Solutions of Network activities I

1. Activity 1

   (a) 1.1.1.1 $\Rightarrow$ Right

   (b) 2.2.2.200 $\Rightarrow$ Right

   (c) 200.260.0.3 $\Rightarrow$Not right because $260 > 255$

   (d) 4.4.4.4.4 $\Rightarrow$ Not right, this IP has 5 bytes, 5 groups of 8 bits.

   (e) 5.0.0.300 $\Rightarrow$ Not Right because $300 > 255$

   (f) 256.244.244.4 $\Rightarrow$ Not right because $256 > 255$

   (g) 700.1000.100 $\Rightarrow$ Not right because $700 > 255$ and $1000 > 255$. Besides, it has 3 bytes.

2. Activity 2

   The network mask is formed by two parts:

   - a group of "1". This group of 1 are considered the part which is not possible to change and this group must be together.
   - a group of "0". It is conisdered the host part.

   (a) 255.0.0.0 $\Rightarrow$ Mask Number of hosts $\Rightarrow 2^{24} = 16777216; 16777216 - 2 = 16777214$ hosts

   (b) 255.255.0.1 $\Rightarrow$ this IP is not a mask because ones must be together.

   (c) 255.255.128.0 $\Rightarrow$ Mask Number of hosts $\Rightarrow 2^{15} = 32768; 32768 - 2 = 32766$ hosts

   (d) 255.255.127.0 $\Rightarrow$ this IP is not a mask because 255.255.01111111.00000000 and as it can be seen 0 between 255 and a group of "1".

   (e) 255.255.128.15 $\Rightarrow$ this IP is not a mask because 255.255.10000000.00001111 and as it can be seen 0 between 255 and a group of "1".

3. Activity 3

   (a) 18.120.16.250: Mask not provided

   A Class IP

   Mask $\Rightarrow$ 255.0.0.0

IP	0	0	0	1	0	0	1	0	.120	.16	.250
$Mask$	1	1	1	1	1	1	1	1	.0	.0	.0
$ID\ Network$	0	0	0	1	0	0	1	0	.0	.0	.0
$ID\ Network$								18	.0	.0	.0

IP broadcast ⇒ 18.255.255.255

In red, it is shown the part of the IP which is blocked. The rest of the IP must be "1".

(b) 18.120.16.255 / 255.255.0.0:

Mask ⇒ 255.255.0.0

IP	0	0	0	1	0	0	1	0	.0	1	1	1	1	0	0	0	.16	.255
$Mask$	1	1	1	1	1	1	1	1	.1	1	1	1	1	1	1	1	.0	.0
$ID\ Network$	0	0	0	1	0	0	1	0	.0	1	1	1	1	0	0	0	.0	.0
$ID\ Network$								18								.120	.0	.0

IP broadcast ⇒ 18.120.255.255

In red, it is shown the part of the IP which is blocked. The rest of the IP must be "1".

(c) 155.4.220.39: Mask not provided

B Class IP

Mask ⇒ 255.255.0.0

IP	155	.4	.220	.39
$Mask$	255	.255	.0	.0
$ID\ Network$	155	.4	.0	.0

IP broadcast ⇒ 155.4.255.255

In red, it is shown the part of the IP which is blocked. The rest of the IP must be "1".

(d) 194.209.14.33: Mask not provided

C Class IP

Mask ⇒ 255.255.255.0

IP	194	.209	.14	.33
$Mask$	255	.255	.255	.0
$ID\ Network$	194	.209	.14	.0

IP broadcast ⇒ 194.209.14.255

In red, it is shown the part of the IP which is blocked. The rest of the IP must be "1".

(e) 190.33.109.133 / 255.255.255.0

Mask ⇒ 255.255.255.0

IP	190	.33	.109	.133
$Mask$	255	.255	.255	.0
$ID\ Network$	190	.33	.109	.0

IP broadcast ⇒ 190.33.109.255

In red, it is shown the part of the IP which is blocked. The rest of the IP must be "1".

4. Activity 4

The network mask is 255.255.0.0 so there are 8+8=16 bits for hosts.

Each subnet need to address 47 hosts, so it will be needed:

$2^5 = 32; 32 - 2 = 30 < 47$

$2^6 = 64; 64 - 2 = 62 > 47 \Rightarrow$ At least, it will be needed 6 bits to address 47 hosts.

There are 16 bits for hosts but it is possible to stole 6 bits in order to make subnets:

16 bits -6 =10 bits to use for subnetting, that is to say, it is possible to stole 10 bits as a max to split in subnets. So as a max, it is possible to get:

$2^{10} = 1024$ subnets with 62 possibles IP to address differents hosts

6 Activity 6

(a) B Class IP Mask ⇒ 255.255.0.0

(b) In order to split in 4 subnets, it will be needed to stole 2 bits of the hosts bits:

$2^2 = 4$

255.255.11 000000.00000000 ⇒ 255.255.192.0

(c) Each subnet:

Network ID	Network ID	Broadcast IP
172.10.00 000000.0	172.10.0.0	172.10.63.255
172.10.01 000000.0	172.10.64.0	172.10.127.255
172.10.10 000000.0	172.10.128.0	172.10.191.255
172.10.11 000000.0	172.10.192.0	172.10.255.255

(d) our IP is 172.10.130.4

IP	172	.10	.1	0	0	0	0	0	1	0	.4
$Mask$	255	.255	.1	1	0	0	0	0	0	0	.0
$ID\ Network$	172	.10	.1	0	0	0	0	0	0	0	.0
$ID\ Network$	172	.10	.							128	.0

(e) In order to know the number hosts available in each subnet, it is needed to focus on the number of 0 of the mask:

255.255.11 000000.00000000 ⇒ 14 bits available for hosts:

$2^{14} = 16384; 16384 - 2 = 16382$ hosts

7 Activity 7

(a) B Class IP Mask $\Rightarrow$ 255.255.0.0

(b) In order to split in 5 subnets, it will be needed to stole 3 bits of the hosts bits:

$2^2 = 4 < 5$

$2^3 = 8 > 5$

255.255.111 00000.00000000 $\Rightarrow$ 255.255.224.0

(c) Each subnet:

Network ID	Network ID	Broadcast IP
170.10.000 00000.0	172.10.0.0	172.10.31.255
170.10.001 00000.0	172.10.32.0	172.10.63.255
170.10.010 00000.0	172.10.64.0	172.10.95.255
170.10.011 00000.0	172.10.96.0	172.10.127.255
170.10.100 00000.0	172.10.128.0	172.10.159.255
170.10.101 00000.0	172.10.160.0	172.10.191.255
170.10.110 00000.0	172.10.192.0	172.10.223.255
170.10.111 00000.0	172.10.224.0	172.10.255.255

(d) our IP is 170.10.133.2

IP	172	.10	.1	0	0	0	0	0	1	0	.4
$Mask$	255	.255	.1	1	1	0	0	0	0	0	.0
$ID\ Network$	172	.10	.1	0	0	0	0	0	0	0	.0
$ID\ Network$	172	.10	.							128	.0

(e) In order to know the number hosts available in each subnet, it is needed to focus on the number of 0 of the mask:

255.255.111 00000.00000000 $\Rightarrow$ 13 bits available for hosts:

$2^{13} = 8192; 8192 - 2 = 8190$ hosts