Computer Networks (CS30006)

Handouts

1. The time taken to transmit a packet from the host to the transmission medium is called Transmission delay.
2. The time taken by the last bit of the packet to reach the destination is called propagation delay.
3. The amount of time data waits in queue before being processed is called queueing delay.
4. Propagation time=Total distance/Speed
5. Transmission time= Data size/ Bandwidth
6. Noise is an unwanted signal which interferes with the original message signal and corrupts the parameters of the message signal.
7. Signal-to-Noise Ratio (SNR) is the ratio of the signal power to the noise power. The higher the value of SNR, the greater will be the quality of the received output.
8. Attenuation is a general term that refers to any reduction in the strength of a signal.
9. Attenuation=$10*\log_{10}(P_1/P_2)$
10. In Amplitude Shift keying, baud rate = bit rate.
11. In Frequency Shift keying, baud rate = bit rate.
12. In n-Phase Shift keying, baud rate = bit rate/$\log_2 n$.
13. In n-QAM, baud rate = bit rate/$\log_2 n$.
14. Line utilization = Transmission time/ Total time involved since data transmission to the receipt of acknowledgment.
15. Throughput for stop and wait =1/(1 + 2a) * Bandwidth
16. Throughput for Go Back N = N/(1 + 2a) * Bandwidth
17. Throughput for Selective Repeat = N/(1 + 2a) * Bandwidth
18. a = Propagation delay / Transmission delay
19. Throughput= Efficiency * Bandwidth

20. Sequence No. >= (Sender's Window Size) + (Receiver's Window Size)

21. Efficiency in TDM(polling) = $T_t / (T_{poll} + T_t)$

22. In CSMA/CD, $T_t >= 2*T_p$, Hence, min frame length = $2*T_p*B$

23. In CSMA/CD, Efficiency = 1/(1 + 6.44a)

24. Back-off Algorithm for CSMA/CD

Waiting time = back–off time

Let n = collision number or re-transmission serial number.

Then, Waiting time = K * T_{slot}

where K = [0, 2^n – 1]

25. For Token Ring, if N = No. of stations

Early Token Reinsertion: Efficiency = 1/(1 + a/N)

Delayed Token Reinsertion : Efficiency = 1/(1 + (N+1)a/N)

26. Pure Aloha Efficiency = 18.4 %

27. Slotted Aloha Efficiency = 36.8 %

28. Noiseless Channel : Nyquist Bit Rate

BitRate = 2 * Bandwidth * log2(L)

where,L is the number of signal levels used to represent data.

29. Noisy Channel : Shannon Capacity

Capacity = bandwidth * log2(1 + SNR)

where, SNR is the signal-to-noise ratio

30. Simplex Mode: the communication is unidirectional, as on a one-way street.Only one of the two devices on a link can transmit, the other can only receive.

31. Half-duplex Mode: each station can both transmit and receive, but not at the same time.

32. Full-duplex Mode: both stations can transmit and receive simultaneously.

33. Character/Byte Stuffing: Used when frames consist of character. If data contains ED then, byte is stuffed into data to differentiate it from ED.

34. Bit stuffing: Sender stuffs a bit to break the pattern i.e. here appends a 0 in data = 011101.

35. Line coding is the process of converting digital data to digital signals.

36. Block coding is referred to as mB/nB coding as it replaces each m-bit data group with an n-bit data group (where n>m). Thus, its adds extra bits (redundancy bits) which helps in synchronization at receiver's and sender's end and also providing some kind of error detecting capability. Eg: 4B/5B, 8B/10B, 64B/66B.

37. Line coding is the process of converting digital data to digital signals.