

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 ← 2 Reserved

Number of bits borrowed 11

Show your work for Problem 7 in the space below.

Number of Hosts	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 Subnets	2	4	8	16	32	64	128	256	512	1024	2048	4096	8192	16384	32768	65536
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	0

$$178_{10} = 10110010_2$$

← class B

$$255 + 128 + 64 + 32 = 479$$

← 224

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.

Number of Hosts	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 Subnets	2	4	8	16	32	64	128	256	512	1024	2048	4096	8192	16384	32768	65536
Binary values	128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1

172	59	.	0	0	0	0	0	0	0	.	0	0	0	0	0	0
-----	----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$\begin{array}{r}
 128 \\
 + 64 \\
 \hline
 192
 \end{array}$$

Problem 11

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? 135.70.166.0 → 135.70.192.255

What is the subnet number for the 7th subnet? 135.70.192.0

What is the subnet broadcast address for the 3rd subnet? 135.70.95.255

What are the assignable addresses for the 5th subnet? 135.70.128.1 → 135.70.154.254

Hosts Custom Subnet

235.255.224.0

Number of Hosts	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 Subnets	2	4	8	16	32	64	128	256	512	1,024	2,048	4,096	8,192	16,384	32,768	65,536
Binary values	-	128	64	32	16	8	4	2	1	128	64	32	16	8	4	2

135. 70. 0.00000000.00000000.00000000.00000001

0	0	135.70.0.0 → 31.255
1	1	135.70.32.0 → 63.255
2	10	135.70.64.0 → 95.255
3	11	135.70.96.0 → 127.255
4	100	135.70.128.0 → 159.255
5	101	135.70.160.0 → 191.255
6	110	135.70.192.0 → 223.255
7	111	135.70.224.0 → 255.255

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? 198.125.50.64 → 198.125.50.127

What is the subnet number for the 2nd subnet? 198.125.50.64

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

What are the assignable addresses for the 3rd subnet? 198.125.50.129 → 190

↳ Subnets?

255.255.255.192

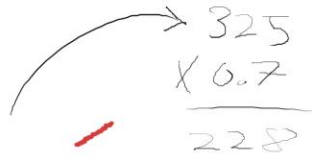
64 Hosts

2 bits

Number of Subnets	256	128	64	32	16	8	4	2	Number of Hosts
	2	4	8	16	32	64	128	256	
198.125.50.	0	0	0	0	0	0	0	0	
	128	64	32	16	8	4	2	1	Binary values

0	198.125.50.0 → 198.125.50.63?
1	198.125.50.64 → 198.125.50.127
10	198.125.50.128 → 198.125.50.191
11	198.125.50.192 → 198.125.50.255

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.



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

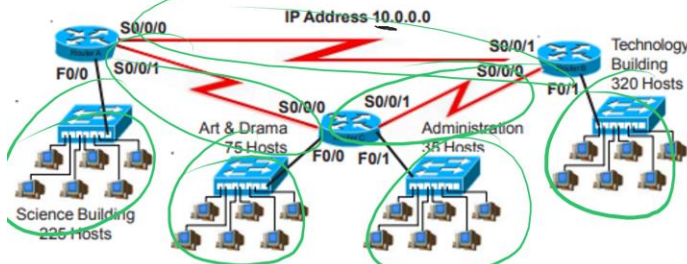
64

Number of Hosts	Number of Subnets	Binary values
65,536	2	128 64 32 16 8 4 2
32,768	4	128 64 32 16 8 4 2
16,384	8	128 64 32 16 8 4 2
8,192	16	128 64 32 16 8 4 2
4,096	32	128 64 32 16 8 4 2
2,048	64	128 64 32 16 8 4 2
1,024	128	128 64 32 16 8 4 2
512	256	128 64 32 16 8 4 2
256	512	128 64 32 16 8 4 2
128	1,024	128 64 32 16 8 4 2
64	2,048	128 64 32 16 8 4 2
32	4,096	128 64 32 16 8 4 2
16	8,192	128 64 32 16 8 4 2
8	16,384	128 64 32 16 8 4 2
4	32,768	128 64 32 16 8 4 2
2	65,536	128 64 32 16 8 4 2

Subnet	Subnet Address	Range
0	135.126.0.0	15.255
1	135.126.16.0	31.255
2	135.126.32.0	47.255
3	135.126.48.0	63.255
4	135.126.64.0	79.255
5	135.126.80.0	95.255
	135.126.96.0	111.255
	135.126.128.0	143.255

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.
 Minimum number of subnets needed 7
 Extra subnets (required for 20% growth) + 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 → 10.15.255.255
 IP address range for Science 10.16.0.0 → 10.31.255.255
 IP address range for Arts & Drama 10.32.0.0 → 10.47.255.255
 IP Address range Administration 10.48.0.0 → 10.63.255.255
 IP address range for Router A to Router B serial connection 10.64.0.0 → 10.79.255.255
 IP address range for Router A to Router C serial connection 10.80.0.0 → 10.95.255.255
 IP address range for Router B to Router C serial connection 10.96.0.0 → 10.111.255.255

Number of Hosts	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 Subnets	2	4	8	16	32	64	128	256	512	1,024	2,048	4,096	8,192	16,384	32,768	65,536
Binary values	128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	10.0.0.0 → 10.15.255.255
1	1	10.16.0.0 → 10.31.255.255
2	10	10.32.0.0 → 10.47.255.255
3	11	10.48.0.0 → 10.63.255.255
4	100	10.64.0.0 → 10.79.255.255
5	101	10.80.0.0 → 10.95.255.255
6	110	10.96.0.0 → 10.111.255.255
7	111	10.112.0.0 → 10.127.255.255
8	1000	10.128.0.0 → 10.143.255.255

$$\begin{array}{r}
 7 \\
 + 2 \\
 \hline
 9
 \end{array}$$