Subnetting :

A subnetting or subnetwork is a logical subdivision of an IP network. The practice of dividing a network into two or more network is called subnetting.

Subnet mask means the 32-bit number that mask an IP address, and divides the IP address into network address and host address.

Internet Protocol Version 4 (IPv4) :
Ranges:

Class	First Octet (Decimal value)	First Octet (Binary value)	Possible No. of Host
Class A NHHH	1-126	00000001-01111110	16,777,214
Class B NNHH	128-191	10000000-10111111	65,534
Class C NNNH	192-223	11000000-11011111	254
Class D	224-239	Used for Multitasking purpose	
Class E	240-255	Used for Research and Development	

➔ IP 127.0.0.1 is Reserved called loopback ip which is used for trobleshoot.

Bit :
128 64 32 16 8 4 2 1

1 bit on = 10000000 = 128
2 bit on = 11000000 = 192
3 bit on = 11100000 = 224
4 bit on = 11110000 = 240
5 bit on = 11111000 = 248
6 bit on = 11111100 = 252
7 bit on = 11111110 = 254
8 bit on = 11111111 = 255

Private IP Ranges (used in home or self design)

Class	Ranges
Class A	10.0.0.0 -10.255.255.255
Class B	172.16.0.0-172.31.255.255
Class C	192.168.0.0-192.168.255.255

Classful :

The class which have exact no. of network and host bit considering their individual classes.
For example:
Class A= /8
Class B= /16
Class C= /24

CIDR :

For class A

Slash value	Netmask	No. of Network	No. of Host	Bits
/9	255.128.0.0	2	8388606	1
/10	255.192.0.0	4	4194302	2
/11	255.224.0.0	8	2097150	3
/12	255.240.0.0	16	1048574	4
/13	255.248.0.0	32	524286	5
/14	255.252.0.0	64	262142	6
/15	255.254.0.0	128	131070	7
/16	255.255.0.0	256	65534	8
/17	255.255.128.0	512	32766	9
/18	255.255.192.0	1024	16382	10
/19	255.255.224.0	2048	8190	11
/20	255.255.240.0	4096	4094	12
/21	255.255.248.0	8192	2046	13
/22	255.255.252.0	16384	1022	14
/23	255.255.254.0	32768	510	15
/24	255.255.255.0	65536	254	16
/25	255.255.255.128	131072	126	17
/26	255.255.255.192	262144	62	18
/27	255.255.255.224	524288	30	19
/28	255.255.255.240	1048576	14	20
/29	255.255.255.248	2097152	6	21
/30	255.255.255.252	4194304	2	22
/31	255.255.255.254	8388608	0	23

For class B

Slash value	Netmask	No. of Network	No. of Host	Bits
/17	255.255.128.0	2	32766	1
/18	255.255.192.0	4	16382	2
/19	255.255.224.0	8	8190	3
/20	255.255.240.0	16	4094	4
/21	255.255.248.0	32	2046	5
/22	255.255.252.0	64	1022	6
/23	255.255.254.0	128	510	7
/24	255.255.255.0	256	254	8
/25	255.255.255.128	512	126	9
/26	255.255.255.192	1024	62	10
/27	255.255.255.224	2048	30	11
/28	255.255.255.240	4096	14	12
/29	255.255.255.248	8192	6	13
/30	255.255.255.252	16384	2	14
/31	255.255.255.254	32768	0	15

For class C

Slash value	Netmask	No. of Network	No. of Host	Bits
/25	255.255.255.128	2	126	1
/26	255.255.255.192	4	62	2
/27	255.255.255.224	8	30	3
/28	255.255.255.240	16	14	4
/29	255.255.255.248	32	6	5
/30	255.255.255.252	64	2	6
/31	255.255.255.254	128	0	7

Classless Interdomain Routing (CIDR) :

Specific Case :

1. 10.0.0.0/1

New Subnet mask = 10000000.00000000.00000000.00000000
= 128.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^1=2
Number of Host = 2^m ;m = number of off(0) bit = 2^31= 2147483648
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^31-2= 2147483646
Block size or magic Number or Jumping value = 256-128 =128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 127.255.255.254	127.255.255.255
128.0.0.0	128.0.0.1-255.255.255.254	255.255.255.255

2. 10.0.0.0/2

i. New Subnet mask = 11000000.00000000.00000000.00000000
= 192.0.0.0
ii. Number of Network = 2^n ; n = number of on(1) bit = 2^2=4
iii. Number of Host = 2^m ;m = number of off(0) bit = 2^30=1073741824
iv. Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^30-2=1073741822
v. Block size or magic Number or Jumping value = 256-192 =64
vi. Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 63.255.255.254	63.255.255.255
64.0.0.0	64.0.0.1- 127.255.255.254	127.255.255.255
128.0.0.0	128.0.0.1-191.255.255.254	191.255.255.255
192.0.0.0	192.0.0.1- 255.255.255.254	255.255.255.255

3. 10.0.0.0/3

New Subnet mask = 11100000.00000000.00000000.00000000
= 224.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^3=8
Number of Host = 2^m ;m = number of off(0) bit = 2^29=8388608
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^29-2=8388606
Block size or magic Number or Jumping value = 256-224 =32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 31.255.255.254	31.255.255.255
32.0.0.0	32.0.0.1- 63.255.255.254	63.255.255.255
64.0.0.0	64.0.0.1-95.255.255.254	95.255.255.255
96.0.0.0	96.0.0.1-127.255.255.254	127.255.255.255
128.0.0.0	128.0.0.1-159.255.255.254	159.255.255.255
160.0.0.0	160.0.0.1-191.255.255.254	191.255.255.255
192.0.0.0	192.0.0.1-223.255.255.254	223.255.255.255
224.0.0.0	224.0.0.1-255.255.255.254	255.255.255.255

4. 10.0.0.0/4

New Subnet mask = 11110000.00000000.00000000.00000000
= 240.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^4=16
Number of Host = 2^m ;m = number of off(0) bit = 2^28=268435456
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^28-2= 268435456
Block size or magic Number or Jumping value = 256-240 =16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1-15.255.255.254	15.255.255.255
16.0.0.0	16.0.0.1- 31.255.255.254	31.255.255.255
32.0.0.0	32.0.0.1- 47.255.255.254	47.255.255.255
48.0.0.0	48.0.0.1- 63.255.255.254	63.255.255.255
……...	……..	……..
……...	……..	……...
192.0.0.0	192.0.0.1- 207.255.255.254	207.255.255.255
208.0.0.0	208.0.0.1-223.255.255.254	223.255.255.255
224.0.0.0	224.0.0.1-239.255.255.254	239.255.255.255
240.0.0.0	240.0.0.1-255.255.255.254	255.255.255.255

5. 10.0.0.0/5

New Subnet mask = 11111000.00000000.00000000.00000000
= 248.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^5=32
Number of Host = 2^m ;m = number of off(0) bit = 2^27=134217728
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^27-2= 134217726
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1-7.255.255.254	7.255.255.255
8.0.0.0	8.0.0.1-15.255.255.254	15.255.255.255
16.0.0.0	16.0.0.1-23.255.255.254	23.255.255.255
24.0.0.0	24.0.0.1-31.255.255.254	31.255.255.255
32.0.0.0	32.0.0.1-39.255.255.254	39.255.255.255
...……..	……..	……..
……...	……..	……...
216.0.0.0	216.0.0.1-223.255.255.254	223.255.255.255
224.0.0.0	224.0.0.1-231.255.255.254	231.255.255.255
232.0.0.0	232.0.0.1-239.255.255.254	239.255.255.255
240.0.0.0	240.0.0.1-247.255.255.254	247.255.255.255
248.0.0.0	248.0.0.1-255.255.255.254	255.255.255.255

6. 10.0.0.0/6

New Subnet mask = 11111100.00000000.00000000.00000000
= 252.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^6=64
Number of Host = 2^m ;m = number of off(0) bit = 2^26= 67108864
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^18-2=67108862
Block size or magic Number or Jumping value = 256-252 = 4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 3.255.255.254	3.255.255.255
4.0.0.0	4.0.0.1- 7.255.255.254	7.255.255.255
8.0.0.0	8.0.0.1- 11.255.255.254	11.255.255.255
12.0.0.0	12.0.0.1- 15.255.255.254	15.255.255.255
16.0.0.0	16.0.0.1- 19.255.255.254	19.255.255.255
……...	……..	……..
……...	……..	……...
236.0.0.0	236.0.0.1- 239.255.255.254	239.255.255.255
240.0.0.0	240.0.0.1- 243.255.255.254	243.255.255.255
244.0.0.0	244.0.0.1- 247.255.255.254	247.255.255.255
248.0.0.0	248.0.0.1- 251.255.255.254	251.255.255.255
252.0.0.0	252.0.0.1- 255.255.255.254	255.255.255.255

7. 10.0.0.0/7

New Subnet mask = 11111110.00000000.00000000.00000000
= 254.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^7=128
Number of Host = 2^m ; m = number of off(0) bit = 2^25=33554432
Number of Valid Host = 2^m-2 ; m = number of off(0) bit = 2^25-2=33554432
Block size or magic Number or Jumping value = 256-254 = 2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 1.255.255.254	1.255.255.255
2.0.0.0	2.0.0.1- 3.255.255.254	3.255.255.255
4.0.0.0	4.0.0.1- 5.255.255.254	5.255.255.255
6.0.0.0	6.0.0.1- 7.255.255.254	7.255.255.255
8.0.0.0	8.0.0.1- 9.255.255.254	9.255.255.255
……...	……..	……..
…….	……..	……...
246.0.0.0	246.0.0.1-247.255.255.254	247.255.255.255
248.0.0.0	248.0.0.1-249.255.255.254	249.255.255.255
250.0.0.0	250.0.0.1-251.255.255.254	251.255.255.255
252.0.0.0	252.0.0.1-253.255.255.254	253.255.255.255
254.0.0.0	254.0.0.1-255.255.255.254	255.255.255.255

8. 10.0.0.0/8

New Subnet mask = 255.00000000.00000000.00000000
= 255.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^0=1
Number of Host = 2^m ;m = number of off(0) bit = 2^24=16711216
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^24-2=16711214
Block size or magic Number or Jumping value = 256-0 =256
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.255.255.254	10.255.255.255

CLASS A

9. 10.0.0.0/9

New Subnet mask = 255.10000000.00000000.00000000
= 255.128.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^1=2
Number of Host = 2^m ;m = number of off(0) bit = 2^23=8388608
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^23-2=8388606
Block size or magic Number or Jumping value = 256-128 =128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.127.255.254	10.127.255.255
10.128.0.0	10.128.0.1-10 255.255.254	10.255.255.255

10. 10.0.0.0/10

New Subnet mask = 255.11000000.00000000.00000000
= 255.192.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^2=4
Number of Host = 2^m ;m = number of off(0) bit = 2^22=4194306
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^23-2=4194304
Block size or magic Number or Jumping value = 256-192 =64
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.63.255.254	10.63.255.255
10.64.0.0	10.64.0.1-10.63.255.254	10.127.255.255
10.128.0.0	10.128.0.1-10.63.255.254	10.191.255.255
10.192.0.0	10.192.0.1-10.255.255.254	10.255.255.255

11. 10.0.0.0/11

New Subnet mask = 255.11100000.00000000.00000000
= 255.224.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^3=8
Number of Host = 2^m ;m = number of off(0) bit = 2^21= 2097152
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^21-2= 2097150
Block size or magic Number or Jumping value = 256-224 =32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.31.255.254	10.31.255.255
10.32.0.0	10.32.0.1-10.63.255.254	10.63.255.255
10.64.0.0	10.64.0.1-10.95.255.254	10.95.255.255
10.96.0.0	10.96.0.1-10.127.255.254	10.127.255.255
10.128.0.0	10128.0.1-10.159.255.254	10.159.255.255
10.160.0.0	10.160.0.1-10.191.255.254	10.191.255.255
10.192.0.0	10.192.0.1-10.223.255.254	10.223.255.255
10.224.0.0	10.224.0.1-10.255.255.254	10.255.255.255

12. 10.0.0.0/12

New Subnet mask = 255.11110000.00000000.00000000
= 255.240.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^4=16
Number of Host = 2^m ;m = number of off(0) bit = 2^20=1048576
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^20-2=1048574
Block size or magic Number or Jumping value = 256-240 =16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.15.255.254	10.15.255.255
10.16.0.0	10.16.0.1-10.31.255.254	10.31.255.255
10.32.0.0	10.32.0.1-10.47.255.254	10.47.255.255
10.48.0.0	10.48.0.1-10.63.255.254	10.63.255.255
……...	……..	……..
……...	……..	……...
10.192.0.0	10.192.0.1-10.159.255.254	10.207.255.255
10.208.0.0	10.208.0.1-10.191.255.254	10.223.255.255
10.224.0.0	10.224.0.1-10.223.255.254	10.239.255.255
10.240.0.0	10.240.0.1-10.255.255.254	10.255.255.255

13. 10.0.0.0/13

New Subnet mask = 255.11111000.00000000.00000000
= 255.248.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^5=32
Number of Host = 2^m ;m = number of off(0) bit = 2^19=524288
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^19-2=524286
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.7.255.254	10.7.255.255
10.8.0.0	10.8.0.1-10.15.255.254	10.15.255.255
10.16.0.0	10.16.0.1-10.23.255.254	10.23.255.255
10.24.0.0	10.24.0.1-10.31.255.254	10.31.255.255
10.32.0.0	10.32.0.1-10.39.255.254	10.39.255.255
……...	……..	……..
……...	……..	……...
10.216.0.0	10.216.0.1-10.223.255.254	10.223.255.255
10.224.0.0	10.224.0.1-10.231.255.254	10.231.255.255
10.232.0.0	10.232.0.1-10.239.255.254	10.239.255.255
10.240.0.0	10.240.0.1-10.247.255.254	10.247.255.255
10.248.0.0	10.248.0.1-10.255.255.254	10.255.255.255

14. 10.0.0.0/14

New Subnet mask = 255.11111100.00000000.00000000
= 255.252.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^6=64
Number of Host = 2^m ;m = number of off(0) bit = 2^18=262144
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^18-2=262142
Block size or magic Number or Jumping value = 256-252 =4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.3.255.254	10.3.255.255
10.4.0.0	10.4.0.1-10.7.255.254	10.7.255.255
10.8.0.0	10.8.0.1-10.11.255.254	10.11.255.255
10.12.0.0	10.12.0.1-10.15.255.254	10.15.255.255
10.16.0.0	10.16.0.1-10.19.255.254	10.19.255.255
……...	……..	……..
……...	……..	……...
10.236.0.0	10.236.0.1-10.239.255.254	10.239.255.255
10.240.0.0	10.240.0.1-10.243.255.254	10.243.255.255
10.244.0.0	10.244.0.1-10.247.255.254	10.247.255.255
10.248.0.0	10.248.0.1-10.251.255.254	10.251.255.255
10.252.0.0	10.252.0.1-10.255.255.254	10.255.255.255

15. 10.0.0.0/15

New Subnet mask = 255.11111110.00000000.00000000
= 255.254.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^7=128
Number of Host = 2^m ;m = number of off(0) bit = 2^17=131072
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^17-2=131070
Block size or magic Number or Jumping value = 256-254 =2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.1.255.254	10.1.255.255
10.2.0.0	10.2.0.1-10.3.255.254	10.3.255.255
10.4.0.0	10.4.0.1-10.5.255.254	10.5.255.255
10.6.0.0	10.6.0.1-10.7.255.254	10.7.255.255
10.8.0.0	10.8.0.1-10.9.255.254	10.9.255.255
……...	……..	……..
……..	……..	……...
10.246.0.0	10.246.0.1-10.247.255.254	10.247.255.255
10.248.0.0	10.248.0.1-10.249.255.254	10.249.255.255
10.250.0.0	10.250.0.1-10.251.255.254	10.251.255.255
10.252.0.0	10.252.0.1-10.253.255.254	10.253.255.255
10.254.0.0	10.254.0.1-10.255.255.254	10.255.255.255

16. 10.0.0.0/16

New Subnet mask = 255.11111111.00000000.00000000
= 255.255.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^8=256
Number of Host = 2^m ;m = number of off(0) bit = 2^16=65536
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^16-2=65534
Block size or magic Number or Jumping value = 256-255 = 1
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.0.255.254	10.0.255.255
10.1.0.0	10.1.0.1 -10.0.255.254	10.1.255.255
10.2.0.0	10.2.0.1 -10.0.255.254	10.2.255.255
10.3.0.0	10.3.0.1 -10.0.255.254	10.3.255.255
10.4.0.0	10.4.0.1 -10.0.255.254	10.4.255.255
…….	…….	……...
……..	……..	……...
10.251.0.0	10.251.0.1 -10.251.255.254	10.251.255.255
10.252.0.0	10.252.0.1 -10.252.255.254	10.252.255.255
10.253.0.0	10.253.0.1 -10.253.255.254	10.253.255.255
10.254.0.0	10.254.0.1 -10.254.255.254	10.254.255.255
10.255.0.0	10.255.0.1 -10.255.255.254	10.255.255.255

17. 10.0.0.0/17

New Subnet mask = 255.11111111.10000000.00000000
= 255.255.128.0
Number of Network = 2^n ; n = number of on(1) bit = 2^9=512
Number of Host = 2^m ;m = number of off(0) bit = 2^15=32768
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^15-2=32766
Block size or magic Number or Jumping value = 256-128= 128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.0.127.254	10.0.127.255
10.0.128.0	10.0.128.1 -10.0.255.254	10.0.255.255
10.1.0.0	10.1.0.1 -10.1.127.254	10.1.127.255
10.1.128.0	10.1.128.1 -10.1.255.254	10.1.255.255
10.2.0.0	10.2.0.1 -10.2.127.254	10.2.127.255
…….	…….	……...
……..	……..	……...
10.253.128.0	10.253.128.1 -10.253.255.254	10.253.255.255
10.254.0.0	10.254.0.1 -10.254.127.254	10.254.127.255
10.254.128.0	10.254.128.1 -10.254.255.254	10.254.255.255
10.255.0.0	10.255.0.1 -10.255.127.254	10.255.127.255
10.255.128.0	10.255.128.1 -10.255.255.254	10.255.255.255

18. 10.0.0.0/18

New Subnet mask = 255.11111111.11000000.00000000
= 255.255.192.0
Number of Network = 2^n ; n = number of on(1) bit = 2^10=1024
Number of Host = 2^m ;m = number of off(0) bit = 2^14=16384
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^14-2=16382
Block size or magic Number or Jumping value = 256-192= 64
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.0.63.254	10.0.63.255
10.0.64.0	10.0.64.1 -10.0.127.254	10.0.127.255
10.0.128.0	10.0.128.1 -10.0.191.254	10.0.191.255
10.0.192.0	10.0.192.1 -10.0.255.254	10.0.255.255
10.1.0.0	10.1.0.1 -10.1.63.254	10.1.63.255
…….	…….	……...
……..	……..	……...
10.254.192.0	10.254.192.1 -10.254.255.254	10.254.255.255
10.255.0.0	10.255.0.1 -10.255.63.254	10.255.63.255
10.255.64.0	10.255.64.1 -10.255.127.254	10.255.127.255
10.255.128.0	10.255.128.1 -10.255.191.254	10.255.191.255
10.255.192.0	10.255.192.1 -10.255.255.254	10.255.255.255

19. 10.0.0.0/19

New Subnet mask = 255.11111111.11100000.00000000
= 255.255.224.0
Number of Network = 2^n ; n = number of on(1) bit = 2^11=2048
Number of Host = 2^m ;m = number of off(0) bit = 2^13=8192
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^13-2=8190
Block size or magic Number or Jumping value = 256-224= 32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.0.31.254	10.0.31.255
10.0.32.0	10.0.32.1 -10.0.63.254	10.0.63.255
10.0.64.0	10.0.64.1 -10.0.95.254	10.0.95.255
10.0.96.0	10.0.96.1 -10.0.127.254	10.0.127.255
10.0.128.0	10.0.128.1 -10.0.159.254	10.0.159.255
…….	…….	……...
……..	……..	……...
10.255.96.0	10.255.96.1 -10.255.127.254	10.255.127.255
10.255.128.0	10.255.128.1 -10.255.159.254	10.255.159.255
10.255.160.0	10.255.160.1 -10.255.191.254	10.255.191.255
10.255.192.0	10.255.192.1 -10.255.223.254	10.255.223.255
10.255.224.0	10.255.224.1 -10.255.255.254	10.255.255.255

20. 10.0.0.0/20

New Subnet mask = 255.11111111.11110000.00000000
= 255.255.240.0
Number of Network = 2^n ; n = number of on(1) bit = 2^12=4096
Number of Host = 2^m ;m = number of off(0) bit = 2^12=4096
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^12-2=4094
Block size or magic Number or Jumping value = 256-240= 16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.0.15.254	10.0.15.255
10.0.16.0	10.0.16.1 -10.0.31.254	10.0.31.255
10.0.32.0	10.0.32.1 -10.0.47.254	10.0.47.255
10.0.48.0	10.0.48.1 -10.0.63.254	10.0.63.255
10.0.64.0	10.0.64.1 -10.0.95.254	10.0.95.255
…….	…….	……...
…….	……..	……...
10.255.255.176	10.255.255.177 - 10.255.255.190	10.255.255.191
10.255.255.192	10.255.255.193 -10.255.255.206	10.255.255.207
10.255.255.208	10.255.255.209 - 10.255.255.222	10.255.255.223
10.255.255.224	10.255.255.225 - 10.255.255.238	10.255.255.239
10.255.255.240	10.255.255.241 - 10.255.255.254	10.255.255.255

21. 10.0.0.0/21

New Subnet mask = 255.11111111.11111000.00000000
= 255.248.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^13=8192
Number of Host = 2^m ;m = number of off(0) bit = 2^11=2048
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^11-2=2046
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0	10.0.0.1-10.0.7.254	10.0.7.255
10.0.8.0	10.0.8.1-10.0.15.254	10.0.15.255
10.0.16.0	10.0.16.1-10.0.23.254	10.0.23.255
10.0.24.0	10.0.24.1-10.0.31.254	10.0.31.255
10.0.32.0	10.0.32.1-10.0.39.254	10.0.39.255
……...	……..	……..
……...	……..	……..
10.255.216.0	10.255.216.1-10.223.255.254	10.255.223.255
10.255.224.0	10.255224.1-10.231.255.254	10.255.231.255
10.255.232.0	10.255.232.1-10.239.255.254	10.255.239.255
10.255.240.0	10.255.240.1-10.247.255.254	10.255.247.255
10.255.248.0	10.255.248.1-10.255.255.254	10.255.255.255

22. 10.0.0.0/22

New Subnet mask = 255.11111111.11111100.00000000
= 255.255.252.0
Number of Network = 2^n ; n = number of on(1) bit = 2^14=16384
Number of Host = 2^m ;m = number of off(0) bit = 2^10=1024
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^10-2=1022
Block size or magic Number or Jumping value = 256-252 =4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.0.3.254	10.0.3.255
10.0.4.0	10.0.4.1-10.0.7.254	10.0.7.255
10.0.8.0	10.0.8.1-10.0.11.254	10.0.11.255
10.0.12.0	10.0.12.1-10.0.15.254	10.0.15.255
10.0.16.0	10.0.16.1-10.0.19.254	10.0.19.255
……...	……..	……..
……...	……..	……...
10.255.236.0	10.255.236.1-10.255.239.254	10.255.239.255
10.255.240.0	10.255.240.1-10.255.243.254	10.255.243.255
10.255.244.0	10.255.244.1-10.255.247.254	10.255.247.255
10.255.248.0	10.255.248.1-10.255.251.254	10.255.251.255
10.255.252.0	10.255.252.1-10.255.255.254	10.255.255.255

23. 10.0.0.0/23

New Subnet mask = 255.11111111.11111110.00000000
= 255.255.254.0
Number of Network = 2^n ; n = number of on(1) bit = 2^15=32768
Number of Host = 2^m ;m = number of off(0) bit = 2^9=512
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^17-2=510
Block size or magic Number or Jumping value = 256-254 =2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.0.1.254	10.0.1.255
10.0.2.0	10.0.4.1-10.0.3.254	10.0.3.255
10.0.4.0	10.0.8.1-10.0.5.254	10.0.5.255
10.0.6.0	10.0.12.1-10.0.7.254	10.0.7.255
10.0.8.0	10.0.16.1-10.0.9.254	10.0.9.255
……...	……..	……..
……..	……..	……...
10.255.246.0	10.255.246.1-10.255.247.254	10.255.247.255
10.255.248.0	10.255.248.1-10.255.249.254	10.255.249.255
10.255.250.0	10.255.250.1-10.255.251.254	10.255.251.255
10.255.252.0	10.255.252.1-10.255.253.254	10.255.253.255
10.255.254.0	10.255.254.1-10.255.255.254	10.255.255.255

24. 10.0.0.0/24

New Subnet mask = 255.11111111.11111111.00000000
= 255.255.255.0
Number of Network = 2^n ; n = number of on(1) bit = 2^16=65536
Number of Host = 2^m ;m = number of off(0) bit = 2^8=256
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^8 =254
Block size or magic Number or Jumping value = 256-255 = 1
Subnetting Table :

Network ID (NiD)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.0.0.254	10.0.0.255
10.0.1.0	10.0.1.1 -10.0.1.254	10.0.1.255
10.0.2.0	10.0.2.1 -10.0.2.254	10.0.2.255
10.0.3.0	10.0.3.1 -10.0.3.254	10.0.3.255
10.0.4.0	10.0.4.1 -10.0.4.254	10.0.4.255
…….	…….	……...
…….	……..	……...
10.255.251.0	10.255.251.1 -10.255.251.254	10.255.251.255
10.255.252.0	10.255.252.1 -10.255.252.254	10.255.252.255
10.255.253.0	10.255.253.1 -10.255.253.254	10.255.253.255
10.255.254.0	10.255.254.1 -10.255.254.254	10.255.254.255
10.255.255.0	10.255.255.1 -10.255.255.254	10.255.255.255

25. 10.0.0.0/25

New Subnet mask = 255.11111111.11111111.10000000
= 255.255.255.128
Number of Network = 2^n ; n = number of on(1) bit = 2^17=131072
Number of Host = 2^m ;m = number of off(0) bit = 2^7=128
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^7-2=126
Block size or magic Number or Jumping value = 256-128= 128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.0.0.126	10.0.0.127
10.0.0.128	10.0.0.129 -10.0.0.254	10.0.0.255
10.0.1.0	10.0.1.1 -10.0.1.126	10.0.1.127
10.0.1.128	10.0.1.129 -10.0.1.254	10.0.1.255
10.0.2.0	10.0.2.1 -10.0.2.126	10.0.2.127
…….	…….	……...
…….	……..	……...
10.255.253.128	10.255.253.129 -10.255.253.254	10.255.253.255
10.255.254.0	10.255.254.1 -10.255.254.126	10.255.254.127
10.255.254.128	10.255.254.129 -10.255.254.254	10.255.254.255
10.255.255.0	10.255.255.1 -10.255.255.126	10.255.255.127
10.255.255.128	10.255.255.129 -10.255.255.254	10.255.255.255

26. 10.0.0.0/26

New Subnet mask = 255.11111111.11111111.11000000
= 255.255.255.192
Number of Network = 2^n ; n = number of on(1) bit = 2^18=262144
Number of Host = 2^m ;m = number of off(0) bit = 2^6=64
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^6-2=62
Block size or magic Number or Jumping value = 256-192= 64
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 -10.0.0.62	10.0.0.63
10.0.0.64	10.0.0.65 -10.0.126	10.0.0.127
10.0.0.128	10.0.0.129 -10.0.0.190	10.0.0.191
10.0.0.192	10.0.0.193 -10.0.0.254	10.0.0.255
10.0.1.0	10.0.1.1 -10.0.1.62	10.0.1.63
…….	…….	……...
……..	……...	……...
10.255.254.192	10.255.254.193 -10.255.254.254	10.255.254.255
10.255.255.0	10.255.255.1 -10.255.255.62	10.255.255.63
10.255.255.64	10.255.255.65 -10.255.255.126	10.255.255.127
10.255.255.128	10.255.255.129 -10.255.255.190	10.255.255.191
10.255.255.192	10.255.255.193 -10.255.255.254	10.255.255.255

27. 10.0.0.0/27

New Subnet mask = 255.11111111.11111111.11100000
= 255.255.225.224
Number of Network = 2^n ; n = number of on(1) bit = 2^19=524288
Number of Host = 2^m ;m = number of off(0) bit = 2^5=32
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^5-2=30
Block size or magic Number or Jumping value = 256-224= 32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address ranges	Broadcast ID (BID)
10.0.0.0	10.0.0.0.1 -10.0.0.30	10.0.0.31
10.0.0.32	10.0.0.33 -10.0.0.62	10.0.0.63
10.0.0.64	10.0.0.65 -10.0.0.94	10.0.0.95
10.0.0.96	10.0.0.97 -10.0.0.126	10.0.0.127
10.0.0.128	10.0.0.129 -10.0.0.158	10.0.0.159
…….	…….	……...
……..	……...	……...
10.255.255.96	10.255.255.97 - 10.255.255.126	10.255.255.127
10.255.255.128	10.255.255.129 -10.255.255.158	10.255.255.159
10.255.255.160	10.255.255.161 -10.255.255.190	10.255.255.191
10.255.255.192	10.255.255.193 -10.255.255.222	10.255.255.223
10.255.255.224	10.255.255.225 -10.255.255.254	10.255.255.255

28. 10.0.0.0/28

New Subnet mask = 255.11111111.11111111.11110000
= 255.255.255.240
Number of Network = 2^n ; n = number of on(1) bit = 2^20=1048576
Number of Host = 2^m ;m = number of off(0) bit = 2^4=16
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^4-2=14
Block size or magic Number or Jumping value = 256-240= 16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 - 10.0.0.14	10.0.0.15
10.0.0.16	10.0.0.17 -10.0.0.30	10.0.0.31
10.0.0.32	10.0.0.33 -10.0.0.46	10.0.0.47
10.0.0.48	10.0.0.49 -10.0.0.62	10.0.0.63
10.0.0.64	10.0.0.65 -10.0.0.94	10.0.0.95
…….	…….	……...
……..	……..	……...
10.255.255.176	10.255.255.177 -10.255.255.190	10.255.255.191
10.255.255.192	10.255.255.193 -10.255.255.206	10.255.255.207
10.255.255.208	10.255.255.209 -10.255.255.222	10.255.255.223
10.255.255.224	10.255.255.225 -10.255.255.238	10.255.255.239
10.255.255.240	10.255.255.241 -10.255.255.254	10.255.255.255

29. 10.0.0.0/29

New Subnet mask = 255.11111111.11111111.11111000
= 255.255.255.248
Number of Network = 2^n ; n = number of on(1) bit = 2^21=2097152
Number of Host = 2^m ;m = number of off(0) bit = 2^3=8
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^3-2=6
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address range	Broadcast ID (BID)
10.0.0.0	10.0.0.1-10.0.0.6	10.0.0.7
10.0.0.8	10.0.0.9 - 10.0.0.14	10.0.0.15
10.0.0.16	10.0.0.17-10.0.0.22	10.0.0.23
10.0.0.24	10.0.0.25-10.0.0.30	10.0.0.31
10.0.0.32	10.0.0.33-10.0.0.38	10.0.0.39
……...	……..	……..
……...	……..	……..
10.255.255.216	10.255.255.217-10.255.255.222	10.255.255.223
10.255.255.224	10.255.255.225-10.255.255.230	10.255.255.231
10.255.255.232	10.255.255.233-10.255.255.238	10.255.255.239
10.255.255.240	10.255.255.241 -10.255.255.246	10.255.255.247
10.255.255.248	10.255.255.249 - 10.255.255.254	10.255.255.255

30. 10.0.0.0/30

New Subnet mask = 255.11111111.11111111.11111100
= 255.255.255.252
Number of Network = 2^n ; n = number of on(1) bit = 2^22=4194304
Number of Host = 2^m ;m = number of off(0) bit = 2^2=4
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^2-2=2
Block size or magic Number or Jumping value = 256-252 =4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	10.0.0.1 & 10.0.0.2	10.0.0.3
10.0.0.4	10.0.0.5 & 10.0.0.6	10.0.0.7
10.0.0.8	10.0.0.9 & 10.0.0.10	10.0.0.11
10.0.0.12	10.0.0.13 & 10.0.0.14	10.0.0.15
10.0.0.16	10.0.0.15 & 10.0.0.18	10.0.0.19
……...	……..	……..
……...	……..	……...
10.255.255.236	10.255.255.237 & 10.255.255.238	10.255.255.239
10.255.255.240	10.255.255.241 & 10.255.255.242	10.255.255.243
10.255.255.244	10.255.255.245 & 10.255.255.246	10.255.255.247
10.255.255.248	10.255.255.249 & 10.255.255.250	10.255.255.251
10.255.255.252	10.255.255.253 & 10.255.255.254	10.255.255.255

31. 10.0.0.0/31

New Subnet mask = 255.11111111.11111111.11111110
= 255.255.255.254
Number of Network = 2^n ; n = number of on(1) bit = 2^23=8388608
Number of Host = 2^m ;m = number of off(0) bit = 2^1=2
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^1-2=0
Block size or magic Number or Jumping value = 256-254 =2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	……..	10.0.0.1
10.0.2	……..	10.0.0.3
10.0.4	……..	10.0.0.5
10.0.6	……..	10.0.0.7
10.0.8	……..	10.0.0.9
……...	……..	……..
……..	…….	……...
10.255.255.246	…….	10.255.255.247
10.255.255.248	……	10.255.255.249
10.255.255.250	……...	10.255.255.251
10.255.255.252	……...	10.255.255.253
10.255.255.254	……...	10.255.255.255

32. 10.0.0.0/32

New Subnet mask = 255.11111111.11111111.11111111
= 255.255.255.255
Number of Network = 2^n ; n = number of on(1) bit = 2^24=16777216
Number of Host = 2^m ;m = number of off(0) bit = 2^0 = 0
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^0-2=0
Block size or magic Number or Jumping value = 256-255 = 1
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
10.0.0.0	…….	……..
10.0.0.1	…….	……..
10.0.0.2	…….	……..
10.0.0.3	…….	……..
10.0.0.4	…….	……..
…….	…….	……..
……..	…….	……..
10.255.255.251	…….	……..
10.255.255.252	…….	……..
10.255.255.253	…….	……..
10.255.255.254	…….	……..
10.255.255.255	…….	……..

Specific Case : For class B

1. 172.16.0.0/1

New Subnet mask = 10000000.00000000.00000000.00000000
= 128.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^1=2
Number of Host = 2^m ;m = number of off(0) bit = 2^31= 2147483648
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^31-2= 2147483646
Block size or magic Number or Jumping value = 256-128 =128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 127.255.255.254	127.255.255.255
128.0.0.0	128.0.0.1-255.255.255.254	255.255.255.255

2. 172.16.0.0/2

New Subnet mask = 11000000.00000000.00000000.00000000
= 192.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^2=4
Number of Host = 2^m ;m = number of off(0) bit = 2^30=1073741824
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^30-2=1073741822
Block size or magic Number or Jumping value = 256-192 =64
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 63.255.255.254	63.255.255.255
64.0.0.0	64.0.0.1- 127.255.255.254	127.255.255.255
128.0.0.0	128.0.0.1-191.255.255.254	191.255.255.255
192.0.0.0	192.0.0.1- 255.255.255.254	255.255.255.255

3. 172.16.0.0/3

New Subnet mask = 11100000.00000000.00000000.00000000
= 224.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^3=8
Number of Host = 2^m ;m = number of off(0) bit = 2^29=8388608
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^29-2=8388606
Block size or magic Number or Jumping value = 256-224 =32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 31.255.255.254	31.255.255.255
32.0.0.0	32.0.0.1- 63.255.255.254	63.255.255.255
64.0.0.0	64.0.0.1-95.255.255.254	95.255.255.255
96.0.0.0	96.0.0.1-127.255.255.254	127.255.255.255
128.0.0.0	128.0.0.1-159.255.255.254	159.255.255.255
160.0.0.0	160.0.0.1-191.255.255.254	191.255.255.255
192.0.0.0	192.0.0.1-223.255.255.254	223.255.255.255
224.0.0.0	224.0.0.1-255.255.255.254	255.255.255.255

4. 172.16.0.0/4

New Subnet mask = 11110000.00000000.00000000.00000000
= 240.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^4=16
Number of Host = 2^m ;m = number of off(0) bit = 2^28=268435456
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^28-2= 268435456
Block size or magic Number or Jumping value = 256-240 =16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1-15.255.255.254	15.255.255.255
16.0.0.0	16.0.0.1- 31.255.255.254	31.255.255.255
32.0.0.0	32.0.0.1- 47.255.255.254	47.255.255.255
48.0.0.0	48.0.0.1- 63.255.255.254	63.255.255.255
……...	……..	……..
……...	……..	……...
192.0.0.0	192.0.0.1- 207.255.255.254	207.255.255.255
208.0.0.0	208.0.0.1-223.255.255.254	223.255.255.255
224.0.0.0	224.0.0.1-239.255.255.254	239.255.255.255
240.0.0.0	240.0.0.1-255.255.255.254	255.255.255.255

5. 172.16.0.0/5

New Subnet mask = 11111000.00000000.00000000.00000000
= 248.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^5=32
Number of Host = 2^m ;m = number of off(0) bit = 2^27=134217728
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^27-2= 134217726
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1-7.255.255.254	7.255.255.255
8.0.0.0	8.0.0.1-15.255.255.254	15.255.255.255
16.0.0.0	16.0.0.1-23.255.255.254	23.255.255.255
24.0.0.0	24.0.0.1-31.255.255.254	31.255.255.255
32.0.0.0	32.0.0.1-39.255.255.254	39.255.255.255
...……..	……..	……..
……...	……..	……...
216.0.0.0	216.0.0.1-223.255.255.254	223.255.255.255
224.0.0.0	224.0.0.1-231.255.255.254	231.255.255.255
232.0.0.0	232.0.0.1-239.255.255.254	239.255.255.255
240.0.0.0	240.0.0.1-247.255.255.254	247.255.255.255
248.0.0.0	248.0.0.1-255.255.255.254	255.255.255.255

6. 172.16.0.0/6

New Subnet mask = 11111100.00000000.00000000.00000000
= 252.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^6=64
Number of Host = 2^m ;m = number of off(0) bit = 2^26= 67108864
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^18-2=67108862
Block size or magic Number or Jumping value = 256-252 = 4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 3.255.255.254	3.255.255.255
4.0.0.0	4.0.0.1- 7.255.255.254	7.255.255.255
8.0.0.0	8.0.0.1- 11.255.255.254	11.255.255.255
12.0.0.0	12.0.0.1- 15.255.255.254	15.255.255.255
16.0.0.0	16.0.0.1- 19.255.255.254	19.255.255.255
……...	……..	……..
……...	……..	……...
236.0.0.0	236.0.0.1- 239.255.255.254	239.255.255.255
240.0.0.0	240.0.0.1- 243.255.255.254	243.255.255.255
244.0.0.0	244.0.0.1- 247.255.255.254	247.255.255.255
248.0.0.0	248.0.0.1- 251.255.255.254	251.255.255.255
252.0.0.0	252.0.0.1- 255.255.255.254	255.255.255.255

7. 172.16.0.0/7

New Subnet mask = 11111110.00000000.00000000.00000000
= 254.0.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^7=128
Number of Host = 2^m ; m = number of off(0) bit = 2^25=33554432
Number of Valid Host = 2^m-2 ; m = number of off(0) bit = 2^25-2=33554432
Block size or magic Number or Jumping value = 256-254 = 2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
0.0.0.0	0.0.0.1- 1.255.255.254	1.255.255.255
2.0.0.0	2.0.0.1- 3.255.255.254	3.255.255.255
4.0.0.0	4.0.0.1- 5.255.255.254	5.255.255.255
6.0.0.0	6.0.0.1- 7.255.255.254	7.255.255.255
8.0.0.0	8.0.0.1- 9.255.255.254	9.255.255.255
……...	……..	……..
……..	……..	……...
246.0.0.0	246.0.0.1-247.255.255.254	247.255.255.255
248.0.0.0	248.0.0.1-249.255.255.254	249.255.255.255
250.0.0.0	250.0.0.1-251.255.255.254	251.255.255.255
252.0.0.0	252.0.0.1-253.255.255.254	253.255.255.255
254.0.0.0	254.0.0.1-255.255.255.254	255.255.255.255

8. 172.16.0.0/8

i. New Subnet mask = 255.00000000.00000000.00000000
= 255.0.0.0
ii. Number of Network = 2^n ; n = number of on(1) bit = 2^0=1
iii. Number of Host = 2^m ;m = number of off(0) bit = 2^24=16711216
iv. Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^24-2=16711214
v. Block size or magic Number or Jumping value = 256-0 =256
vi. Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1 -172.255.255.254	172.255.255.255

9. 172.16.0.0/9

New Subnet mask = 255.10000000.00000000.00000000
= 255.128.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^1=2
Number of Host = 2^m ;m = number of off(0) bit = 2^23=8388608
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^23-2=8388606
Block size or magic Number or Jumping value = 256-128 =128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1-10.127.255.254	172.127.255.255
172.128.0.0	172.128.0.1-10 255.255.254	172.255.255.255

10. 172.16.0.0/10

New Subnet mask = 255.11000000.00000000.00000000
= 255.192.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^2=4
Number of Host = 2^m ;m = number of off(0) bit = 2^22=4194306
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^23-2=4194304
Block size or magic Number or Jumping value = 256-192 =64
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1- 172.63.255.254	172.63.255.255
172.64.0.0	172.64.0.1-172.63.255.254	172.127.255.255
172.128.0.0	172.128.0.1-172.63.255.254	172.191.255.255
172.192.0.0	172.192.0.1-172.255.255.254	172.255.255.255

11. 172.16.0.0/11

New Subnet mask = 255.11100000.00000000.00000000
= 255.224.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^3=8
Number of Host = 2^m ;m = number of off(0) bit = 2^21= 2097152
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^21-2= 2097150
Block size or magic Number or Jumping value = 256-224 =32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1- 172.31.255.254	172.31.255.255
172.32.0.0	172.32.0.1-172.63.255.254	172.63.255.255
172.64.0.0	172.64.0.1-172.95.255.254	172.95.255.255
172.96.0.0	172.96.0.1-172.127.255.254	172.127.255.255
172.128.0.0	172.128.0.1-172.159.255.254	172.159.255.255
172.160.0.0	172.160.0.1-172.191.255.254	172.191.255.255
172.192.0.0	172.192.0.1-172.223.255.254	172.223.255.255
172.224.0.0	172.224.0.1-172.255.255.254	172.255.255.255

12. 172.16.0.0/12

New Subnet mask = 255.11110000.00000000.00000000
= 255.240.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^4=16
Number of Host = 2^m ;m = number of off(0) bit = 2^20=1048576
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^20-2=1048574
Block size or magic Number or Jumping value = 256-240 =16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1- 172.15.255.254	172.15.255.255
172.16.0.0	172.16.0.1- 172.31.255.254	172.31.255.255
172.32.0.0	172.32.0.1- 172.47.255.254	172.47.255.255
172.48.0.0	172.48.0.1- 172.63.255.254	172.63.255.255
……...	……..	……..
……...	……..	……...
172.192.0.0	172.192.0.1-172.159.255.254	172.207.255.255
172.208.0.0	172.208.0.1-172.191.255.254	172.223.255.255
172.224.0.0	172.224.0.1-172.223.255.254	172.239.255.255
172.240.0.0	172.240.0.1-172.255.255.254	172.255.255.255

13. 172.16.0.0/13

New Subnet mask = 255.11111000.00000000.00000000
= 255.248.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^5=32
Number of Host = 2^m ;m = number of off(0) bit = 2^19=524288
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^19-2=524286
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1-172.7.255.254	172.7.255.255
172.8.0.0	172.8.0.1-172.15.255.254	172.15.255.255
172.16.0.0	172.16.0.1-172.23.255.254	172.23.255.255
172.24.0.0	172.24.0.1-172.31.255.254	172.31.255.255
172.32.0.0	172.32.0.1-172.39.255.254	172.39.255.255
……...	……..	……..
……...	……..	……...
172.216.0.0	172.216.0.1-172.223.255.254	172.223.255.255
172.224.0.0	172.224.0.1-172.231.255.254	172.231.255.255
172.232.0.0	172.232.0.1-172.239.255.254	172.239.255.255
172.240.0.0	172.240.0.1-172.247.255.254	172.247.255.255
172.248.0.0	172.248.0.1-172.255.255.254	172.255.255.255

14.172.16.0.0/14

New Subnet mask = 255.11111100.00000000.00000000
= 255.252.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^6=64
Number of Host = 2^m ;m = number of off(0) bit = 2^18=262144
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^18-2=262142
Block size or magic Number or Jumping value = 256-252 =4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1-172.3.255.254	172.3.255.255
172.4.0.0	172.4.0.1-172.7.255.254	172.7.255.255
172.8.0.0	172.8.0.1-172.11.255.254	172.11.255.255
172.12.0.0	172.12.0.1-172.15.255.254	172.15.255.255
172.16.0.0	172.16.0.1-172.19.255.254	172.19.255.255
……...	……..	……..
……...	……..	……...
172.236.0.0	172.236.0.1-172.239.255.254	172.239.255.255
172.240.0.0	172.240.0.1-172.243.255.254	172.243.255.255
172.244.0.0	172.244.0.1-172.247.255.254	172.247.255.255
172.248.0.0	172.248.0.1-172.251.255.254	172.251.255.255
172.252.0.0	172.252.0.1-172.255.255.254	172.255.255.255

15. 172.16.0.0/15

New Subnet mask = 255.11111110.00000000.00000000
= 255.254.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^7=128
Number of Host = 2^m ;m = number of off(0) bit = 2^17=131072
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^17-2=131070
Block size or magic Number or Jumping value = 256-254 =2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1-172.1.255.254	172.1.255.255
172.2.0.0	172.2.0.1-172.3.255.254	172.3.255.255
172.4.0.0	172.4.0.1-172.5.255.254	172.5.255.255
172.6.0.0	172.6.0.1-172.7.255.254	172.7.255.255
172.8.0.0	172.8.0.1-172.9.255.254	172.9.255.255
……...	……..	……..
……..	……..	……...
172.246.0.0	172.246.0.1-172.247.255.254	172.247.255.255
172.248.0.0	172.248.0.1-172.249.255.254	172.249.255.255
172.250.0.0	172.250.0.1-172.251.255.254	172.251.255.255
172.252.0.0	172.252.0.1-172.253.255.254	172.253.255.255
172.254.0.0	172.254.0.1-172.255.255.254	172.255.255.255

16. 172.16.0.0/16

New Subnet mask = 255.11111111.00000000.00000000
= 255.255.0.0
Number of Network = 2^n ; n = number of on(1) bit = 2^8=256
Number of Host = 2^m ;m = number of off(0) bit = 2^16=65536
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^16-2=65534
Block size or magic Number or Jumping value = 256-255 = 1
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.0.0.0	172.0.0.1 -172.0.255.254	172.0.255.255
172.1.0.0	172.1.0.1 -172.0.255.254	172.1.255.255
172.2.0.0	172.2.0.1 -172.0.255.254	172.2.255.255
172.3.0.0	172.3.0.1 -172.0.255.254	172.3.255.255
172.4.0.0	172.4.0.1 -172.0.255.254	172.4.255.255
…….	……..	……...
…….	……..	……...
172.251.0.0	172.251.0.1 -172.251.255.254	172.251.255.255
172.252.0.0	172.252.0.1 -172.252.255.254	172.252.255.255
172.253.0.0	172.253.0.1 -172.253.255.254	172.253.255.255
172.254.0.0	172.254.0.1 -172.254.255.254	172.254.255.255
172.255.0.0	172.255.0.1 -172.255.255.254	172.255.255.255

CLASS B

17. 172.16.0.0/17

New Subnet mask = 255.255.10000000.00000000
= 255.255.128.0
Number of Network = 2^n ; n = number of on(1) bit = 2^1=2
Number of Host = 2^m ;m = number of off(0) bit = 2^15=32768
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^15-2=32766
Block size or magic Number or Jumping value = 256-128= 128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1 -172.16.127.254	172.16.127.255
172.16.128.0	172.16.128.1 -172.16.255.254	172.16.255.255

18. 172.16.0.0/18

New Subnet mask = 255.255.11000000.00000000
= 255.255.192.0
Number of Network = 2^n ; n = number of on(1) bit = 2^2=4
Number of Host = 2^m ;m = number of off(0) bit = 2^14=16384
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^14-2=16382
Block size or magic Number or Jumping value = 256-192= 64
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1 -172.16.63.254	172.16.63.255
172.16.64.0	172.16.64.1 -172.16.127.254	172.16.127.255
172.16.128.0	172.16.128.1 -172.16.191.254	172.16.191.255
172.16.192.0	172.16.192.1 -172.16.255.254	172.16.255.255

19. 172.16.0.0/19

New Subnet mask = 255.255.11100000.00000000
= 255.255.224.0
Number of Network = 2^n ; n = number of on(1) bit = 2^3=8
Number of Host = 2^m ;m = number of off(0) bit = 2^13=8192
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^13-2=8190
Block size or magic Number or Jumping value = 256-224= 32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1 -10.0.31.254	172.16.31.255
172.16.32.0	172.16.32.1 -10.0.63.254	172.16.63.255
172.16.64.0	172.16.64.1 -10.0.95.254	172.16.95.255
172.16.96.0	172.16.96.1 -10.0.127.254	172.16.127.255
172.16.128.0	172.16.128.1 -10.0.159.254	172.16.159.255
172.16.160.0	172.16.255.97 -172.16.255.126	172.16.191.255
172.16.192.0	172.16.255.129 -172.16.255.158	172.16.223.255
172.16.224.0	172.16.224.1 – 172.16.255.254	172.16.255.255

20. 172.16.0.0/20

New Subnet mask = 255.255.11110000.00000000
= 255.255.240.0
Number of Network = 2^n ; n = number of on(1) bit = 2^4=16
Number of Host = 2^m ;m = number of off(0) bit = 2^12=4096
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^12-2=4094
Block size or magic Number or Jumping value = 256-240= 16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1 -172.16.254	172.16.15.255
172.16.16.0	172.16.16.1 -172.16.31.254	172.16.31.255
172.16.32.0	172.16.32.1 -172.16.47.254	172.16.47.255
172.16.48.0	172.16.48.1 -172.16.79.254	172.16.79.255
172.16.64.0	172.16.80.1 -172.16.95.254	172.16.95.255
…….	…….	……...
……..	……..	……...
172.16.176.0	172.16.176.1 -172.16.191.254	172.16.191.255
172.16.192.0	172.16.192.1 -172.16.207.254	172.16.207.255
172.16.208.0	172.16.208.1 -172.16.223.254	172.16.223.255
172.16.224.0	172.16.224.1 -172.16.239.254	172.16.239.255
172.16.240.0	172.16.240.1 -172.16.255.254	172.16.255.255

21. 172.16.0.0/21

New Subnet mask = 255.255.11111000.00000000
= 255.255.248.0
Number of Network = 2^n ; n = number of on(1) bit = 2^5=32
Number of Host = 2^m ;m = number of off(0) bit = 2^11=2048
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^11-2=2046
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1-172.16.7.254	172.16.7.255
172.16.8.0	172.16.8.1-172.16.15.254	172.16.15.255
172.16.16.0	172.16.16.1-172.16.23.254	172.16.23.255
172.16.24.0	172.16.24.1-172.16.31.254	172.16.31.255
172.16.32.0	172.16.32.1-172.16.39.254	172.16.39.255
……...	……..	……..
……...	……..	……..
172.16.216.0	172.16.216.1-172.16.223.254	172.16.223.255
172.16.224.0	172.16.224.1-172.16.231.254	172.16.231.255
172.16.232.0	172.16.232.1-172.16.239.254	172.16.239.255
172.16.240.0	172.16.240.1-172.16.247.254	172.16.247.255
172.16.248.0	172.16.248.1-172.16.255.254	172.16.255.255

22. 172.16.0.0/22

New Subnet mask = 255.255.11111100.00000000
= 255.255.252.0
Number of Network = 2^n ; n = number of on(1) bit = 2^6=64
Number of Host = 2^m ;m = number of off(0) bit = 2^10=1024
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^10-2=1022
Block size or magic Number or Jumping value = 256-252 =4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1- 172.16.3.254	172.16.3.255
172.16.4.0	172.16.4.1- 172.16.7.254	172.16.7.255
172.16.8.0	172.16.8.1-172.16.11.254	172.16.11.255
172.16.12.0	172.16.12.1-172.16.15.254	172.16.15.255
172.16.16.0	172.16.16.1-172.16.19.254	172.16.19.255
……...	……..	……..
……...	……..	……...
172.16.236.0	172.16.236.1- 172.16.239.254	172.16.239.255
172.16.240.0	172.16.240.1- 172.16.243.254	172.16.243.255
172.16.244.0	172.16.244.1- 172.16.247.254	172.16.247.255
172.16.248.0	172.16.248.1-172.16.251.254	172.16.251.255
172.16.252.0	172.16.252.1-172.16.255.254	172.16.255.255

23. 172.16.0.0/23

New Subnet mask = 255.255.11111110.00000000
= 255.255.254.0
Number of Network = 2^n ; n = number of on(1) bit = 2^7=128
Number of Host = 2^m ;m = number of off(0) bit = 2^9=512
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^17-2=510
Block size or magic Number or Jumping value = 256-254 =2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1-172.16.1.254	172.16.1.255
172.16.2.0	172.16.4.1-172.16.3.254	172.16.3.255
172.16.4.0	172.16.8.1-172.16..254	172.16.5.255
172.16.6.0	172.16.12.1-172.16.7.254	172.16.7.255
172.16.8.0	172.16.16.1-172.16.9.254	172.16.9.255
……...	……..	……..
……..	……..	……...
172.16.246.0	172.16.246.1-172.16.247.254	172.16.247.255
172.16.248.0	172.16.248.1-172.16.249.254	172.16.249.255
172.16.250.0	172.16.250.1-172.16.251.254	172.16.251.255
172.16.252.0	172.16.252.1-172.16.253.254	172.16.253.255
172.16.254.0	172.16.254.1-172.16.255.254	172.16.255.255

24. 172.16.0.0/24

New Subnet mask = 255.255.11111111.00000000
= 255.255.255.0
Number of Network = 2^n ; n = number of on(1) bit = 2^8=256
Number of Host = 2^m ;m = number of off(0) bit = 2^8=256
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^8 =254
Block size or magic Number or Jumping value = 256-255 = 1
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	10.0.0.1 -10.0.255.254	172.16.0.255
172.16.1.0	10.0.1.1 -10.0.255.254	172.16.1.255
172.16.2.0	10.0.2.1 -10.0.255.254	172.16.2.255
172.16.3.0	10.0.3.1 -10.0.255.254	172.16.3.255
172.16.4.0	10.0.4.1 -10.0.255.254	172.16.4.255
…….	…….	……...
……..	……...	……...
172.16.251.0	10.255.251.1 -10.255.251.254	172.16.251.255
172.16.252.0	10.255.252.1 -10.255.252.254	172.16.252.255
172.16.253.0	10.255.253.1 -10.255.253.254	172.16.253.255
172.16.254.0	10.255.254.1 -10.255.254.254	172.16.254.255
172.16.255.0	10.255.255.1 -10.255.255.254	172.16.255.255

25. 172.16.0.0/25

New Subnet mask = 255.255.11111111.10000000
= 255.255.255.128
Number of Network = 2^n ; n = number of on(1) bit = 2^9=512
Number of Host = 2^m ;m = number of off(0) bit = 2^7=128
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^7-2=126
Block size or magic Number or Jumping value = 256-128= 128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1 - 172.16.0.126	172.16.0.127
172.16.0.128	172.16.0.129 - 172.16.0.254	172.16.0.255
172.16.1.0	172.16.1.1 -172.16.1.126	172.16.1.127
172.16.1.128	172.16.1.129 - 172.16.1.254	172.16.1.255
172.16.2.0	172.16.2.1 -172.16.2.126	172.16.2.127
…….	…….	……...
……..	……..	……...
172.16.253.128	172.16.253.129 -172.16.253.254	172.16.253.255
172.16.254.0	172.16.254.1 -172.16.254.126	172.16.254.127
172.16.254.128	172.16.254.129 -172.16.254.254	172.16.254.255
172.16.255.0	172.16.255.1 -172.16.255.126	172.16.255.127
172.16.255.128	172.16.255.129 -172.16.255.254	172.16.255.255

26. 172.16.0.0/26

New Subnet mask = 255.255.11111111.11000000
= 255.255.255.192
Number of Network = 2^n ; n = number of on(1) bit = 2^10=1024
Number of Host = 2^m ;m = number of off(0) bit = 2^6=64
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^6-2=62
Block size or magic Number or Jumping value = 256-192= 64
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1 - 172.16.0.62	172.16.0.63
172.16.0.64	172.16.0.65 -172.16.0.126	172.16.0.127
172.16.0.128	172.16.0.129 -172.16.0.190	172.16.0.191
172.16.0.192	172.16.0.193 -172.16.0.254	172.16.0.255
172.16.1.0	172.16.1.1 - 172.16.1.62	172.16.1.63
…….	…….	……...
……..	……..	……...
172.16.254.192	172.16.254.193 -172.16.254.254	172.16.254.255
172.16.255.0	172.16.255.1 - 172.16.255.62	172.16.255.63
172.16.255.64	172.16.255.65 - 172.16.255.126	172.16.255.127
172.16.255.128	172.16.255.129 -172.16.255.190	172.16.255.191
172.16.255.192	172.16.255.193 -172.16.255.254	172.16.255.255

27. 172.16.0.0/27

New Subnet mask = 255.255.11111111.11100000
= 255.255.225.224
Number of Network = 2^n ; n = number of on(1) bit = 2^11=2048
Number of Host = 2^m ;m = number of off(0) bit = 2^5=32
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^5-2=30
Block size or magic Number or Jumping value = 256-224= 32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address ranges	Broadcast ID (BID)
172.16.0.0	172.16.0.1 -172.16.0.30	172.16.0.31
172.16.0.32	172.16.0.32 -172.16.0.62	172.16.0.63
172.16.0.64	172.16.0.64 -172.16.0.94	172.16.0.95
172.16.0.96	172.16.0.96 -172.16.0.126	172.16.0.127
172.16.0.128	172.16.0.128 -172.16.0.158	172.16.0.159
…….	…….	……...
……..	……..	……...
172.16.255.96	172.16.255.97 - 172.16.255.126	172.16.255.127
172.16.255.128	172.16.255.129 - 172.16.255.158	172.16.255.159
172.16.255.160	172.16.255.161 -172.16.255.190	172.16.255.191
172.16.255.192	172.16.255.193 -172.16.255.222	172.16.255.223
172.16.255.224	172.16.255.225 -172.16.255.254	172.16.255.255

28. 172.16.0.0/28

New Subnet mask = 255.255.11111111.11110000
= 255.255.255.240
Number of Network = 2^n ; n = number of on(1) bit = 2^12=4096
Number of Host = 2^m ;m = number of off(0) bit = 2^4=16
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^4-2=14
Block size or magic Number or Jumping value = 256-240= 16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.16.0.0	172.16.0.1 - 172.16.0.14	172.16.0.15
172.16.0.16	172.16.0.17 -172.16.0.30	172.16.0.31
172.16.0.32	172.16.0.33 -172.16.0.46	172.16.0.47
172.16.0.48	172.16.0.49 -172.16.0.62	172.16.0.63
172.16.0.64	172.16.0.65 -172.16.0.94	172.16.0.95
…….	…….	……...
……..	……..	……...
172.16.255.176	172.16.255.177 -172.16.255.190	172.16.255.191
172.16.255.192	172.16.255.193 -172.16.255.206	172.16.255.207
172.16.255.208	172.16.255.209 -172.16.255.222	172.16.255.223
172.16.255.224	172.16.255.225 -172.16.255.238	172.16.255.239
172.16.255.240	172.16.255.241 -172.16.255.254	172.16.255.255

29.172.168.0.0/29

New Subnet mask = 255.255.11111111.11111000
= 255.255.255.248
Number of Network = 2^n ; n = number of on(1) bit = 2^13=8192
Number of Host = 2^m ;m = number of off(0) bit = 2^3=8
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^3-2=6
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address range	Broadcast ID (BID)
172.16.0.0	172.16.0.1-172.16.0.6	172.16.0.7
172.16.0.8	172.16.0.9 - 172.16.0.14	172.16.0.15
172.16.0.16	172.16.0.17- 172.16.0.22	172.16.0.23
172.16.0.24	172.16.0.25 - 172.16.0.30	172.16.0.31
172.16.0.32	172.16.0.33 - 172.16.0.38	172.16.0.39
……...	……..	……..
……...	……..	……..
172.16.255.216	172.16.255.217-172.16.255.222	172.16.255.223
172.16.255.224	172.16.255.225 -172.16.255.230	172.16.255.231
172.16.255.232	172.16.255.233 -172.16.255.238	172.16.255.239
172.16.255.240	172.16.255.241 -172.16.255.246	172.16.255.247
172.16.255.248	172.16.255.249 - 172.16.255.254	172.16.255.255

30. 10.0.0.0/30

New Subnet mask = 255.255.11111111.11111100
= 255.255.255.252
Number of Network = 2^n ; n = number of on(1) bit = 2^14=16384
Number of Host = 2^m ;m = number of off(0) bit = 2^2=4
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^2-2=2
Block size or magic Number or Jumping value = 256-252 =4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.168.0.0	172.168.0.1 & 172.168.0.2	172.168.0.3
172.168.0.4	172.168.0.5 & 172.168.0.6	172.168.0.7
172.168.0.8	172.168.0.9 & 172.168.0.10	172.168.0.11
172.168.0.12	172.168.0.13 & 172.168.0.14	172.168.0.15
172.168.0.16	172.168.0.15 & 172.168.0.18	172.168.0.19
……...	……..	……..
……...	……..	……...
172.168.255.236	172.168.255.237 & 172.168.255.238	172.168.255.239
172.168.255.240	172.168.255.241 & 172.168.255.242	172.168.255.243
172.168.255.244	172.168.255.245 & 172.168.255.246	172.168.255.247
172.168.255.248	172.168.255.249 & 172.168.255.250	172.168.255.251
172.168.255.252	172.168.255.253 & 172.168.255.254	172.168.255.255

31. 172.168.0.0/31

New Subnet mask = 255.255.11111111.11111110
= 255.255.255.254
Number of Network = 2^n ; n = number of on(1) bit = 2^15=32768
Number of Host = 2^m ;m = number of off(0) bit = 2^1=2
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^1-2=0
Block size or magic Number or Jumping value = 256-254 =2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.168.0.0	……..	172.168.0.1
172.168.0.2	……..	172.168.0.3
172.168.0.4	……..	172.168.0.5
172.168.0.6	……..	172.168.0.7
172.168.0.8	……..	172.168.0.9
……...	……..	……..
…….	…….	……...
172.168.255.246	…….	172.168.255.247
172.168.255.248	……	172.168.255.249
172.168.255.250	……...	172.168.255.251
172.168.255.252	……...	172.168.255.253
172.168.255.254	……...	172.168.255.255

32. 172.168.0.0/32

New Subnet mask = 255.255.11111111.11111111
= 255.255.255.255
Number of Network = 2^n ; n = number of on(1) bit = 2^16=65536
Number of Host = 2^m ;m = number of off(0) bit = 2^0 = 0
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^0-2=0
Block size or magic Number or Jumping value = 256-255 = 1
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
172.168.0.0	…….	……..
172.168.0.1	…….	……..
172.168.0.2	…….	……..
172.168.0.3	…….	……..
172.168.0.4	…….	……..
…….	…….	……..
……..	…….	……..
172.168.255.251	…….	……..
172.168.255.252	…….	……..
172.168.255.253	…….	…….
172.168.255.254	…….	……..
172.168.255.255	…….	……..

CLASS C:

1. 192.168.1.0/25

New Subnet mask = 255.255.255.10000000
= 255.255.255.128
Number of Network = 2^n ; n = number of on(1) bit = 2^1=2
Number of Host = 2^m ;m = number of off(0) bit = 2^7=128
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^7-2=126
Block size or magic Number or Jumping value = 256-128= 128
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
192.168.1.0	192.168.1.1 -192.168.1.126	192.168.1.127
192.168.1.128	192.168.1.127 -192.168.1.254	192.168.1.255

2. 192.168.1.0/26

New Subnet mask = 255.255.255.11000000
= 255.255.255.192
Number of Network = 2^n ; n = number of on(1) bit = 2^2=4
Number of Host = 2^m ;m = number of off(0) bit = 2^6=64
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^6-2=62
Block size or magic Number or Jumping value = 256-192= 64
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
192.168.1.0	192.168.1.1 -192.168.1.62	192.168.1.63
192.168.1.64	192.168.1.65 -192.168.1.126	192.168.1.127
192.168.1.128	192.168.1.129 -192.168.1.190	192.168.1.191
192.168.1.192	192.168.1.193 -192.168.1.254	192.168.1.255

3. 192.168.1.0/27

New Subnet mask = 255.255.255.11100000
= 255.255.225.224
Number of Network = 2^n ; n = number of on(1) bit = 2^3=8
Number of Host = 2^m ;m = number of off(0) bit = 2^5=32
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^5-2=30
Block size or magic Number or Jumping value = 256-224= 32
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address ranges	Broadcast ID (BID)
192.168.1.0	192.168.1.1 -192.168.1.30	192.168.1.31
192.168.1.32	192.168.1.33 -192.168.1.62	192.168.1.63
192.168.1.64	192.168.1.65 -192.168.1.94	192.168.1.95
192.168.1.96	192.168.1.97 -192.168.1.126	192.168.1.127
192.168.1.128	192.168.1.129 - 192.168.1.158	192.168.1.159
192.168.1.160	192.168.1.161 -192.168.1.190	192.168.1.191
192.168.1.192	192.168.1.193 -192.168.1.222	192.168.1.223
192.168.1.224	192.168.1.225 -192.168.1.254	192.168.1.255

4. 192.168.1/28

New Subnet mask = 255.255.255.11110000
= 255.255.255.240
Number of Network = 2^n ; n = number of on(1) bit = 2^4=16
Number of Host = 2^m ;m = number of off(0) bit = 2^4=16
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^4-2=14
Block size or magic Number or Jumping value = 256-240= 16
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
192.168.1.0	192.168.1.1 - 192.168.1.14	192.168.1.15
192.168.1.16	192.168.1.17 -192.168.1.30	192.168.1.31
192.168.1.32	192.168.1.33 -192.168.1.46	192.168.1.47
192.168.1.48	192.168.1.49 -192.168.1.62	192.168.1.63
192.168.1.64	192.168.1.65 -192.168.1.94	192.168.1.95
…….	…….	……...
……..	……..	……...
192.168.1.176	192.168.1.177 -192.168.1.190	192.168.1.191
192.168.1.192	192.168.1.193 -192.168.1.206	192.168.1.207
192.168.1.208	192.168.1.209 -192.168.1.222	192.168.1.223
192.168.1.224	192.168.1.225 -192.168.1.238	192.168.1.239
192.168.1.240	192.168.1.241 -192.168.1.254	192.168.1.255

5. 192.168.1/29

New Subnet mask = 255.255.255.11111000
= 255.255.255.248
Number of Network = 2^n ; n = number of on(1) bit = 2^5=32
Number of Host = 2^m ;m = number of off(0) bit = 2^3=8
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^3-2=6
Block size or magic Number or Jumping value = 256-248 =8
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address range	Broadcast ID (BID)
192.168.1	192.168.1.1-192.168.1.6	192.168.1.7
192.168.1.8	192.168.1.9 - 192.168.1.14	192.168.1.15
192.168.1.16	192.168.1.17-192.168.1.22	192.168.1.23
192.168.1.24	192.168.1.25-192.168.1.30	192.168.1.31
192.168.1.32	192.168.1.33-192.168.1.38	192.168.1.39
……...	……..	……..
……...	……..	……..
192.168.1.216	192.168.1.217-192.168.1.222	192.168.1.223
192.168.1.224	192.168.1.225-192.168.1.230	192.168.1.231
192.168.1.232	192.168.1.233-192.168.1.238	192.168.1.239
192.168.1.240	192.168.1.241 -192.168.1.246	192.168.1.247
192.168.1.248	192.168.1.249 - 192.168.1.254	192.168.1.255

6. 192.168.1/30

New Subnet mask = 255.255.255.11111100
= 255.255.255.252
Number of Network = 2^n ; n = number of on(1) bit = 2^6=64
Number of Host = 2^m ;m = number of off(0) bit = 2^2=4
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^2-2=2
Block size or magic Number or Jumping value = 256-252 =4
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
192.168.1.0	192.168.1.1 & 192.168.1.2	192.168.1.3
192.168.1.4	192.168.1.5 & 192.168.1.6	192.168.1.7
192.168.1.8	192.168.1.9 & 192.168.1.10	192.168.1.11
192.168.1.12	192.168.1.13 & 192.168.1.14	192.168.1.15
192.168.1.16	192.168.1.15 & 192.168.1.18	192.168.1.19
……...	……..	……..
……...	……..	……...
192.168.1.236	192.168.1.237 & 192.168.1.238	192.168.1.239
192.168.1.240	192.168.1.241 & 192.168.1.242	192.168.1.243
192.168.1.244	192.168.1.245 & 192.168.1.246	192.168.1.247
192.168.1.248	192.168.1.249 & 192.168.1.250	192.168.1.251
192.168.1.252	192.168.1.253 & 192.168.1.254	192.168.1.255

7. 192.168.0/31

New Subnet mask = 255.255.255.11111110
= 255.255.255.254
Number of Network = 2^n ; n = number of on(1) bit = 2^7=128
Number of Host = 2^m ;m = number of off(0) bit = 2^1=2
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^1-2=0
Block size or magic Number or Jumping value = 256-254 =2
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
192.168.1.0	……..	192.168.1.1
192.168.1.2	……..	192.168.1.3
192.168.1.4	……..	192.168.1.5
192.168.1.6	……..	192.168.1.7
192.168.1.8	……..	192.168.1.9
……...	……..	……..
……..	…….	……...
192.168.1.246	…….	192.168.1.247
192.168.1.248	……	192.168.1.249
192.168.1.250	……...	192.168.1.251
192.168.1.252	……...	192.168.1.253
192.168.1.254	……...	192.168.1.255

8. 192.168.1.0/32

New Subnet mask = 255.255.255.11111111
= 255.255.255.255
Number of Network = 2^n ; n = number of on(1) bit = 2^8=256
Number of Host = 2^m ;m = number of off(0) bit = 2^0 = 0
Number of Valid Host = 2^m-2 ;m = number of off(0) bit = 2^0-2=0
Block size or magic Number or Jumping value = 256-255 = 1
Subnetting Table :

Network ID (NID)	Valid IP (VIP) address	Broadcast ID (BID)
192.168.1.0	……	……..
192.168.1.1	……	……..
192.168.1.2	……	……..
192.168.1.3	……	……..
192.168.1.4	……	……..
…….	……	……..
……..	……	……..
192.168.1.251	……	……..
192.168.1.252	……	……..
192.168.1.253	……	……..
192.168.1.254	……	……..
192.168.1.255	……	……..