ITS323 – Quiz 6

Introduction to Data Communications, Semester 1, 2011

Prepared by Steven Gordon on 13 September 2011
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Question 1   [5 marks]

(a) Draw a LAN connecting [5 | 6 | 6 | 5] stations using a [star | ring | bus | hub-based star] topology. Label each station with a letter, e.g. A, B, C, . . . [3 marks]

Answer.   *See the lecture notes for examples of star, ring and bus based topologies. Note that the diagram of the hub-based star and star topology are the same.*

(b) If the LAN has instead [50 | 40 | 40 | 50] stations and uses a [bus | hub-based star | switch-based star | ring] topology, how many cables are needed in the LAN? [2 marks]

Answer.   *With a bus topology there is a single cable passing by all the stations. (Alternatively, a cable between each neighbouring pair except the end points, meaning 49 cables). With a star topology there is a cable from each station to the central device (hub or switch) meaning 40 cables. For a ring topology there are cables between each neighbouring pair meaning 50 cables.*

Question 2   [5 marks]

(a) Explain the rules for a [random access, distributed | round-robin, centralised | reservation-based, centralised | round-robin, distributed] MAC protocol. [3 marks]

Answer.

- *Random access, distributed: each station waits a random time before attempting to transmit; if another station transmits then wait and try again.*

- *Round-robin, centralised: one station informs other stations that they can transmit, in order*

- *Reservation-based, centralised: stations request opportunities to transmit to one station and that station allocates opportunities based upon requests*

- *Round-robin, distributed: each station transmits when they have a token; the token is passed to the next station in a ring after each transmission*

(b) Explain an advantage of the above MAC protocol compared to a [reservation-based, centralised | random access, distributed | round-robin, centralised | round-robin, centralised] MAC protcol. [2 marks]

Answer.

- *Random access, distributed vs reservation-based, centralised: Random access does not relay on central station; can efficiently handle varying amounts of traffic to send from stations*

- *Round-robin, centralised vs random access, distributed: Round-robin is more efficient if all nodes have data to send; no collisions*

- *Reservation-based, centralised vs round-robin, centralised: Reservation-based can give priority to selected stations*

- *Round-robin, distributed vs round-robin, centralised: Distributed does not rely on central station*