COMP3203 Final Exam Summary

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Contents

1 Units

- unit chart

prefix	base 10	base 2
pico	10^{-12}	2^{-40}
nano	10^{-9}	2^{-30}
micro	10^{-6}	2^{-20}
milli	10^{-3}	2^{-10}
—	10^{0}	2^{0}
kilo	10^{3}	2^{10}
mega	10^{6}	2^{20}
giga	10^{9}	2^{30}
tera	10^{12}	2^{40}
peta	10^{15}	2^{50}

- $Hz \implies$ cycles per second
  - $GHz \implies 10^9$ cycles per second
  - etc.

2 Formulas

2.1 Frequency

$$f = \frac{1}{T}$$

2.2 Period

$$T = \frac{1}{f}$$

2.3 Wavelength

$$\lambda = vT$$
$$\lambda = \frac{v}{f}$$

2.4 Bandwidth

$$B = vT$$

2.5 Delay

$$D = D_P + D_T + D_Q$$

2.5.1 Propagation

$$D_P = \frac{\text{distance}}{\text{speed of light}}$$

2.5.2 Transmit

$$D_T = \frac{\text{packet size}}{\text{bandwidth}}$$

2.5.3 Queue

$$D_Q = \sum_{\text{nodes}} (\text{buffering} + \text{switching})$$

2.5.4 Round Trip Time

$$RTT = 2D$$

- how long does it take a packet to go **there and back**

2.6 Overhead

$$T_O = \frac{h}{p} \qquad \text{where } h = \text{overhead bits, } p = \text{message bits}$$

- **extra** over **what we want**

3 Error Checking

- VRC
- LRC
- **CRC**
  - this guy is usually used
  - use in tandem with ARQ
- checksum

4 ARQ

- automatic repeat request
- handle errors by requesting they be resent
- use in tandem with error detection
  - **CRC**
  - checksum
- main parts
  - **ACKS**
  - **NAKS**
  - **timers**

4.1 Sliding Window

- number frames sequentially
- window of either fixed or variable size
  - see TCP section

4.1.1 Go Back N

- go back to the beginning of the window and resend everything
- $w - i = N$

4.1.2 Selective Reject

- **only** resend the **damaged frame**
- need **sorting logic**
  - frames may be out of order

4.2 Stop and Wait

- like sliding window with a **window size** $= 1$

5 Multiaccess

- problem of **shared channels**
  - who gets a turn?
  - how do we make sure things get to the right place?
- point-to-point is easy (by contrast)

5.1 LANs

- local area network
- shared channel

5.1.1 Switched LANs

- *interconnection* by *transmission*
- **complex**
  - routing tables
  - hierarchical addressing

5.1.2 Broadcast LANs

- information *received by all*
- **simple**
  - no routing
  - flat addressing scheme
- MAC (medium access control)
- **used more often**

5.2 MAC Protocol

- Medium Access Control
- **dynamic**
- on demand
- must **minimize** collisions

MAC vs Static

MAC $\implies$ dynamic, on demand

Static $\implies$ separate dedicated channels

5.2.1 Centralized

- *one* **master node**
  - makes decisions for slaves nodes
- *dependent* on **master**
  - what if it fails?
  - less efficient

5.2.2 Distributed

- all nodes **equivalent**
- make a decision together
  - *distributed* fashion