

IP Addressing

1. Determine the class, network address, host address, broadcast address and default subnet mask for the following IPv4 addresses:

Host IP Address	Address Class	Network Address	Host Address	Network Broadcast Address	Default Subnet Mask
216.14.55.137	C	216.14.55.0	216.14.55.137	216.14.55.255	255.255.255.0
123.1.1.15	A	123.0.0.0	123.1.1.15	123.255.255.255	255.0.0.0
150.127.221.244	B	150.127.0.0	150.127.221.244	150.127.255.255	255.255.0.0
194.125.35.199	C	194.125.35.0	194.125.35.199	194.125.35.255	255.255.255.0
175.12.239.244	B	175.12.0.0	175.12.239.244	175.12.255.255	255.255.0.0

2. Given an IP address of 142.226.0.15 and a subnet mask of 255.255.0.0, answer the following questions:

What is the binary equivalent of the second octet? 11100010

What is the class of the address? Class B

What is the network address of this IP address? 142.226.0.0

Is this a valid IP host address (Y/N)? Yes

Why or why not? It is not a network or broadcast address

3. Determine the class, network number and broadcast address for the following IP addresses:

a. IP address: **207.21.54.240** Address Class: C
Subnet mask: **255.255.255.0** Network Number: 207.21.54.0
Broadcast Address: 207.21.54.255
Possible # of Hosts: 254

b. IP address: **60.41.211.5** Address Class: A

Subnet mask: **255.0.0.0** Network Number: 60.0.0.0
Broadcast Address: 60.255.255.255
Possible # of Hosts: $2^{24} - 2$

c. IP address: **190.101.2.199** Address Class: B
Subnet mask: **255.255.0.0** Network Number: 190.101.0.0
Broadcast Address: 190.101.255.255
Possible # of Hosts: $2^{16} - 2$

d. IP address: **192.191.25.11** Address Class: C
Subnet mask: **255.255.255.0** Network Number: 192.191.25.0
Broadcast Address: 192.191.25.255
Possible # of Hosts: 254

4. Why would you want to subnet (break into smaller networks) the networks in b and c in the previous step? To break up the network into smaller broadcast segments and reduce the network traffic

5. Determine the class and major network number (not subnet number) for the following IPv4 addresses. Use the subnet masks to determine the number of subnets created for the address, and the number of hosts permitted on each subnet:

a. IP address: **207.21.54.140** Address Class: C
Subnet mask: **255.255.255.224** Network Number: 207.21.54.0
Possible # of Subnets: 8
Possible # of Hosts: $32 (-2)$

b. IP address: **60.41.211.5** Address Class: A
Subnet mask: **255.255.255.0** Network Number: 60.0.0.0
Possible # of Subnets: 2^{16}
Possible # of Hosts: $256 (-2)$

c. IP address: **190.101.2.199** Address Class: B
Subnet mask: **255.255.255.224** Network Number: 190.101.0.0
Possible # of Subnets: 2^{11}
Possible # of Hosts: $32 (-2)$

d. IP address: **182.191.25.11** Address Class: B
Subnet mask: **255.255.254.0** Network Number: 182.191.0.0

Possible # of Subnets: 128

Possible # of Hosts: 512 (-2)

e. IP address: **107.21.54.100** Address Class: A
Subnet mask: **255.255.255.224** Network Number: 107.0.0.0
Possible # of Subnets: 2¹⁹
Possible # of Hosts: 32 (-2)

f. IP address: **96.96.11.78** Address Class: A
Subnet mask: **255.255.255.240** Network Number: 96.0.0.0
Possible # of Subnets: 2²⁰
Possible # of Hosts: 16 (-2)

g. IP address: **96.96.11.78** Address Class: A
Subnet mask: **255.255.252.0** Network Number: 96.0.0.0
Possible # of Subnets: 2¹⁴
Possible # of Hosts: 1024 (-2)

h. IP address: **171.91.5.1** Address Class: B
Subnet mask: **255.255.252.0** Network Number: 171.91.0.0
Possible # of Subnets: 64
Possible # of Hosts: 1024 (-2)

i. IP address: **195.91.5.1** Address Class: C
Subnet mask: **255.255.255.240** Network Number: 195.91.5.0
Possible # of Subnets: 16
Possible # of Hosts: 16 (-2)

6. Determine the subnetwork number and broadcast address for each of the following hosts subnets:

a. IP address: **201.19.100.140** Subnet Number: 201.19.100.128
Subnet mask: **255.255.255.224** Broadcast Address: 201.19.100.159
Possible # of Subnets: 8
Possible # of Hosts: 30

b. IP address: **75.60.11.5** Subnet Number: 75.60.11.0
Subnet mask: **255.255.255.0** Broadcast Address: 75.60.11.255

Possible # of Subnets: 2¹⁶

Possible # of Hosts: 254

c. IP address: **190.101.2.140** Subnet Number: 190.101.2.128

Subnet mask: **255.255.255.192** Broadcast Address: 190.101.2.191

Possible # of Subnets: 1024

Possible # of Hosts: 62

d. IP address: **182.191.25.11** Subnet Number: 182.191.25.0

Subnet mask: **255.255.255.224** Broadcast Address: 182.191.25.31

Possible # of Subnets: 2048

Possible # of Hosts: 30

e. IP address: **107.21.54.100** Subnet Number: 107.21.54.0

Subnet mask: **255.255.254.0** Broadcast Address: 107.21.55.255

Possible # of Subnets: 2¹⁵

Possible # of Hosts: 510