RECAP : MIDSEMS

— Given Problem Description Draw ERD
  ° Take care of constraints (Total/Partial
    & Cardinality constraints)
    {state assumptions}
  ° Converting ER diagrams to tables.

— Given a schema/table & description of
  query (in english)

  ° Write SQL queries ⎱ Questions in
  ° Write RA queries ⎰ course website

— Functional Dependencies
  ° definition
  ° Armstrong axioms
  ° Closure (of attributes)
  ° Closure (of FD)
  ° Canonical covers
  ° Relation with keys.

— Given a set of tables & FD: Check if 3CNF/BCNF
  ° If not in Normal form, do decomposition.

— Decomposition
  ° Lossless join
  ° Dependency preservation.

"Text book exercises & previous years' problems should be enough"

Quick Review:

Transmission Basics:

- Spectrum
- Bandwidth
- Effective bandwidth, dB, SNR, Attenuation
- Nyquist (Sampling rate & Channel capacity)
- Shannon Capacity.

Media — Twisted Pair, OFC (types)

Direct Communication between 2 machines using a link

- What/Why synchronization
- If clocks are out of sync in $x\%$ and $y \rightarrow$ duration how many bits before you lose a bit
- Given y, p & size of one frame, what is the max difference between the clocks you can tolerate.
- Bit stuffing.
- Encodings - desirable properties
    (less overhead, less bandwidth)
    less more transitions.
- Given bit ~~str~~ streams $\rightarrow$ show encoding (vice versa)
- Given bit stream & encoding how many transitions occur
- ASK, FSK, PSK/DPSK $\rightarrow$ def with diagram (only)

- **Error Detection**
  - Parity, CRC, Checksum,

    workout examples:

  - What errors CRC/Checksum can handle?
    [No need for exam]

    ① Given bit stream generate CRC/Checksum
    ② Given CRC scheme, bit stream received,
    see if it is correct.

- **Flow Control** :

  - **Stop & Wait** .
    (Practise with non-neglegible ack size,
    processing delays at receive, separators
    with specific delay in between, e.t.c)

  - **ARQ**
    Practice some scenarios
    (pro what if error rate — 0.)
    what if frame gets lost with probability $\frac{1}{2}$

  - Window size —— what & why

- **Medium Sharing** :

    FDM — ~~given bandw~~ given x signals, each
    with given bandwidth requirements
    & given guardband size what is
    the bandwidth required?

TDM — Given no. of senders with data rate, given frame ~~size~~ format, what is the min data rate to be supported.

CSMA — basic def.
— If $p = 0.5$ in p-persistent CSMA, what is the prob. that atleast one among n-senders ~~such that~~ successfully transmit

CSMA/CD — Slot time def.
- Minimum length of frame computation $\left(\frac{2DV}{R}\right)$ (~~add processing delays~~, repeaters with delays & so on.)
- Given slot time & the fact that a station/node suffers 3 collisions before it transmitted successfully. What would be the min & max time it could had taken.

Hidden Terminal Problem : Why doesn't RTS/CTS solve it fully.
[• RTS from another node D comes
• CTS might get lost]

LAN:

① Why no flow control & error in Ethernet.
② keep buffer. at router.
if you do it (the acknowledgement etc.) anyway in the

- Minimuem how many switches ^{with y port.} will be required to connect x machine

- What if we say delay per switch (processing delay at switch) is y & total delay cannot be more than T?

— Practice packet switching ("last picture")
  [The pipeline problem]
  [Total frames last frame must be detected before the next frame is started.