

Module 1

- 1) Service Primitives
- 2) Uses of Computer. — study all introduction topics .
Topology, Model of transmission
- 3) Connection oriented & connection less .
- 4) Signal encoding - Manchester and
TRACE KU Differential.
- 5) Guided & Unguided Medium .
- 6) TCP ref model, OSI ref model
- 7) Comparisons
- 8) Performance Indicators
(problems will put ~~use~~ notes)

Module 2

- 1) Data link layer design issues
- 2) Hamming code, CRC, checksum, Parity
(problems)
- 3) Multiple Access protocols
 - ↳ CSMA, Aloha, slotted Aloha
 - ↳ CSMA/CD/CA

- 4) Data link protocols
- 4) HDLC → TRACE KTU
 - 5) IEEE 802.11, 802.3 → Ethernet frame for
 - 6) Repeaters, hubs, Bridges, switches, Routers,
[Just study what do you mean by each]
 - 7) Datagram
 - 8) sliding window Protocols
 - ↳ Stop & wait
 - ↳ Selective ARQ
 - ↳ Go back ARQ

Module 3

10. Routing in Mobile hosts

↳ figure explaining foreign host
home Agent

Distance Vector Routing → steps to find

↳ Problem,

Disadvantages

Flooding → purpose, disadvantages.

* Network layer design issues.

* Congestion Control methods Virtual Circuits

TRACE KTU

↳ open loop = 5 methods
↳ closed loop = 4 methods

* Congestion Control in datagram Circuits

⇒ 3 methods

* Difference b/w virtual and datagram.

* QoS = Quality Service. - methods

↳ 1. Token Bucket ; study problem also.

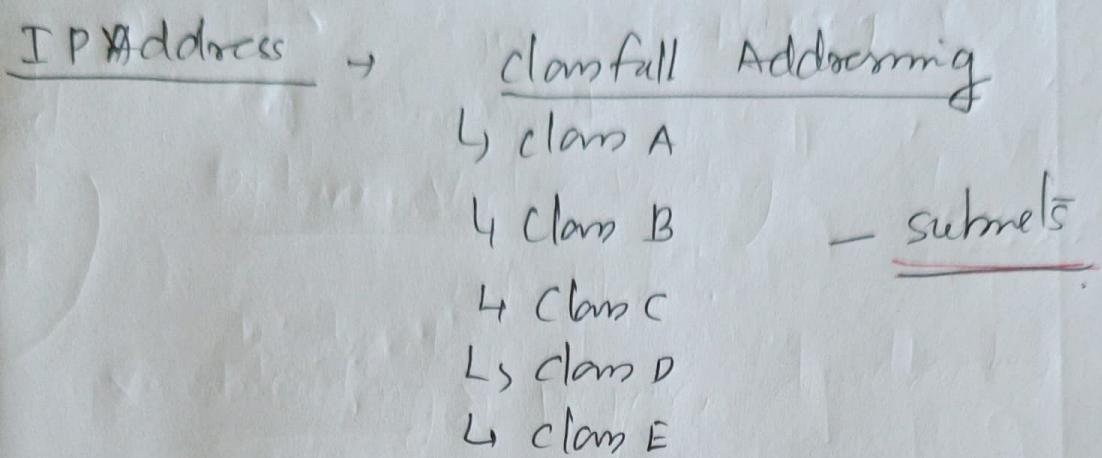
↳ 2. Leaky Bucket

Important

p.

Module 4

IPV4 protocol → header format - 32 bit.



Problems → Subnet Masks, subnet
(problems njan xere idam)

IPV6, ICMP (2 types of msgs)

TRACE KTU

- ↳ Query Message
- ↳ Error Reporting

ARP and RARP

RARP → disadvantages.

Becos of that DHCP and BOOTP developed.

→ Classless Addressing → Advantages.

→ NAT, Private Addresses.

→ Notes →

Module IV

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Module 5 (Refer the Module IV note in
drive CN)

TCP → header (important)

+ handshaking protocol

↳ Connection Establishment }

H Release . }

SYN, FIN
(diagram)

UDP → header.

DNS → Domain Name System (full padikam)

↳ Resolution

↳ Domain Name space .

↳ DNS header .

↳ Resource Record

Electronic Mail = SMTP

→ SNMP

→ WWW = Working .

Subnet Mask = put 1s in the net id
positions and 1s in the subnet id
positions

A nw in the internet has a subnet mask
of 255.255.240.0. what is max n:of hosts
it can handle.

Subnet mask = 255.255.240.0

write the mask in binary form.

TRACE KTU

255. 255. 240 . 0

↓

1111111. 1111111. 1110000. 0000.0000

Max no:of hosts = Count the
no:of zeros in above binary

format = 12.

$$\begin{array}{r} 240^0 \\ 2 \quad | 120^0 \\ 2 \quad | \quad 60^0 \\ 2 \quad | \quad 30^0 \\ 2 \quad | \quad 15^1 \\ 2 \quad | \quad 7^1 \\ 2 \quad | \quad 3^1 \\ \hline \end{array}$$

So no:of hosts = $2^{12} - 2$

Dont forget write the $\underline{\underline{-2}}$

A person who lives in Boston travels to Minneapolis, taking her portable computer with her. To her surprise, the LAN at her destination in Minneapolis is a wireless IP LAN, so she does not have to plug in. Is it still necessary to go through the entire busines with home agents and foreign agents to make emails and other traffic arrive correctly?

Ans: Write No Routing in Mobile hosts

• Connection Oriented and Connection less communication- difference.

Connection Oriented → stream based.
connection is established, Information is sent, connection is released, Reliable

Eg: TCP

Connection less Connection → msg based

Each msg is routed independently from source to destination. The order of msg sent can be different from order received

In connection less, the data is transferred in one direction from source to destination. Is still there or not or if it is prepared to accept the msg, Non reliable.

Eg: TCP, UDP.

How do you subnet the class C IP address 195.1.1.0 so as to have 10 subnets with a max of 12 hosts in each subnet?

$$\text{No. of subnets} = 2^4 = \underline{\underline{16}}$$

4 subnets

0000/0000

Subnets = 16, so 4 bits is used to represent 16 subnets.

{ In an 10 subnets, but always take power of 2 }

Subnet id is represented in host id part

Here in Qn it is mentioned that class C so in class C, 8 bits represents the host id. So from 8 bits, 4 bits used to represent the ~~host~~ subnet id. Rest of bits is used to represent host id.

Subnet Mask = To represent subnet mask, put 1s in network and subnet id part and zero's in host id.

In the ^{Qn} \rightarrow First 24 bits = Network id part and next 4 bits is subnet id

Network id Subnet id Host id. ①
11111111.11111111.11110000 - ①

No. of hosts = $\underline{2^4 - 2}$
= $16 - 2 = \underline{\underline{14}}$ possible host.
[4 bits is used to represent hosts]
∴ No. of host in each subnet = $2^4 - 2$

From ① Subnet mask = 255.255.255.240

{ Representing the binary format in decimal }

- How do you subnet the class C IP Address 206.16.2.0 so as to have 30 subnets. What is subnet mask for maximum no. of hosts. How many hosts can each subnet have.

30 subnets → To identify 30 subnets we need atleast 5 bits

So the subnet mask class C

0 1111111 1111111 1111111 . 1111 000
Subnet id hostid

decimal = 255. 255. 255. 248

$$\begin{aligned} \text{No. of hosts} &= \underline{2^3 - 2} \\ &= 8 - 2 = 6 \text{ hosts} \end{aligned}$$

→ Token Bucket

A computer on 10mbps link is required regulated by token bucket. The token bucket is filled at the rate of 2mbps. It is initially filled to capacity 16megabits. What is max duration for which computer can transmit at full 10Mbps.

$$S = \frac{C}{M-P} \quad \left\{ \begin{array}{l} C = \text{token capacity} \\ M = \text{max output rate Mbytes/sec} \\ P = \text{Token arrival rate} \end{array} \right.$$

$$C = 16 \text{ Mbits.}$$

$$M = 10 \text{ Mbps}$$

$$P = 2 \text{ mbps.}$$

$$S = \frac{16}{10-2} = \frac{16}{8} = \underline{\underline{2 \text{ sec}}}$$

$\left\{ \begin{array}{l} \text{New tokens are} \\ \text{arrived at the rate of} \\ 2 \text{mbps} \end{array} \right\}$

$$S = \frac{16}{10-2} = \frac{16}{8} = \underline{\underline{2 \text{ sec}}}$$

→ A computer on 6Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 1 mbps. It is initially filled to capacity with 8megabits. How long can the computer transmit at the full 6Mbps.

$$S = \frac{C}{M-P} \quad \left\{ \begin{array}{l} C = \text{token capacity} \\ M = \text{max output rate} \end{array} \right.$$

$$\therefore \frac{8}{6-1} = \frac{8}{5} = \underline{\underline{1.6 \text{ sec}}} \quad P = \text{Token arrival rate}$$

Check Sum

The following block of 8 bits is to be sent using a checksum of 4 bits. Find checksum.

11001010 → Divide the data into 2 sets. Each of 4 bits

$$\begin{array}{r} 1100 \\ 1010 \end{array}$$

1 0010 add carry

carry

TRACE KTU

→ Complement

↓

1000

Add

$$1+0=1$$

$$0+1=1$$

$$0+0=0$$

$$1+1=10$$

0

and 1
carry

Bit to be transmitted = 110010101000

checking

110010101000

[Again divide by 4 bits]

Do the above

steps
again

$$\begin{array}{r} 1100+ & 0010+ & 0011+ \\ 1010 & & 1000 \\ \hline 0010 & 0011 & 1111 \end{array}$$

complement (1111) = 0000.

II consider data to be transmitted

$$= 10011001111000100010010010000100$$

Check sum 8 bits. So divide data in groups of bits.

Add

$$\begin{array}{r} 10011001 \\ + 01111011 \\ \hline 011111011 \end{array}$$

$$\begin{array}{r} 01111011 \\ + 1 \\ \hline 01111100 \end{array}$$

$$\begin{array}{r} 01111100 \\ + 10100000 \\ \hline \end{array}$$

~~TRACE KTU~~

$$\begin{array}{r} 00100100 \\ + 10000100 \\ \hline 00100000 \end{array}$$

$$\begin{array}{r} 00100100 \\ + 1 \\ \hline 00100101 \end{array}$$

↓ complement

$$11011010$$

Transmitted string including checksum

= 5 bits + 4 segments + checksum

10011001 | 11100010 | 00100000 | 10000100 |

11011010

adding first 4 segments = 00100101 we will get

adding check sum: 11011010 to that

TRACE KTU

00100101 + 11011010

11111111

complement ↓

00000000

III Bit stream = 10011101, Generator polynomial $x^4 + x^3 + 1 = x^3 + x^2 + x + 1$

Generator polynomial = 1001

Append = 3 zeros at the end

$$\begin{array}{r}
 10001100 \\
 \hline
 1001 \overline{)10011101000} \\
 1001 \downarrow \quad \downarrow \\
 \hline
 00091101 \\
 1001 \downarrow \\
 \hline
 1000 \\
 1001 \downarrow \\
 \hline
 0009100
 \end{array}$$

TRACE K TU

CRC = 100

Received \rightarrow 10011101100

Checking = 1001 $\begin{array}{r} 10001100 \\ \hline 10011101100 \\ 1001 \downarrow \downarrow \downarrow \downarrow \\ \hline 01101 \\ 1001 \downarrow \\ \hline 1001 \\ 1001 \\ \hline 000 \\ \hline \end{array}$

Remainder = 0

So no err