Internetworking
Tutorial 2

Addressing and Subnetting

Remember:

IP Address Classes

Class A	1 – 127	(Network 127 is reserved for loopback and internal testing) Leading bit pattern	0	00000000.00000000.00000000.00000000 Network . Host . Host . Host
Class B	128 – 191	Leading bit pattern	10	10000000.00000000.00000000.00000000 Network . Network . Host . Host
Class C	192 – 223	Leading bit pattern	110	11000000.00000000.00000000.00000000 Network . Network . Network . Host
Class D	224 – 239	(Reserved for multicast)		
Class E	240 – 255	(Reserved for experimental, used for research)		

Private Address Space

Class A	10.0.0.0 to 10.255.255.255
Class B	172.16.0.0 to 172.31.255.255
Class C	192.168.0.0 to 192.168.255.255

Default Subnet Masks

Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

Exercise 1:

Convert of the following **8-bit binary** numbers to decimal by using the provided table. **Attempt as many as possible and refrain from using a calculator or a search engine**, simply practice!

Binary Value	128 = 2^7	64=2^6	32=2^5	16=2^4	8=2^3	4=2^2	2=2^1	1=2^0	Decimal Value
00011011	0	0	0	1	1	0	1	1	27
10101010									
01101111									
11111000									
00100000									
01010101									
00111110									
00000011									
11101101									
11000000									

Exercise 2:

Convert the following decimal numbers to **8-bit binary numbers** and complete the provided table. **Attempt as many as possible and refrain from using a calculator or a search engine**.

Decimal Value	128	64	32	16	8	4	2	1
255								
192								
172								
256								
1								
13								
204								
10								
98								
179								
224								
239								

Exercise 3:

Identify the Class the following IP addresses belong to. **Attempt as many as possible. Advise the information on page 1.**

IP Address	Class
10.250.1.1	
150.10.15.0	
1492.14.2.0	
148.17.9.1	
193.42.1.1	
126.8.156.4	
220.200.24.1	
231.230.46.58	
177.100.18.4	
119.18.46.9	
249.240.82.79	
199.156.76.57	
10.256.2.3	
95.0.21.90	

Exercise 4:

Identify the network and host portions for the following IP addresses. **Attempt as many as possible. Advise the information on page 1**.

IP Address	Network address (network ID)	Host address (host ID)
10.250.1.1	10.0.0.0	0.250.1.1
150.10.15.0		
1492.14.2.0		
148.17.9.1		
193.42.1.1		
126.8.156.4		
220.200.24.1		
231.230.46.58		
177.100.18.4		
119.18.46.9		
249.240.82.79		
199.156.76.57		
10.256.2.3		
95.0.21.90		

Exercise 5:

Calculate the network address and host address for the following IP addresses as defined by the provided custom subnet mask.

For example:

156.222.32.27 / 255.255.255.0 ➔ 156.222.32.0 (network) and 0.0.0.27 (host)

IP Address / Subnet mask	Network Address (Network ID)	Host Address (Host ID)
188.11.18.3 / 255.255.0.0		
10.11.48.81 / 255.255.255.0		
192.168.23.185 / 255.255.255.0		
150.203.23.19 / 255.255.0.0		
10.11.12.13 / 255.0.0.0		
186.14.25.114 / 255.255.255.0		
199.21.201.152 / 255.0.0.0		
191.55.168.123 / 255.255.255.0		
28.252.250.254 / 255.255.0.0		
192.168.254.254 / 255.255.0.0		
10.1.5.254 / 255.255.255.0		

Exercise 6:

For the following IP address and the provided subnet mask calculate the number of subnets and hosts you have for each subnet.

Scenario 1 - Default subnet mask

IP address: 192.100.10.0

Default subnet mask: 255.255.255.0

Number of subnets =

Number of hosts per subnet =

Scenario 2 – Custom subnet mask

IP address: 192.100.10.0

Custom Subnet mask: 255.255.255.240

Number of subnets =

Number of hosts per subnet =