

Aim:- IPv4 addressing & Subnetting

Q. An address in a block is given as 180.8.17.9. In the block, find the first address and the last address, no of addresses.

Solution The give IP address 180.8.17.9 belongs to class B because the first octate 180 lies between 128-191  
Therefore the prefix  $n = 16$

The no address in the block is found as

$$n = 16$$

$$N = 2^{32-n}$$

$$N = 2^{32-16}$$

$$N = 2^{16}$$

$$N = 65536 \text{ bits}$$

For the first address we keep  $n$  that is 16 leftmost bits as it is and set  $(32-16)$  that is 16 right most address all to zeros therefore the first address is 180.8.0.0

For the last address we keep  $n$  that is 16 leftmost bits as it is and set  $(32-16)$  that is 16 right most address all to one's therefore the last address is 180.8.255.255

Q2 An address in the block is given as 200.11.8.45 find the no of address in the block, first address and the last address

Solution:- The give IP address 200.11.8.45 belong to class C because the first octate 200 lies in between (192-223) therefore the prefix  $n = 24$

The no of address in the block found as

$$N = 2^{32-n}$$

$$N = 2^{32-24}$$

$$N = 2^8$$

$$N = 256 \text{ bits}$$

for the first address we keep  $n$  that is 24 leftmost bits as it is and set  $(32-24)$  that is 8 rightmost address all to zero therefore the first address is 200.11.8.0

for the last address we keep  $n$  that is 24 leftmost bits as it is and set  $(32-24)$  that is 8 right most address all to ones therefore the last address is 200.11.8.255

- 19 AN IP Address in the block is found as 182.44.82.16/26.  
Find the no of address, First address, Last address?

Solution:- No of address is found as.

$$n = 26$$

$$N = 2^{32-n}$$

$$N = 2^{32-26}$$

$$N = 2^6$$

$$N = 64 \text{ bits}$$

For the first address we keep in that is 26 leftmost digits as it is and set (32-26) that is 6 ~~left~~ rightmost address all to zero. therefore the first address is 182.44.82.0

For the last address we keep in that is 26 leftmost digits as it is and set (32-26) that is 6 rightmost address all to ones. therefore the last address is 182.44.82.16.



Q3 an address in a block is given as 150.80.0.0 find the no of address & last address.

Solution: The given IP address 150.80.0.0 belongs to class B because the first octate 150 lies between (128 to 191) therefore the prefix is  $n = 16$

The no of address in the block is found as

$$N = 2^{32-n}$$

$$N = 2^{32-16}$$

$$N = 2^{16}$$

$$N = 65536 \text{ bits}$$

For the first address we keep in the leftmost bits as it is and set  $(32-16)$  that is 16 rightmost address all to zeros therefore the first address is 150.80.0.0.

For the last address we keep in the leftmost bits as it is and set  $(32-16)$  that is 16 rightmost address all to one's therefore the last address is 150.80.255.255

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Q 4, An IP address in the block is given as 73.22.17.25 find no of the address, first address, & last address.

Solution :- The given IP address lies in 73.22.17.25 lies in class A because the first octate 73 lies between (0 to 127) therefore the prefix is  $n = 8$

The no address in the block is found as

$$N = 2^{32-n}$$

$$N = 2^{32-8}$$

$$N = 2^{24}$$

$$N = 16,777,216$$

For the first address we keep in the left most bits as it is and set (0 to 22) (32-8) that is 8 right most address all to zeros. therefore the first address is 73.0.0.0.

For the last address we keep in the left most bits as it is and set (32-8) that is 8 right most address all to one's. therefore the last address is 73.255.255.255



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- 6 one of the address in the block is 110.23.120.14/20.  
Find no of address, first address, last address.

So

Solution: The no of address is found as  $n = 20$ .

$$N = 2^{32-n}$$

$$N = 2^{32-20}$$

$$N = 2^{12}$$

$$N = 4096.$$

128	64	32	16	8	4	2	1
$2^7$	$2^6$	$2^5$	$2^4$	$2^3$	$2^2$	$2^1$	$2^0$
0	1	1	1	1	0	0	0

$$= 120$$

1st

0	1	1	1	0	0	0	0
---	---	---	---	---	---	---	---

$$= 112$$

last

0	1	1	1	1	1	1	1
---	---	---	---	---	---	---	---

$$= 127$$

for the first address, we keep in that is 27 leftmost bits as it is and  $(32-20)$  that is 12 rightmost address all to zeros, therefore the first address is 110.23.112.14/20

for the last address we keep in that is 27 leftmost bits as it is and  $(32-20)$  that is 12 rightmost address all to 1, therefore the last address is 110.23.127.255/20

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Q 5,

one of address in the block is given as 167.199.170.82/27  
find the no of address the first address & last address?

Solution :- The given IP address 167.199.170.82/27 it lies in the class A because the first octet is 167 and it lies between (0 to 127)

therefore the no of address in the block found as

$$N = 2^{32-n}$$

$$N = 2^{32-27}$$

$$N = 2^5$$

$$N = 32$$

for the first address we keep n that is 27 leftmost bits it is and (32-27) that is 5 rightmost address all to zeros therefore the first address is 167.199.170.64/27

for the last address we keep n that is 27 leftmost bits it and (32-27) that is 5 rightmost address all to one  
therefore the last address is 167.199.170.95/27

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Q7 one of the address is given as 25.34.12.56 /16.

Solution :- No of address is found as .

$$n = 16$$

$$N = 2^{32-n}$$

$$N = 2^{32-16}$$

$$N = 2^{16}$$

$$N = 65536 \text{ bits}$$

For the first we keep in that is 16 left most as it is and set (32-16) that is 16 right most addresses all to zero's therefore the first address is 25.34.0.0.

For the last address we keep in that is 16 leftmost digits as it is and set (32-16) that is 16 right most address all to One's therefore the first address is 25.34.255.255



- 9, An IP address in the block is found as 163.199.170.3/27  
find the no of address, first address, last address.

Solution :- The no of address is found as.

$$n = 27$$

$$N = 2^{32-n}$$

$$N = 2^{32-27}$$

$$N = 2^5$$

$$N = 32 \text{ bits}$$

For the first address we keep in that is 27 left most bits as it is and (32-27) that 5 rightmost address all to zeros  
therefore the first address is 163.199.170.0

for the last address we keep in that is 27 left most bits as it is and (32-27) that 5 rightmost address all to one's  
therefore the last address is 163.199.170.31

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8. An IP address in the block is found as 200.17.180.0/24.  
Find the no of address, first address and last address?

Solution:- No of address is found as.

$$n = 24$$

$$N = 2^{32-n}$$

$$N = 2^{32-24}$$

$$N = 2^8$$

$$N = 256$$

For the first address we keep in that is 24 leftmost as it is  
and set (32-24) that is 8 rightmost address all to zero's  
therefore the first address is 200.17.180.0

For the last address we keep in that is 24 leftmost as it is  
and set (32-24) that is 8 rightmost address all to one's.  
Therefore the ~~first~~ last address is 200.17.180.255