1.What are the differences between classful addressing and classless addressing in IPv4?

Classful addressing assigns an organization a ClassA ,ClassB ,ClassC ,classE ,classD block of addresses. fixed length prefix

Classless addressing assigns an organization a block of contiguous addresses based on its needs. variable length prefix

2. What is the address space in a system with 12-bit addresses? Address space =2^n=2^12=4096

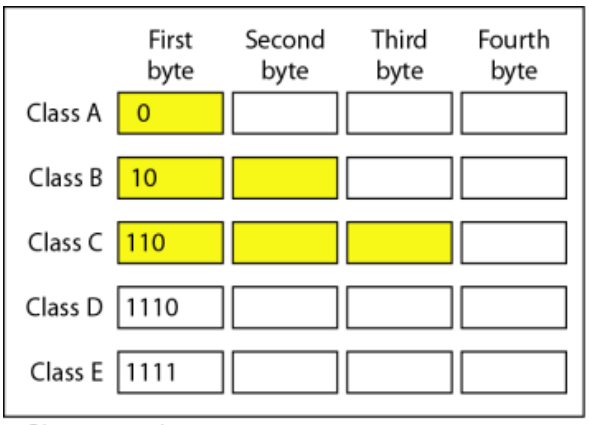
3. **An address space has a total of 2048 addresses. How many bits are needed to represent an address?**

N=log2(address space)=log2(2048)=11

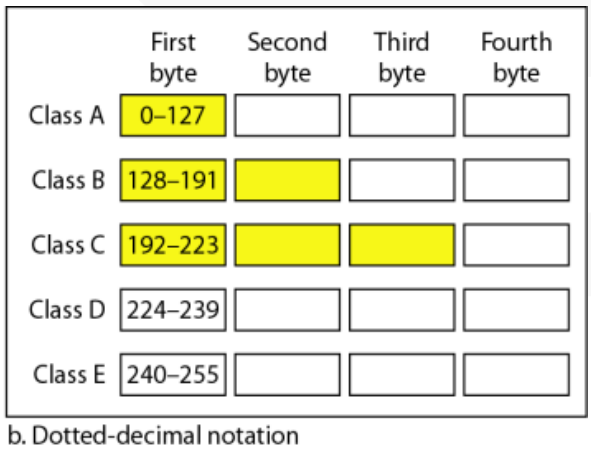
4. Find the class of the following IP addresses.

a. 120.44.15.10 class A

b. 10111111 10110000 00011111 01011101 class B



a. Binary notation



b. Dotted-decimal notation

5. If the following addresses are classful, Find the netid and the hostid of the following IP addresses.

a. 80.66.12.16 netid=80 hostid= 66.12.16

b. 223.55.10.12 netid=223.55.10 hostid=12

6. In a block of addresses, we know the IP address of one host is 20.32.1.56/24. What are the first address (network address) and the last address (limited broadcast address) in this block?

Shift method

first address 20.32.1.0

last address 20.32.1.255

no of address 256

mask method

host	20	.32	.1	.56
mask	255	.255	.255	.0
first address	20.	32	.1	. 0

host	20	.32	.1	.56
mask	0	. 0	. 0	. 255
last address	20.	32	.1	. 255

7. Write the following masks in slash notation (/n).

a. 255.192.0.0 n=10

b. 255.255.128.0 n=17

c. 255.255.240.0 n=20

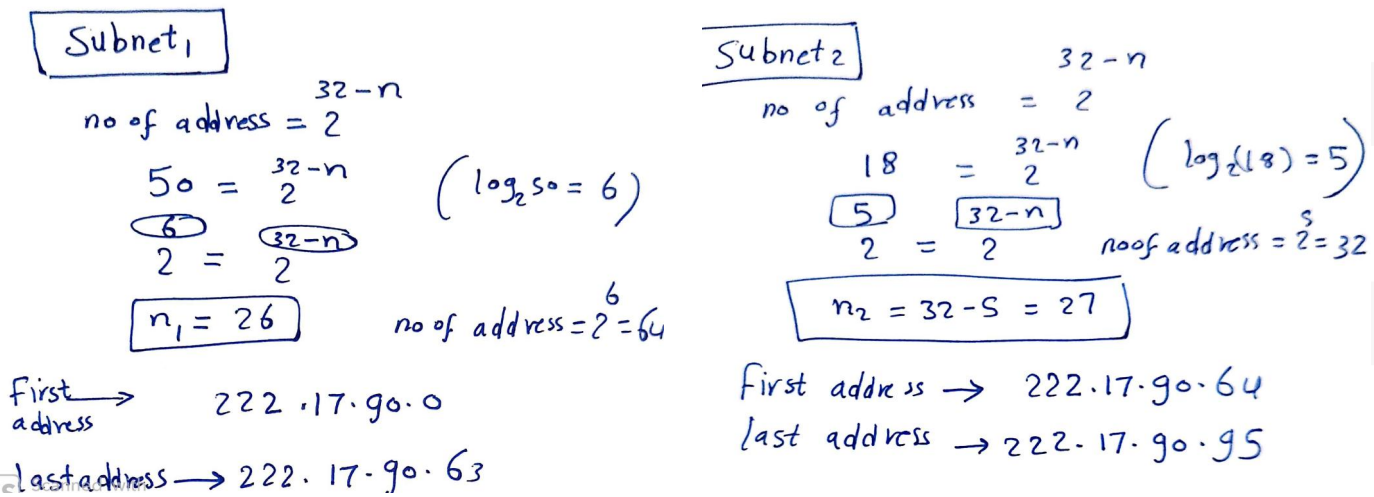
8. An organization is granted the block 222.17.90.0/16. The administrator wants to create 2 subnets one with 50 hosts and other with 18 hosts. Design the subblocks.

a. Find the number of addresses in each subnet. 64 ,32

b. b. Find the subnet mask (/n). /26 ,/27

c. Find the First and Last addresses in each subnet.

subnet1 first 222.17.90.0 last 222.17.90.63 subnet2 first 222.17.90.64 last 222.17.90.95



9.In an IPv4 packet, the value of HLEN is (1100)2. How many bytes of options are being carried by this packet?

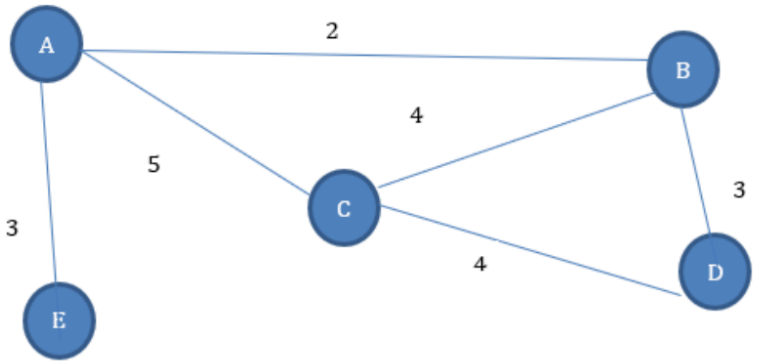
header length=12*4=48

the first 20 byte of base header ,the options=48-20=28

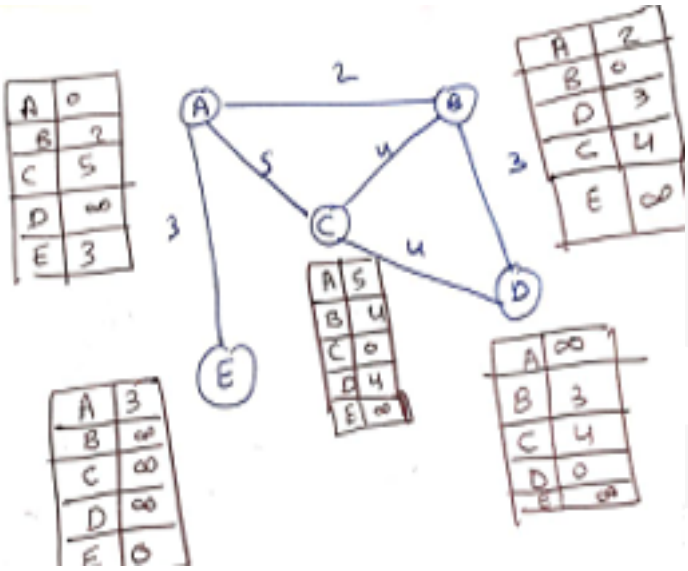
10. In an IPv4 packet, the value of HLEN is 5, and the value of the total length field is (0028)16. How many bytes of data are being carried by this packet?

The HLEN value is 5, which means the total number of bytes in the header is 5 × 4 or 20 bytes (no options). The total length is 40 bytes, which means the packet is carrying 20 bytes of data (40−20).

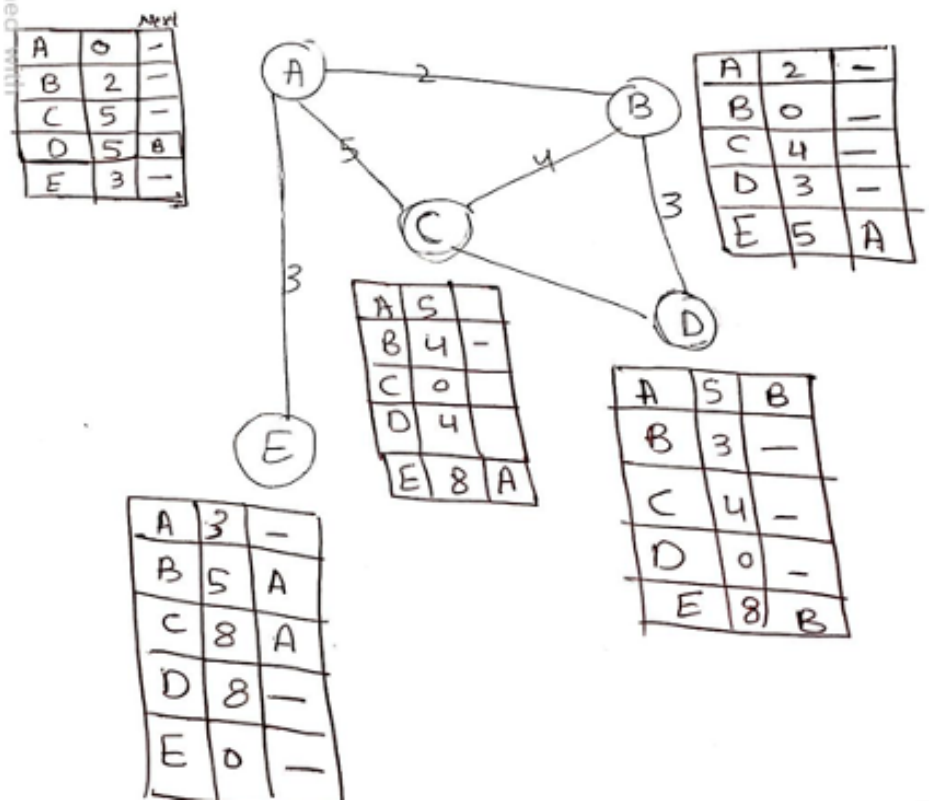
11. Assume the following network that containing five nodes connected as in shown. Apply Distance Vector Routing to fill the entries of routing tables at each node. Discuss all phases through which the tables will be finally stabilized.



1-INITIALIZING



2-UPDATING



3-Sharing (الشرح بالفيديو)