# Tele303 Exam Review

1. Using the Shannon's Capacity Theorem, explain

(a) why a transmission channel of broader bandwidth is preferred?

(b) why a coding scheme of higher signal-to-noise ratio is preferred.

Shannon’s Capacity Theorem:

Capacity = Bandwidth \* Log2[1 + SNR]

So, greater bandwidth and SNR, the greater Capacity

For Nyquist’s formula:

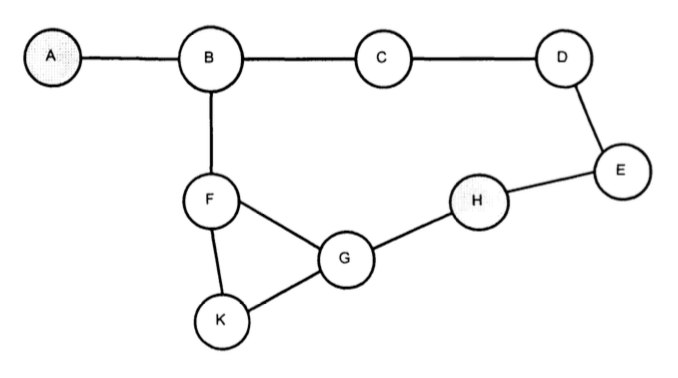
Capacity = 2 \* Bandwidth \* Log2[L], L is the level of signals

1. List four major factors that affect the TCP performance in mobile ad hoc networks(MANET).
2. Wireless transmission errors.
3. Data and ACK packets collision.
4. Multiple-hop routes on shared wireless mediums.
5. Route failure due to mobility
6. What are the similarities and differences between AODV (Ad hoc On-demand Distance Vector) and DSR (Dynamic Source Routing)?

Similarities: they are both reactive protocol, which means they determine route only if when needed, and it is source initiates route discovery.

Differences: DSR include source routes in packets header while AODV maintain route table at nodes.

Node A is to establish a route to reach Node H, using either DSR or AODV. Give three possible routes founded by DSR, and the most likely route founded by AODV.

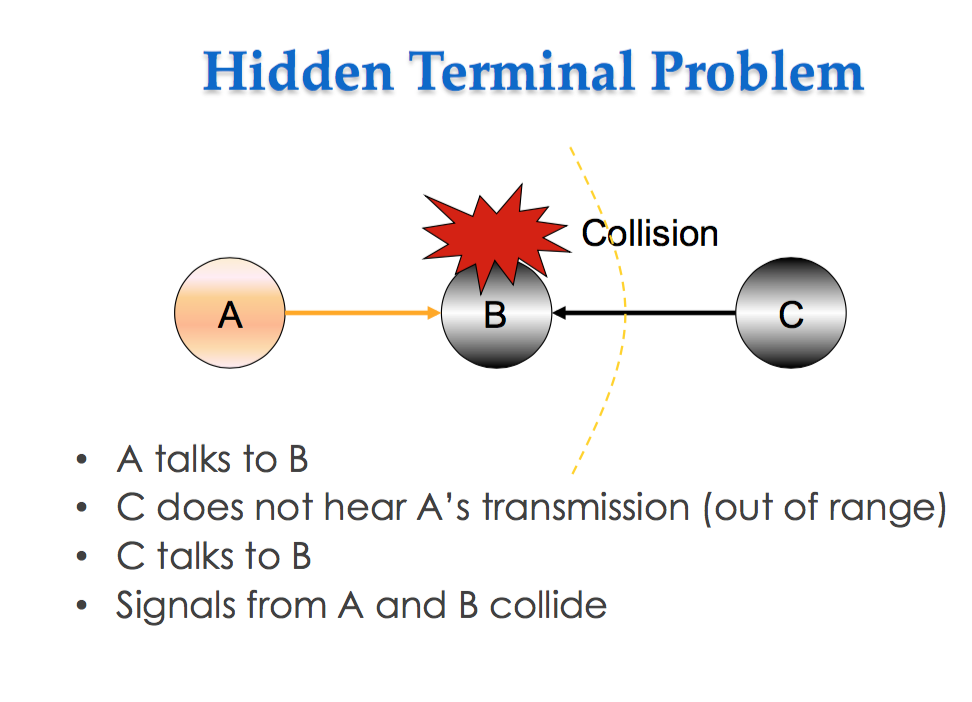


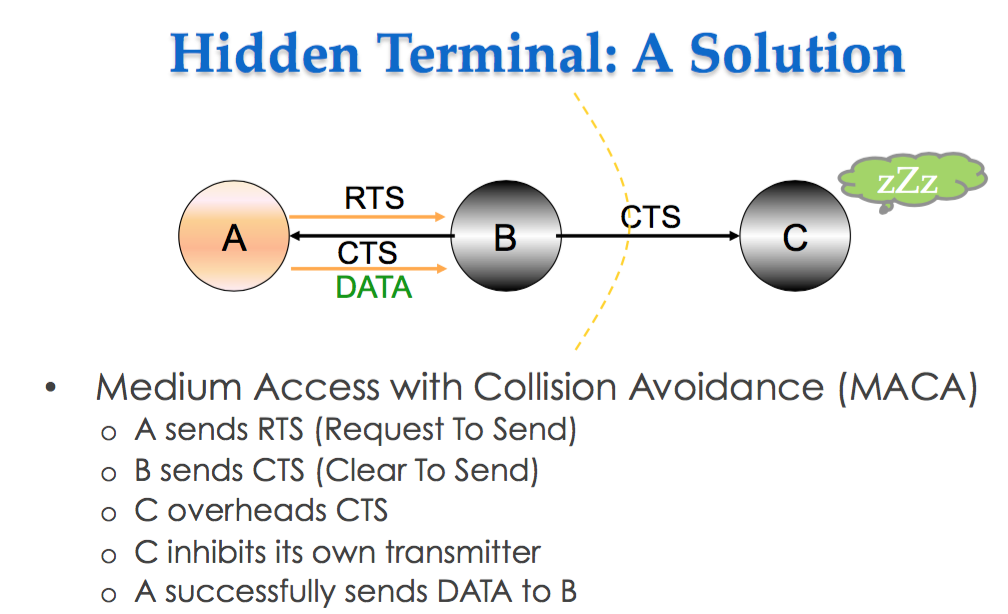
1. Describe and compare both Frequency Hopping Spread Spectrum and Direct Sequence Spread Spectrum.

For FHSS: Carrier frequency hopping according to chips; potential frequency collision; faster hardware required.

For DSSS: Signals multiples by chips; near-far effect (when interfering transmitter get much closer to the receiver than the intended transmitter); require adoptive power control.

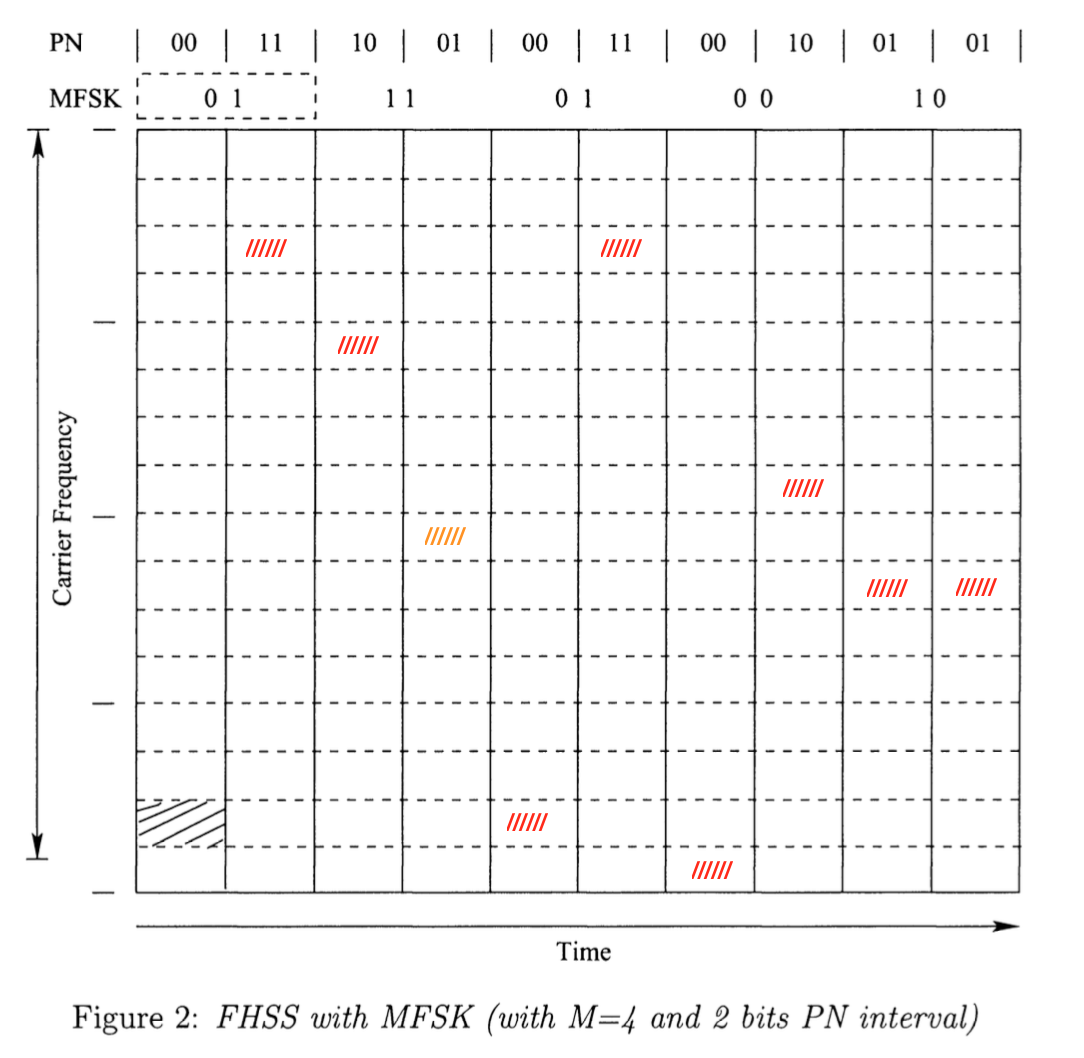
1. Give a description of the “hidden terminal problem” in a wireless LAN and explain how it can be solved. You should use diagrams that present a spatial arrangement of a few network transmitters to illustrate the problem.





1. The figure below shows a scheme with multiple frequency-shift keying input encoding and pseudonoise (PN) sequence for Frequency Hopping Spread Spectrum (FHSS).
2. Is this an example of slow frequency hopping or fast frequency hopping, and why?

It is a fast frequency hopping, because the frequency hopping split each signal element across different hopping frequency.

1. 
2. Name four type of impairments encounter by signal propagating in unguided media.
3. Attenuation and attenuation distortion
4. Noise
5. Atmospheric absorption
6. Multipath and refraction.
7. Briefly outline four common medium access control methods used in wireless communications.
8. Random access control (ALOHA)
9. Frequency division multiple access (FDMA)
10. Time division multiple access (TDMA)
11. Code division multiple access (CDMA)

The last three are all channelization protocol.