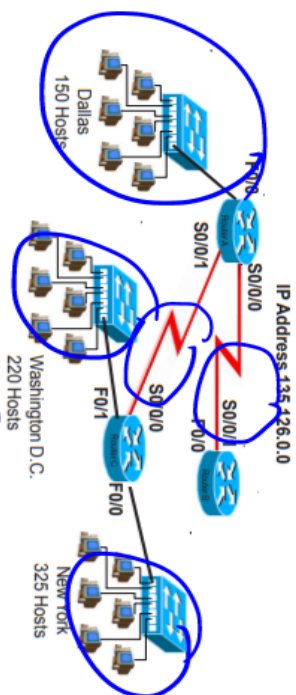


## Practical Subnetting 4

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.



Address class B  
Custom subnet mask 255.255.240.0

Minimum number of subnets needed 5

Extra subnets required for 70% growth +4  
(Round up to the next whole number)  $5 \times 7 = 3.5$

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 + 228  
(Round up to the next whole number)  $325 \times 7 = 227.5$

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 -> 135.126.15.255

IP address range for Washington D.C. 135.126.16.0 -> 135.126.31.255

IP address range for Dallas 135.126.32.0 -> 135.126.47.255

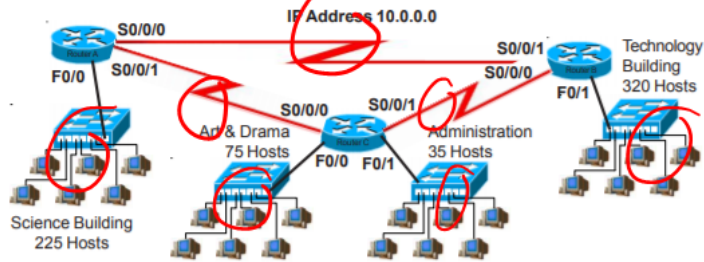
IP address range for Router A to Router B serial connection 135.126.48.0 -> 135.126.63.255

IP address range for Router A to Router C serial connection 135.126.64.0 -> 135.126.79.255

135.126.00000000  
Borrow  
0000000000000000  
R

## 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 255.240.0.0  
 Minimum number of subnets needed 7  
 Extra subnets required for 20% growth + 7 x .2 = 1.4 => 2  
 (Round up to the next whole number)  
 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 255.240.0.0 => 255.240.15.255  
 IP address range for Science 255.240.16.0 => 255.240.31.255  
 IP address range for Arts & Drama 255.240.32.0 => 255.240.47.255  
 IP Address range Administration 255.240.48.0 => 255.240.63.255  
 IP address range for Router A to Router B serial connection 255.240.64.0 => 255.240.79.255  
 IP address range for Router A to Router C serial connection 255.240.80.0 => 255.240.95.255  
 IP address range for Router B to Router C serial connection 255.240.96.0 => 255.240.111.255

## 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  $2048 = 2^{11}$

Total number of host addresses  $32 = 2^5$

Number of usable addresses 30  $32 - 2$

Number of bits borrowed 11

Show your work for Problem 7 in the space below.

	65,536	32,768	16,384	8,192	4,096	2,048	1,024	512	256	128	64	32	16	8	4	2
Number of Hosts																
	2	4	8	16	32	64	128	256	512	1024	2048	4096	8192	16384	32768	65536
Number of Subnets																
Binary values	128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
178 . 100 .	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11 Borrowed											5 remaining				

### 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**

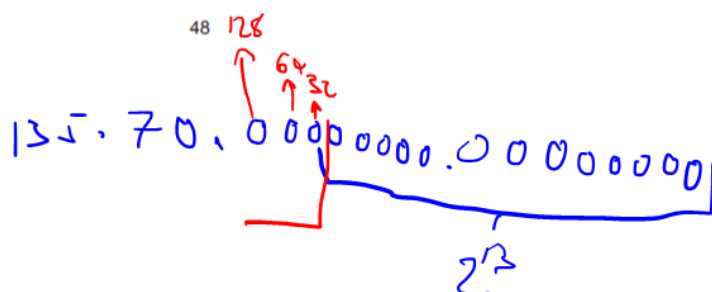
Number of bits borrowed **3**

160-191 What is the 6th subnet range? **135.70.0.160 → 135.70.0.191**

What is the subnet number for the 7th subnet? **135.70.0.192 → 135.70.0.223**

What is the subnet broadcast address for the 3rd subnet? **135.70.0.64 → 135.70.0.95**

What are the assignable addresses for the 5th subnet? **135.70.0.128 → 135.70.0.159**



0	000	135.70.0.0 → 135.70.0.31
1	001	32 → 63
2	010	64 → 95
3	011	96 → 127
4	100	128 → 159
5	101	160 → 191
6	110	192 → 223
7	111	224 → 255

### 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**

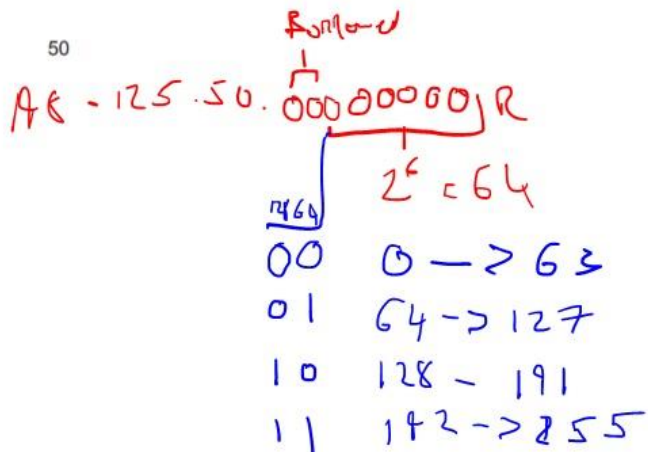
What is the 2nd subnet range? **198.125.50.64 -> 198.125.50.127**

What is the subnet number for the 2nd subnet? **64**

What is the subnet broadcast address for the 4th subnet? **198.125.50.255**

What are the assignable addresses for the 3rd subnet? **198.125.50.128 -> 198.125.50.190**

50



## 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 64-2

Number of bits borrowed 10

Show your work for Problem 15 in the space below.

172 . 59 . 00000000 . 00000000  
└──────────┘ └──────────┘  
2<sup>10</sup> = 1024      6 remaining  
                    Leaves  
                    64 host addresses