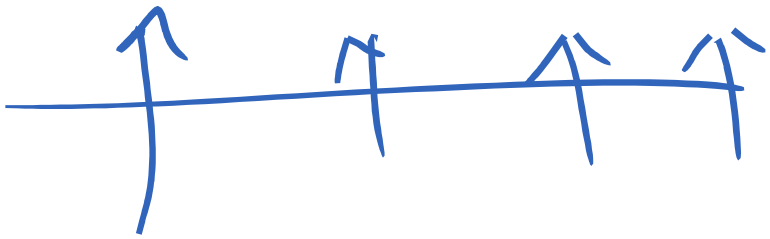
Shared Medium.

+ ~~How~~ Rule for sharing the medium.



Multiple node transmit at the same time, signals collide and both msg are lost.

FDMA, TDMA, CDMA, ...

Multiplexing

- Frequency Division
- Time Division Mult.
- Code Division Multiplexing

Multiple Access

Shailesh

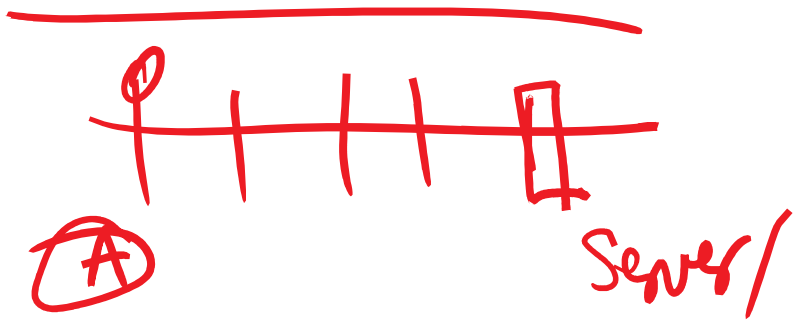
Classroom Protocol.

* Coordinator

→ Ask the coordinator
(Coordinator gives you time
→ start speaking

optical
voice

Extend
↓
2 channels
Control
Data



Protocol.

Same rule for all nodes.

Rule-0 When channel is quiet, start transmitting.

+ multiple users start trans. ✗

⟹ collision.

+ backoff. + randomly.

e.g. 2 nodes. ← toss a coin: Head - Spect
Tail - quiet.

→ RSS R0 → quiet, start sending.

R1: if collision,
use rand. no. [e.g. toss a coin]
send / remain H/T.

R2: repeat R1 if collision happens again

Q: After 2 tries, $p_{success} = \frac{1}{2}$?

more than $\frac{1}{2}$?

less than $\frac{1}{2}$.

Ex: 2 10 nodes.

Rule: 2: repeat if failure in previous round.

Coin toss.

After 1st round:

~~Coin~~ 6 sided dice

$P_S = 10 * \frac{1}{6} \times \left(\frac{5}{6}\right)^9$

$= 2^1 \frac{5^{10}}{6^{10}}$

$P_S = 10 \times \frac{1}{2} \cdot \left(\frac{1}{2}\right)^9$

$= \frac{10}{2^{10}}$

$= \frac{10}{1024} \approx \left(\frac{1}{10}\right)$

R3. Instead of Coin Toss:

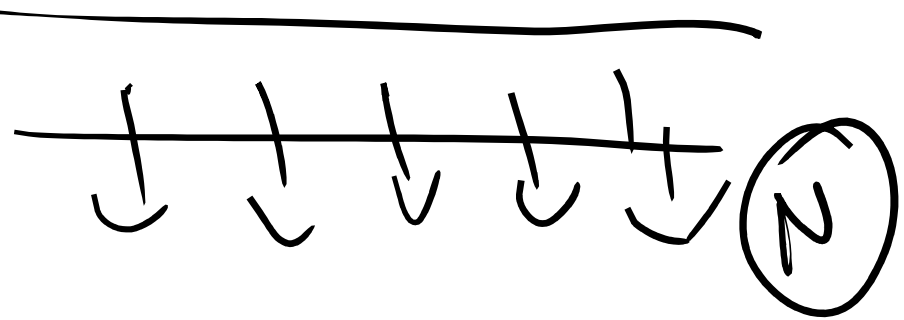
select a random no [1—N]

N = # of nodes.

transmit if rand = 1 else quiet

LAN.

N is not known:



what do do now?

1000 element : linear search

element : 999th . Binary Search

linear → 2 min.

worst = N. avg = N/2

BST : → worst : log N avg : log N

N not known. → 1. kam

optimal N is log N step.