EIGHT STEPS TO SUBNETTING SUCCESS   *by Bob Cunningham*

Given an IP address and a subnet mask these steps will enable you to identify the total number of subnets available, the number of hosts per subnet, the network address of the subnet, the first usable address on that subnet and the broadcast address of that subnet.

> *Before beginning subnetting problems create a powers of "2" table, a bits over mask table, a multiples of "2", "4", "8", "16", "32" and "64" tables (in practice, I only create the "8" and "32" tables and extrapolate the others).   My "cheat sheet" is attached to this paper.*

1) **Draw a line at the classful division. Identify the interesting octet of the subnet mask (the octet which is neither 0 nor 255) and write it out in binary. (If the mask is presented with CIDR notation, convert the mask to dotted decimal using the mask table before beginning step 1.)**

2) **Count the number of 1's from the classful division through the end IP address to calculate the number of usable network addresses using the formula 2^n (use the powers of "2" table to do this quickly!)**

3) **Count the number of 0's from the classful division through the end IP address and calculate the number of usable host addresses using the formula $2^n - 2$ (use the powers of "2" table to do this quickly!)**

4) **In decimal, subtract the interesting octet of the mask from 256 – the result is the size of the boundary of subnets for this mask. This number identifies the table you will use in step 5.**

5) **Take the interesting octet from the _IP address_ and compare it to the "multiples table" identified in step 4. (*The interesting octet from the _IP address_ is the octet in the same position as the interesting octet of the mask.*) Identify the first multiple number that is larger than the address of your interesting octet of the _IP address_ – the number just below than (less than) on your chart (followed by all zeros) is the network address of your subnet.**

6) **Add one to your network address and you have your first usable address.**

7) **Find the next larger number on your multiples table, subtract one and you have your broadcast address.**

8) **Subtract one from the broadcast address and you have the last usable address on your subnet.**

Bob's shortcut sheet

The horizontal row represents the decimal value of each column of an 8 bit binary work

128	64	32	16	8	4	2	1
1	1	2	2	2	2	2	2
2	9	2	4	4	5	5	5
8	2	4	0	8	2	4	5

The vertical columns are used to convert an uninterrupted series of 1's into a binary coded decimal number (i.e. from the left, three 1's places us in the 3rd position which is 224)

Powers of ²

2			8
4			16
8			24
16			32
32			40
64			48
128			56
256			64
512			72
1024			80
2048			88
4096			96
8192			104
16384			112
32768			120
65536			128
		16	136
		32	144
		48	152
		64	160
		80	168
		96	176
		112	184
		128	192
	32	144	200
	64	160	208
	96	176	216
	128	192	224
	160	208	232
	192	224	240
	224	240	248
	256	256	256