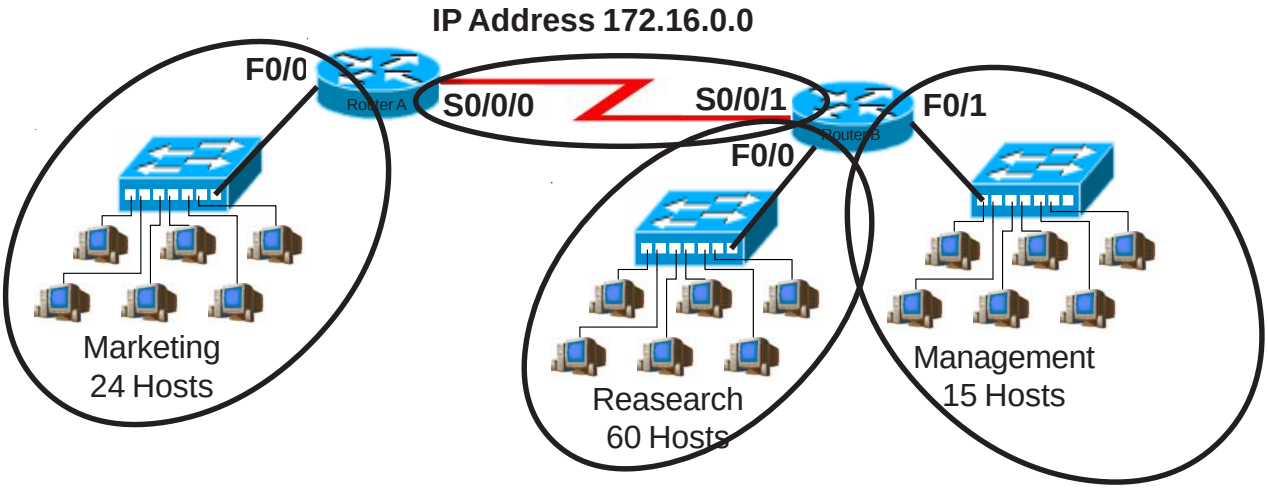
Practical Subnetting 1

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 100% growth in both areas. Circle each subnet on the graphic and answer the questions below.



Address class	B
Custom subnet mask	255.255.224.0
Minimum number of subnets needed	4
Extra subnets required for 100% growth (Round up to the next whole number)	+ 4
Total number of subnets needed	= 8
Number of host addresses in the largest subnet group	60
Number of addresses needed for 100% growth in the largest subnet (Round up to the next whole number)	+ 60
Total number of address needed for the largest subnet	= 120

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

IP address range for Research	172.16.0.0 to 172.31.255
IP address range for Marketing	172.16.32.0 to 172.63.255
IP address range for Management	172.16.64.0 to 172.95.255
IP address range for Router A to Router B serial connection	172.16.96.0 to 172.127.255

Show your work for Practical Subnetting 1 in the space below.

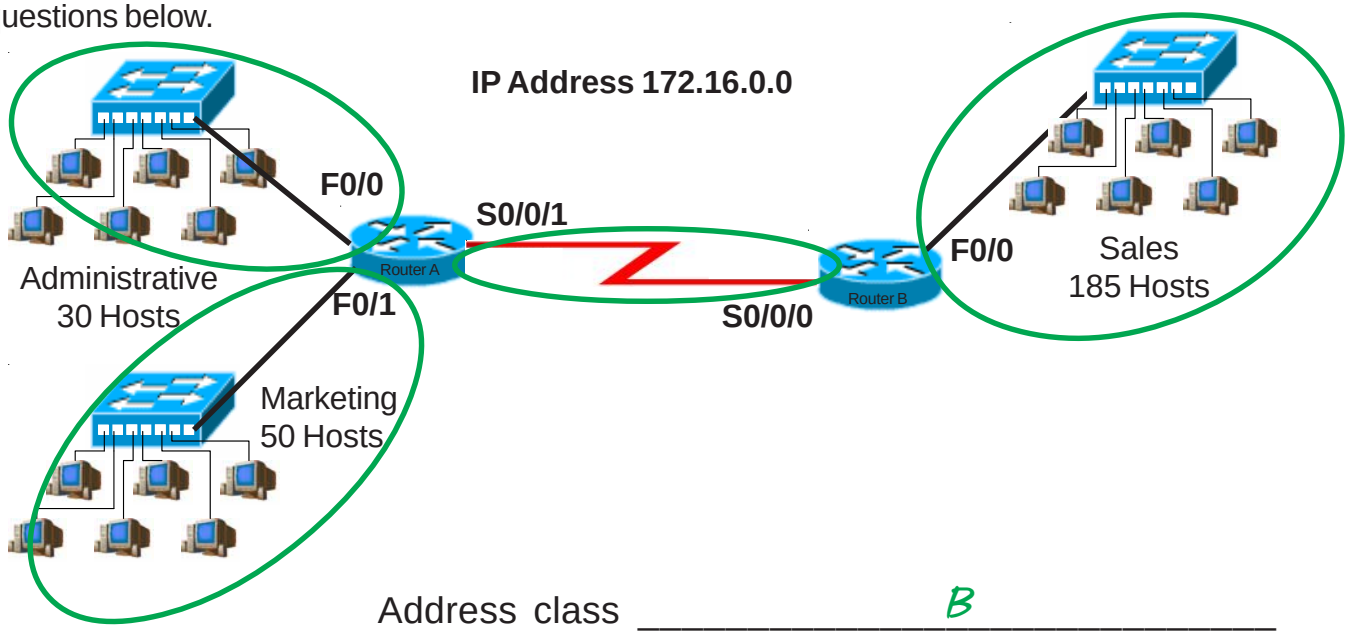
Number of Hosts –	65,536	32,768	16,384	8,192	4,096	2,048	1,024	512	.256	128	64	32	16	8	4	2
Number of Subnets –	2	4	8	16	32	64	128	256.	512	1024	2048	4,096	8,192	16,384	32,768	65,536
Binary values –	128	64	32	16	8	4	2	1 .	128	64	32	16	8	4	2	1
172 . 16 .	0	0	0	0	0	0	0	0 .	0	0	0	0	0	0	0	0

(0)			0	172.16.0.0	to	172.16.31.255
(1)			1	172.16.32.0	to	172.16.63.255
(2)		1	0	172.16.64.0	to	172.16.95.255
(3)		1	1	172.16.96.0	to	172.16.127.255
(4)	1	0	0	172.16.128.0	to	172.16.159.255
(5)	1	0	1	172.16.160.0	to	172.16.191.255
(6)	1	1	0	172.16.192.0	to	172.16.223.255
(7)	1	1	1	172.16.224.0	to	172.16.255.255

$$\begin{array}{r} 4 \\ \times 1.0 \\ \hline 4 \end{array} \qquad \begin{array}{r} 60 \\ \times 1.0 \\ \hline 60 \end{array}$$

Practical Subnetting 3

Based on the information in the graphic shown, design a classfull network addressing scheme that will supply the **minimum number of hosts per subnet**, and allow enough extra subnets and hosts for 25% growth in all areas. Circle each subnet on the graphic and answer the questions below.



Address class	B
Custom subnet mask	255.255.255.0
Minimum number of subnets needed	4
Extra subnets required for 25% growth (Round up to the next whole number)	+ 1
Total number of subnets needed	= 5
Number of host addresses in the largest subnet group	185
Number of addresses needed for 25% growth in the largest subnet (Round up to the next whole number)	+ 47
Total number of address needed for the largest subnet	= 232

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

IP address range for Sales	172.16.0.0 to 172.16.0.255
IP address range for Marketing	172.16.1.0 to 172.16.1.255
IP address range for Administrative	172.16.2.0 to 172.16.2.255
IP address range for Router A to Router B serial connection	172.16.3.0 to 172.16.3.255

Show your work for <u>Problem 3</u> 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
										512	1024	2048	4,096	8,192	16,384	32,768	65,536
Number of Subnets –	2	4	8	16	32	64	128	256	.								
Binary values –	128	64	32	16	8	4	2	1	.	128	64	32	16	8	4	2	1
172. 16 .	0	0	0	0	0	0	0	0	.	0	0	0	0	0	0	0	0

Subnet	8	4	2	1	Start		End
(0)				0	172.16.0.0	to	1172.16.0.255
(1)				1	172.16.1.0	to	1172.16.1.255
(2)			1	0	172.16.2.0	to	1172.16.2.255
(3)			1	1	172.16.3.0	to	1172.16.3.255
(4)		1	0	0	172.16.4.0	to	1172.16.4.255
(5)		1	0	1	172.16.5.0	to	1172.16.5.255
(6)		1	1	0	172.16.6.0	to	1172.16.6.255
(7)		1	1	1	172.16.7.0	to	1172.16.7.255
(8)	1	0	0	0	172.16.8.0	to	1172.16.8.255
(9)	1	0	0	1	172.16.9.0	to	1172.16.9.255
(10)	1	0	1	0	172.16.10.0	to	1172.16.10.255
(11)	1	0	1	1	172.16.11.0	to	1172.16.11.255
(12)	1	1	0	0	172.16.12.0	to	1172.16.12.255
(13)	1	1	0	1	172.16.13.0	to	1172.16.13.255
(14)	1	1	1	0	172.16.14.0	to	1172.16.14.255
(15)	1	1	1	1	172.16.15.0	to	1172.16.15.255

$$4 \times .25 = 1$$

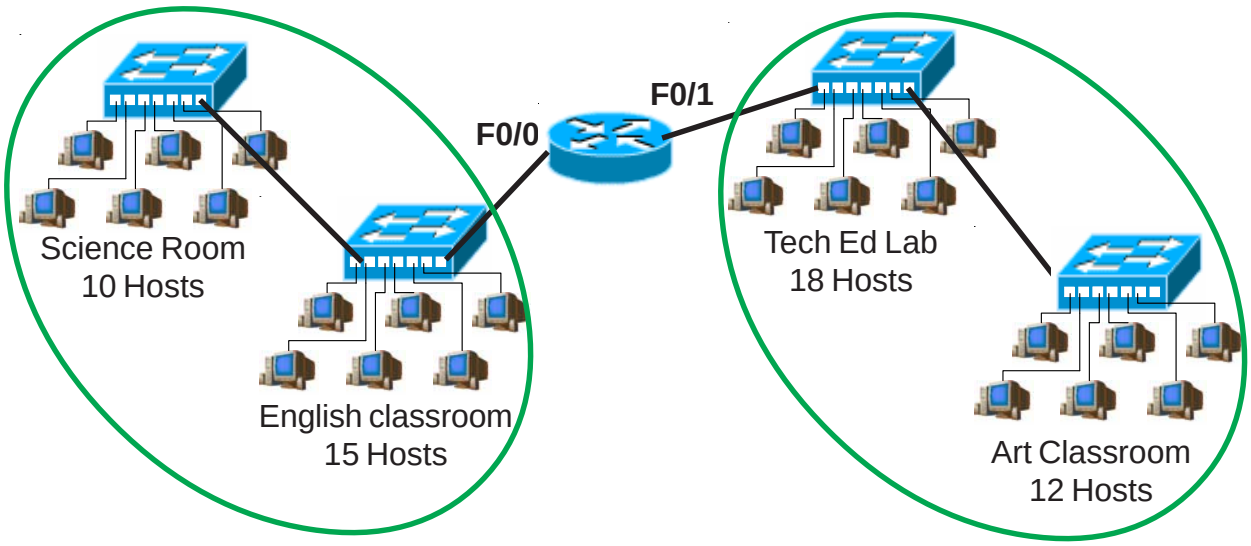
$$225 \times .25 = 56.25$$

(Round up to 57)

Practical Subnetting 5

Based on the information in the graphic shown, design a network addressing scheme that will supply the **minimum number of hosts per subnet**, and allow enough extra subnets and hosts for 100% growth in all areas. Circle each subnet on the graphic and answer the questions below.

IP Address 210.15.10.0



Address class C

Custom subnet mask 255.255.255.192

Minimum number of subnets needed 2

Extra subnets required for 100% growth + 2
(Round up to the next whole number)

Total number of subnets needed = 4

Number of host addresses in the largest subnet group 30

Number of addresses needed for 100% growth in the largest subnet + 30
(Round up to the next whole number)

Total number of address needed for the largest subnet = 60

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

IP address range for Router F0/0 Port 210.15.10.0 to 210.15.10.63

IP address range for Router F0/1 Port 210.15.10.64 to 210.15.10.127

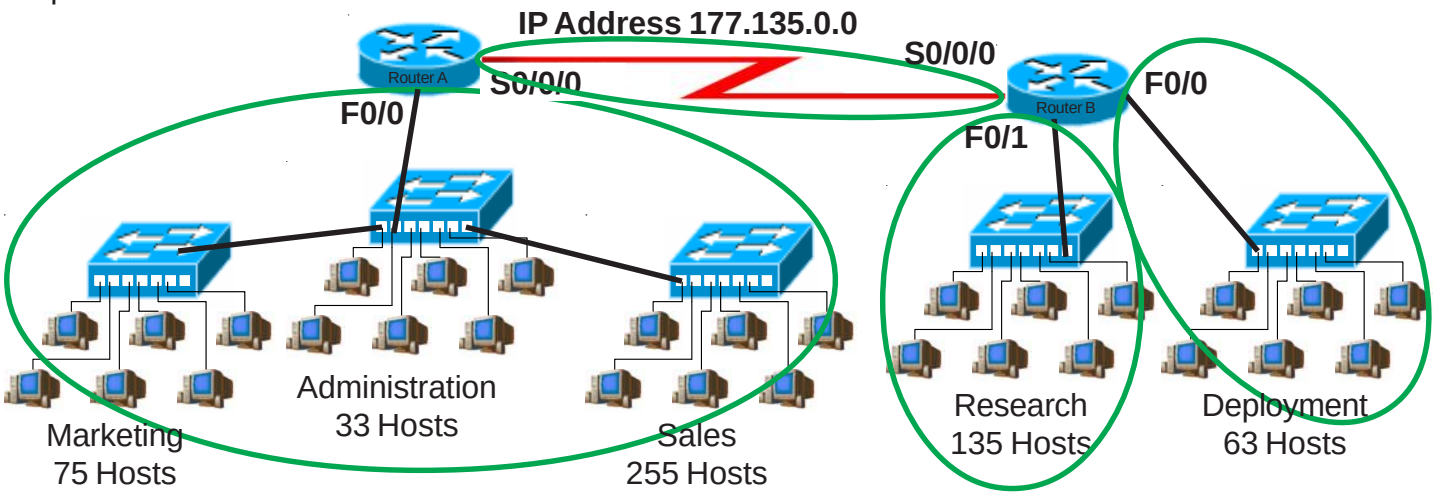
Show your work for <u>Problem 5</u> in the space below.

Number of Subnets	256	128	64	32	16	8	4	2	Number of Hosts
	2	4	8	16	32	64	128	256	
	128	64	32	16	8	4	2	1	Binary values
210.15.10.0	0	0	0	0	0	0	0	0	

(0)	0		210.15.10.0	to	210.15.10.63
(1)	1		210.15.10.64	to	210.15.10.127
(2)	1	0	210.15.10.128	to	210.15.10.191
(3)	1	1	210.15.10.192	to	210.15.10.255

Practical Subnetting 7

Based on the information in the graphic shown, design a network addressing scheme that will supply the **minimum number of hosts per subnet**, and allow enough extra subnets and hosts for 125% growth in all areas. Circle each subnet on the graphic and answer the questions below.



Address class _____ B

Custom subnet mask _____ 255.255.252.0

Minimum number of subnets needed _____ 4

Extra subnets required for 125% growth + _____ 5
(Round up to the next whole number)

Total number of subnets needed = _____ 9

Number of host addresses in the largest subnet group _____ 363

Number of addresses needed for 125% growth in the largest subnet + _____ 454
(Round up to the next whole number)

Total number of address needed for the largest subnet = _____ 817

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

IP address range for Router A Port F0/0 _____ 177.135.0.0 to 177.135.3.255

IP address range for Research _____ 177.135.4.0 to 177.135.7.255

IP address range for Deployment _____ 177.135.8.0 to 177.135.11.255

IP address range for Router A to Router B serial connection _____ 177.135.12.0 to 177.135.15.255

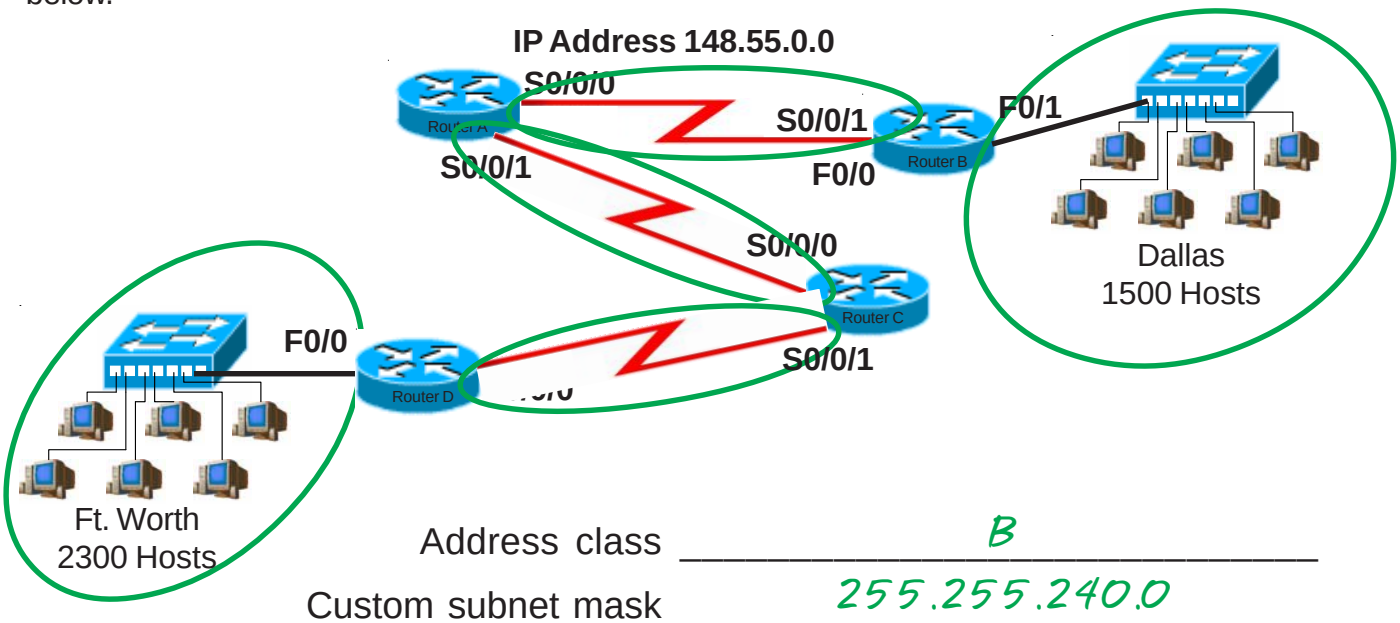
Show your work for Problem 7 in the space below.

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	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
177.135 .	0	0	0	0	0	0	0	0 .	0	0	0	0	0	0	0	0

Subnet	Bits	Start		End
(0)	. 0	177.135.0.0	to	177.135.3.255
(1)	1	177.135.4.0	to	177.135.7.255
(2)	1 0	177.135.8.0	to	177.135.11.255
(3)	1 1	177.135.12.0	to	177.135.15.255
(4)	1 0 0	177.135.16.0	to	177.135.19.255
(5)	1 0 1	177.135.20.0	to	177.135.23.255
(6)	1 1 0	177.135.24.0	to	177.135.27.255
(7)	1 1 1	177.135.28.0	to	177.135.31.255
(8)	1 . 0 0 0	177.135.32.0	to	177.135.35.255
(9)	1 . 0 0 1	177.135.36.0	to	177.135.39.255
(10)	1 . 0 1 0	177.135.40.0	to	177.135.43.255
(11)	1 . 0 1 1	177.135.44.0	to	177.135.47.255
(12)	1 1 0 0	177.135.48.0	to	177.135.51.255
(13)	1 . 1 0 1	177.135.52.0	to	177.135.55.255
(14)	1 . 1 1 0	177.135.56.0	to	177.135.59.255
(15)	1 . 1 1 1	177.135.60.0	to	177.135.63.255

Practical Subnetting 9

Based on the information in the graphic shown, design a network addressing scheme that will supply the **minimum number of hosts per subnet**, and allow enough extra subnets and hosts for 15% 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 15% growth + ___1___
(Round up to the next whole number)

Total number of subnets needed = ___6___

Number of host addresses in the largest subnet group ___2300___

Number of addresses needed for 15% growth in the largest subnet + ___345___
(Round up to the next whole number)

Total number of address needed for the largest subnet = ___2645___

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

IP address range for Ft. Worth ___148.55.0.0. to 148.55.15.255___

IP address range for Dallas ___148.55.16.0. to 148.55.31.255___

IP address range for Router A to Router B serial connection ___148.55.32.0. to 148.55.47.255___

IP address range for Router A to Router C serial connection ___148.55.48.0. to 148.55.63.255___

IP address range for Router C to Router D serial connection ___148.55.64.0. to 148.55.79.255___

Show your work for Problem 9 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	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
148.55.	0	0	0	0	0	0	0	0.	0	0	0	0	0	0	0	0

	128	64	32	16	Range		
(0)				0	148.55.0.0	to	148.55.15.255
(1)				1	148.55.16.0	to	148.55.31.255
(2)			1	0	148.55.32.0	to	148.55.47.255
(3)			1	1	148.55.48.0	to	148.55.63.255
(4)		1	0	0	148.55.64.0	to	148.55.79.255
(5)		1	0	1	148.55.80.0	to	148.55.95.255
(6)		1	1	0	148.55.96.0	to	148.55.111.255
(7)		1	1	1	148.55.112.0	to	148.55.127.255
(8)	1	0	0	0	148.55.128.0	to	148.55.143.255
(9)	1	0	0	1	148.55.144.0	to	148.55.159.255
(10)	1	0	1	0	148.55.160.0	to	148.55.175.255
(11)	1	0	1	1	148.55.176.0	to	148.55.191.255
(12)	1	1	0	0	148.55.192.0	to	148.55.207.255
(13)	1	1	0	1	148.55.208.0	to	148.55.223.255
(14)	1	1	1	0	148.55.224.0	to	148.55.239.255
(15)	1	1	1	1	148.55.240.0	to	148.55.255.255