

lecture 1

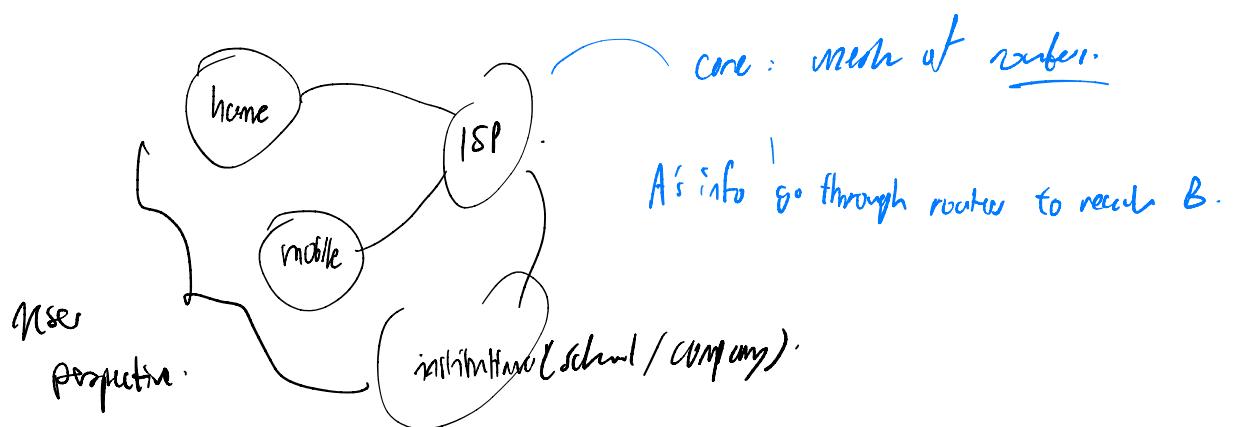
Midterm - 1h / 70 min MCQ - 3 Oct. 2-4pm.

Final - MCQ + short Qnns. - 20 Nov 5-7pm

Troubles / issues → forums

Internet → communication

connects devices & info.



→ Packet Switching Network.

seq. of bits
in binary.
'Big' Message → break into smaller packets.

↖ 'divide' into parts.

Combine after received.

'bit by bit' send onto line.

receiver checks if sine/wine wave (signal).

Link bandwidth (bits/sec).

1. packet transmission delay → line

for transmit

$$\frac{L \text{ (bit)}}{R \text{ (bit/sec)}}.$$

2. propagation delay-

✓ length of cable.

✓ speed of EM wave

Router

✓ special Computer.

✓ Forward Data.

✓ "store and forward". → entire packet must arrive before being forwarded.

✓ breaks up long cables.

- check for integrity / corruption of packet.

e.g.  Router 1 → Router 2 → Destination

- receive entire packet before check.

diff. parent may choose diff way. (design philosophy)

path is not reserved. unlike circuit switching
"simple".

↙ extra time req.

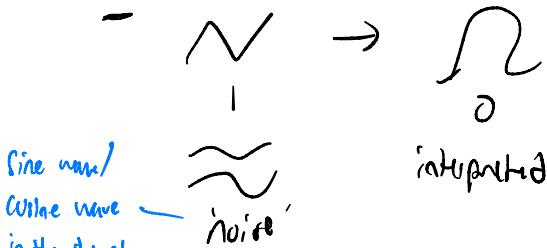
complicated mechanism } if reserved

"admission control" }

↙ no performance guarantee.

Focus on 1.4.

Packet loss. Why?

1. Queue/buffer in Router.
 - part of memory to store incoming packets
 - if full \rightarrow drop new packets.
 2. Corrupted packet due to noise
 - Signal attenuation.
 - 

sine wave
wave wave
in the channel
added to noise

interpreted. "bit error."

digital or analog.
sqr wave sine wave
- packet will be discarded.

Delay

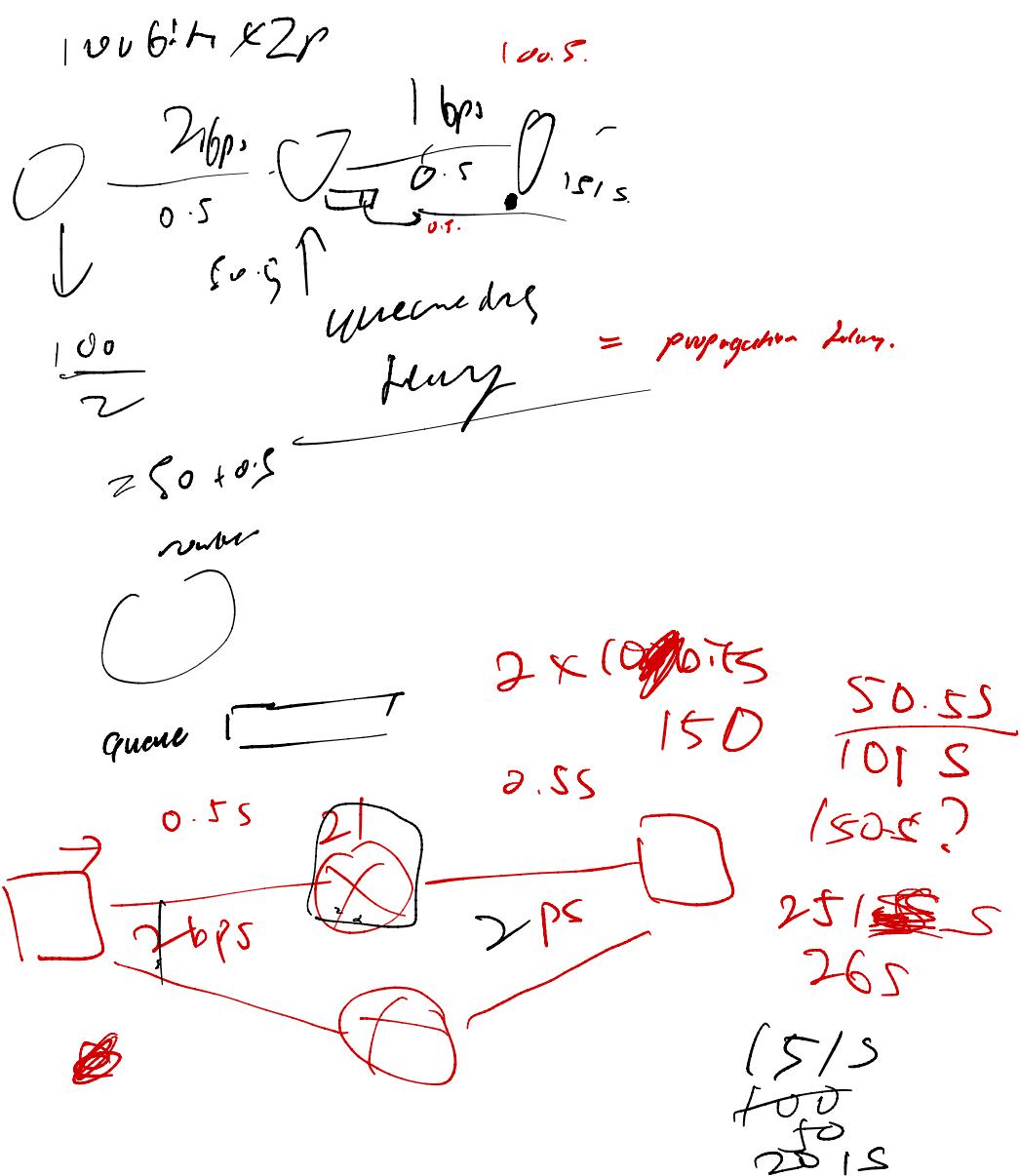
- process incoming packet for error
 - \Rightarrow processing delay. (not interested in avoidance).
- queuing delay in queue. (many cases ignore this).
- Transmission delay. *
 - { resistance?}
- propagation delay. *
 - \hookrightarrow propagation - consider last bit's time
- "end-to-end" delay.
 - $\delta_0 + \delta_1$

2 packets → router will push out 1 packet
before accepting the other packet

→ If 2nd link is slower → incur queuing delay.
is same/faster → no need queu.

Throughput \rightarrow bps for entire link. (or user lowers transmission rate) -

$$\frac{\text{total payout}}{\text{total time}}$$



1000 bits \times 5p.

