnets 1024

Total number of host addresses 64

Number of usable addresses 62

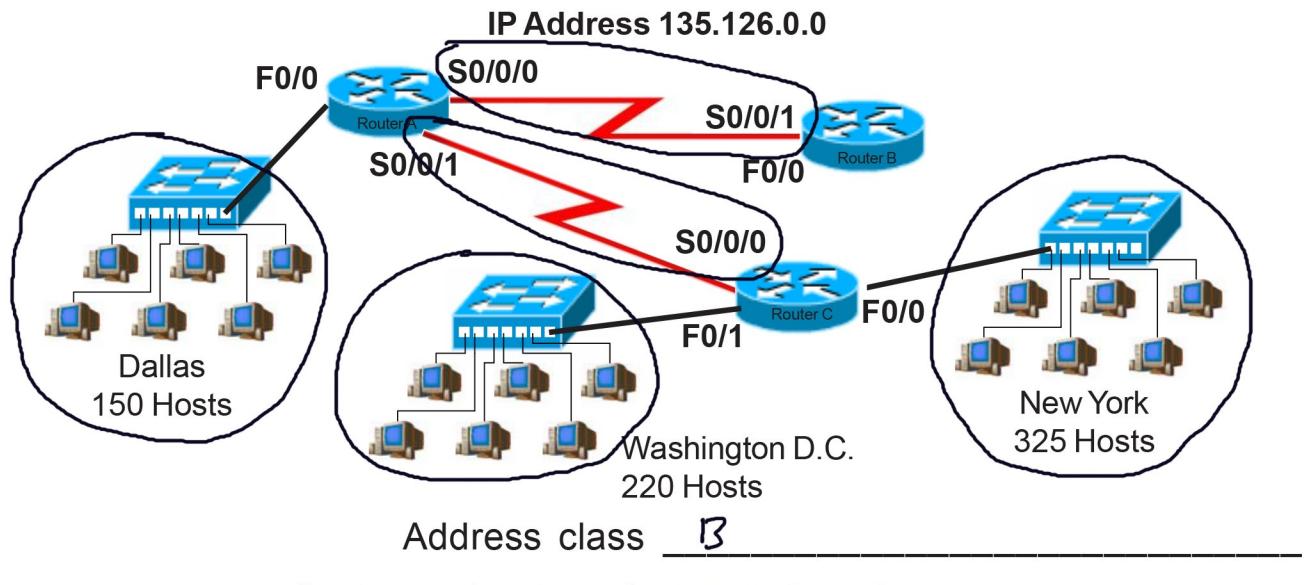
Number of bits borrowed 10

**Show your work for Problem 15 in the space below.**



# Practical Subnetting 4

Based on the information in the graphic shown, design a network addressing scheme that will supply the minimum number of subnets, and allow enough extra subnets and hosts for 70% growth in all areas. Circle each subnet on the graphic and answer the questions below.



Custom subnet mask 255.255.0.0

Minimum number of subnets needed 5

Extra subnets required for 70% growth  
(Round up to the next whole number) + 4

Total number of subnets needed = 9

Number of host addresses  
in the largest subnet group 325

Number of addresses needed for  
70% growth in the largest subnet  
(Round up to the next whole number) + 229

Total number of address  
needed for the largest subnet = 553

Start with the first subnet and arrange your sub-networks from the largest group to the smallest.

IP address range for New York 135.126.0.0 -> 135.126.47.255

IP address range for Washington D. C. 135.126.48.0 -> 135.126.95.255

IP address range for Dallas 135.126.96.0 -> 135.126.143.255

IP address range for Router A  
to Router B serial connection 135.126.144.0 -> 135.126.191.255

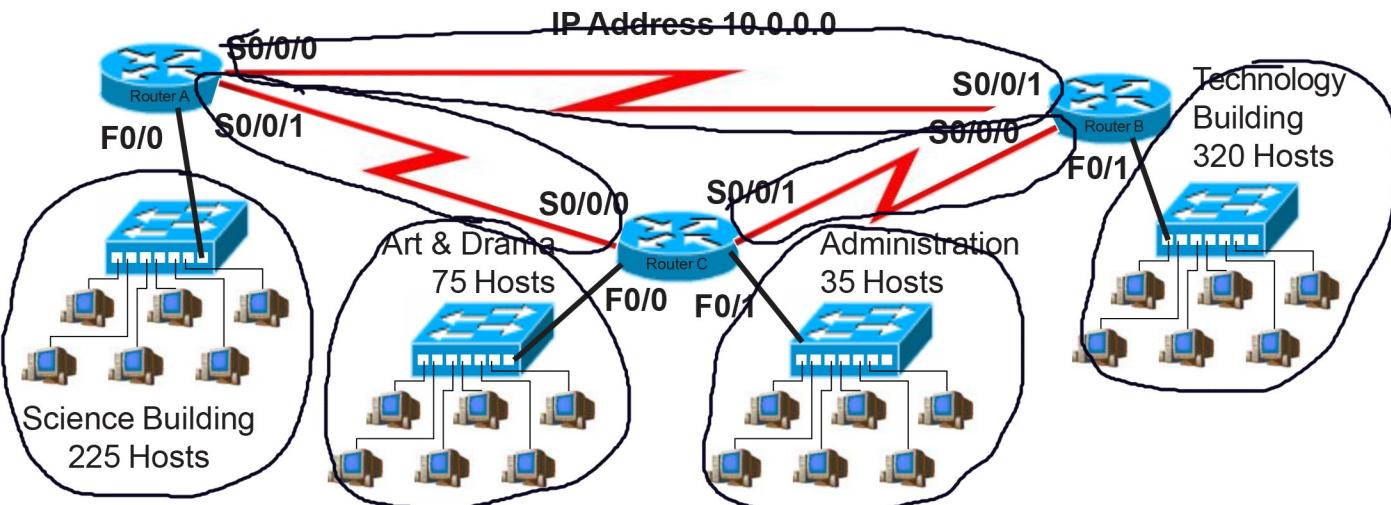
IP address range for Router A  
to Router C serial connection 135.126.192.0 -> 135.126.239.255

Show your work for Problem 4 in the space below.

65570	12568	10304	9192	4096	2048	1024	512	256	128	64	32	16	8	4	2
2	4	8	16	32	64	128	256	512	1024	2048	4096	8192	16384	32768	65536
128	256	384	512	640	768	896	1024	1152	1280	1408	1536	1664	1792	1920	2048
135	126	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<hr/>															
0	135	126	0	0	0	0	0	0	0	0	0	0	0	0	0
-	-	135	126	16	0	0	0	0	0	0	0	0	0	0	0
-	0	135	126	32	0	0	0	0	0	0	0	0	0	0	0
-	-	135	126	48	0	0	0	0	0	0	0	0	0	0	0
-	0	135	126	64	0	0	0	0	0	0	0	0	0	0	0
-	0	135	126	80	0	0	0	0	0	0	0	0	0	0	0
-	-	135	126	96	0	0	0	0	0	0	0	0	0	0	0
-	0	135	126	112	0	0	0	0	0	0	0	0	0	0	0
-	-	135	126	128	0	0	0	0	0	0	0	0	0	0	0
-	0	135	126	144	0	0	0	0	0	0	0	0	0	0	0
-	-	135	126	160	0	0	0	0	0	0	0	0	0	0	0
-	0	135	126	176	0	0	0	0	0	0	0	0	0	0	0
-	-	135	126	192	0	0	0	0	0	0	0	0	0	0	0
-	0	135	126	208	0	0	0	0	0	0	0	0	0	0	0
-	-	135	126	224	0	0	0	0	0	0	0	0	0	0	0
-	0	135	126	240	0	0	0	0	0	0	0	0	0	0	0
-	-	135	126	256	0	0	0	0	0	0	0	0	0	0	0

# Practical Subnetting 6

Based on the information in the graphic shown, design a network addressing scheme that will supply the minimum number of subnets, and allow enough extra subnets and hosts for 20% growth in all areas. Circle each subnet on the graphic and answer the questions below.



Address class A

Custom subnet mask 255.0.0.0

Minimum number of subnets needed 7

Extra subnets required for 20% growth  
(Round up to the next whole number) + 2

Total number of subnets needed = 9

Start with the first subnet and arrange your sub-networks from the largest group to the smallest.

IP address range for Technology 10.0.0.0 -> 10.31.255.255

IP address range for Science 10.32.0.0 -> 10.63.255.255

IP address range for Arts & Drama 10.64.0.0 -> 10.95.255.255

IP Address range Administration 10.96.0.0 -> 10.127.255.255

IP address range for Router A to Router B serial connection 10.128.255.255 -> 10.159.255.255

IP address range for Router A to Router C serial connection 10.160.0.0 -> 10.191.255.255

IP address range for Router B to Router C serial connection 10.192.0.0 -> 10.223.255.255

Show your work for Problem 6 in the space below.

