Networks tutorial

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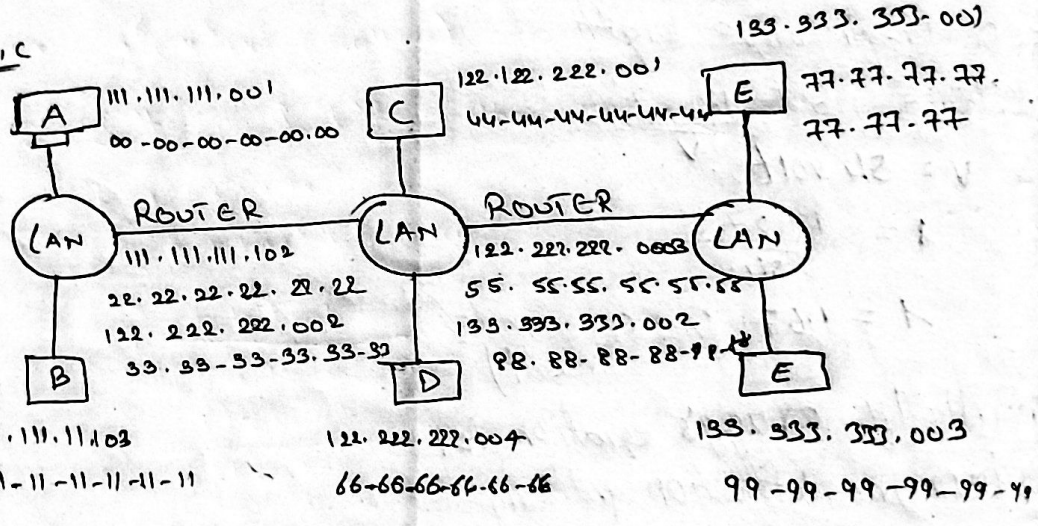
1) Ethernet is connectionless. Upper layer protocols like TCP establishes connection. Connection is implemented through software and connection oriented Ethernet is also there but by default Ethernet is connectionless

2) 2^8 MAC - address
2^{32} IPV4 "
2^{128} IPV6 "

3) a, b, c



3d)

(i) forwarding table in A determining that the datagram should be routed to interface (111.111.111.002)

(ii) the adapter in A creates an Ethernet packet with Ethernet destination address 22-22-22-22-22-22

(iii) the first router receives the packet and extracts the datagram. the datagram is routed to 22-22.222.003

(iv) the first router sends the ethernet packet with the destination address 55-55-55-55-55-55 and src add of 33-33-33-33-33-33 via a interface with IP

(v) Process continue until packet reaches host f

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4c ARP in A must now determine the LAN address of 111.111.111.002
Host A sends out an ARP query packet with in a broadcast Ethernet frame. the first router receives the query packet and sends host A and ARP response packet this ARP packet is carried by Ethernet frame and destination address
00-00-00-00-00-00

ii) In order to send an IP datagram the sender must know both IP and MAC. In order to know the unknown MAC the sender will send LAN. Each node will receive this msg and determine that it is a broadcast message the adapter will then send the msg up to its own ARP module each ARP module checks to see if that IP address matches its IP address if it does, it will send the ARP response back to the sender with the MAC inside the frame of a packet

iii) c's adapter will process the frames, but the adapter will not pass the datagrams up the protocal stack, if the LAN broadcast address is used the c's adapter will both process the frames and pass the datagrams up the protocal stack

iv) An IP datagram send from the source host to the destination host will travel over 8 interfaces.
3 forwarding tables will be indexed to move the datagram from the source to the destination

5)

CSMA/CD	CSMA/CA
-> CSMA/CD is effective after a collision	-> CSMA/CD is effective before collision
-> It used in wired networks	-> commonly used in wireless
-> it only reduced to recovery time	-> minimizes the possibilities of collisions
-> resend the data frame whenever conflict occur	-> will first transmit the intent to send Sr. data
-> It's more efficient than simple CSMA	-> will it is similar to simple CSMA

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8) (to $2^k - 1$) x RTT

9) The physical address does not chage N is globally unique to the computers NIC card

The IP address may need to be chaged to reflect a new network Id and host Id

The solution is same for laptop

(10)

→ $P(x) = x^3 + x^2 + x^0$ (1101)

$G(x) = x^6 + x^3 + x^2$ (1001100)

multiply by the no. of bits in the CRC polynomial)

$x^3 (x^6 + x^3 + x^2)$

$x^9 + x^6 + x^5$ (100110000

```
        1111101
1101 ) 1001100,000
       1101
       1001
       1101
        1000
        1101
         1010
         1101
          1110
          1101
           1100
           1101
            0:01
```

we then divide and determine the remainder the result is "001", so the transmitted is 1001100001 //

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n) Suppose two nodes start to transmit at the same time a packet of length 'L' over a broadcast channel of rate 'R'.

The propagation delay between the two nodes is (d_{prop})

If Transfer noded at same times, then receive the bits of packet from another node while

$[d_{prop} < L/R]$

∴ The collision is occured.