Cairo University
Faculty of Engineering
Computer Department

Computer Networks
CMPN 415 -405B
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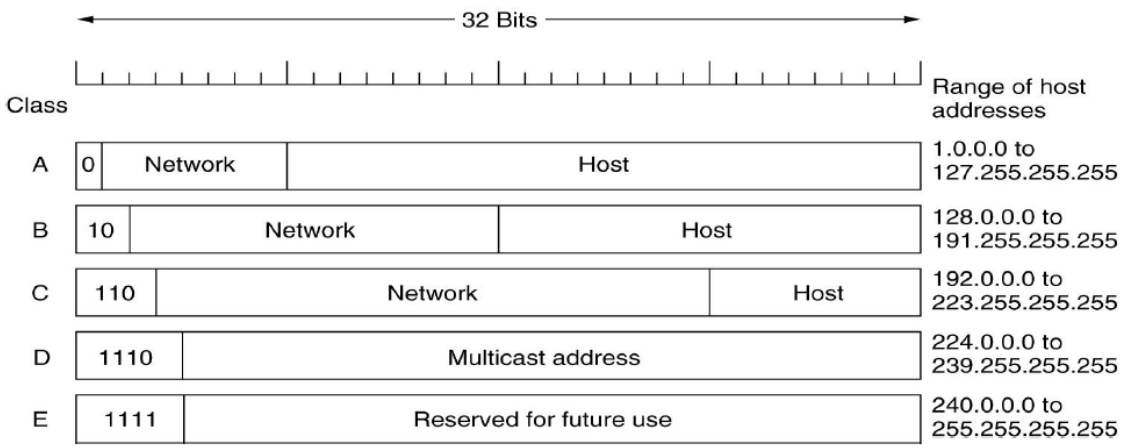
Sheet 8

1. Show the classful address ranges, number of hosts and their relative network masks.



class	Network mask	Host numbers
A	/8	2^24-2
B	/16	2^16-2
C	/24	2^8-2
D	Not defined	Not defined

2. Briefly describe one disadvantage of the classful addressing and how subnetting can solve it.
   Waste of address space, subnetting has helped multiple networks to share address ranges and so a better use of address space.
3. Given the following addresses, choose their relative class (A- B-C-D or E) and their network mask (default subnet mask).

Address	**class**	**network mask**
10.250.1.1	A	/8
192.14.2.0	B	/16

150.10.15.0	B	/16
230.230.45.58	D	Not defined
219.21.56.0	c	/24

4. Using the IP address and subnet mask shown write out the network address and the host address of the following:

Address and mask	**network address**	**host address**
188.10.18.2 255.255.0.0	18.10.0.0	0.0.18.2
10.10.48.80 255.255.255.0	10.10.48.0	0.0.0.80
223.169.23.20 255.255.0.0	223.169.0.0	0.0.23.20

5. Consider a company provided with the address range from 193.62.83.0 to 193.62.83.255 calculate the maximum number of hosts if it uses classful addressing and if it uses classless addressing with 255.128.0.0 as network mask.

Classful addressing:

Class C -> Network mask = /24

Maximum number of hosts= 2^8-2

Classless addressing

Network mask = /9

Maximum number of hosts= 2^23-2

6. A company using classful addressing is provided by network address 192.10.10.0 , the company needed at least 14 subnets each of them has at least 14 hosts , show the following:
   a. Address class
   b. Default subnet mask
   c. Custom subnet mask
   d. Total number of possible subnets
   e. Total number of hosts
   f. Number of bits borrowed for subnetting
   g. Compare the number of hosts if we didn't use subnetting at all.

Address=192.10.10.0
Class C -> Network mask = /24 “default subnet mask”
Need 14 subnets = 4 bits (as 2^4=16)
Custom subnet mask= /(24+4)=/26
Number of possible subnets=16
Total number of hosts per subnet = 2^(8-4)-2=2^4-2=16-2=14 host
Total number of hosts per network= 14*16=224
Without subnetting , number of possible hosts = 2^8-2=256-2=254

7. Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation.

C22F1582=1100 0010 . 0010 1111 .0001 0101 . 1000 0010= 194.47.21.130

8. A large number of consecutive IP address (classless) are available starting at 198.16.0.0. Suppose that four organizations, A, B, C, and D, request 4000, 2000, 4000, and 8000 addresses, respectively, and in that order. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the w.x.y.z/s notation.

There are a lot of valid answers as long as they don’t overlap and satisfy the # of hosts

Organization	Addresses		Subnet bits	Start and end addresses	Total number of hosts
A	4000	12 bits host 4 subnet	0111	198.16.112.0/20: 198.16.127.255/20	2^12-2=4094
B	2000	11 bits host 5 subnet	00000	198.16.0.0/21: 198.16.7.255/21	2^11-2=2046
C	4000	12 bits host 4 subnet	0110	198.16.96.0/20: 198.16.111.255/20	2^12-2=4094
D	8000	13 bits host 3 subnet	010	198.16.64.0/19: 198.16.95.255/19	2^13-2=8190

9. A router has the following (CIDR) entries in its routing table:

Address/mask		Next hop
135.46.56.0/22	135.46.0011 10 00.0 / 8.8.6.0	Interface 0
135.46.60.0/22	135.46.0011 11 00.0 / 8.8.6.0	Interface 1
192.53.40.0/23	135.53.0010 100 0.0 / 8.8.7.0	Router 1
default		Router 2

For each of the following IP addresses, what does the router do if a packet with that address arrives?

a. 135.46.63.10 63-> 0011 1111 "Interface 1"
b. 135.46.57.14 57-> 0011 1001 "Interface 0"
c. 135.46.52.2 52-> 0011 0100 "Router 2"
d. 192.53.40.7 "Router 1"
e. 192.53.56.7 53-> 0011 1000 "Router 2"