106學年度第1學期資訊管理研究所博士班資格考

科目:高等企業資料通訊與網路

1. How does a load balancing switch work? (9%)
2. Draw a diagram of packet switched service, and describe packet switching concepts. (9%)
3. Discuss wireless network security. What are some of the critical problems, what are some of the defenses against these problems? List five potential weaknesses in security and five potential solutions to these perceived weaknesses. Define and describe SSID, WEP, EAP, WPA. (15%)
4. Please explain each layer in OSI model for each layer, from the bottom to the top layer. Then please explain important functions of these layers in detail (7 %)
5. A network has a protocol stack with L layers. A message that is transmitted on the network comprises the application data (payload) and a header for each of the L layers. The length of the application payload (data) is A bytes, and the length of each header is H bytes. ***Please assume that the top layer does not append a header.***
   1. Please find the proportion (fraction) of a message that constitute the application payload as a function of A, H, and L. (2 %)
   2. What can you conclude from part a? (2 %)
6. Assuming we have the following four CDMA chip sequences assigned as follows:

A = (-1, -1, -1, +1, +1, -1, +1, +1)

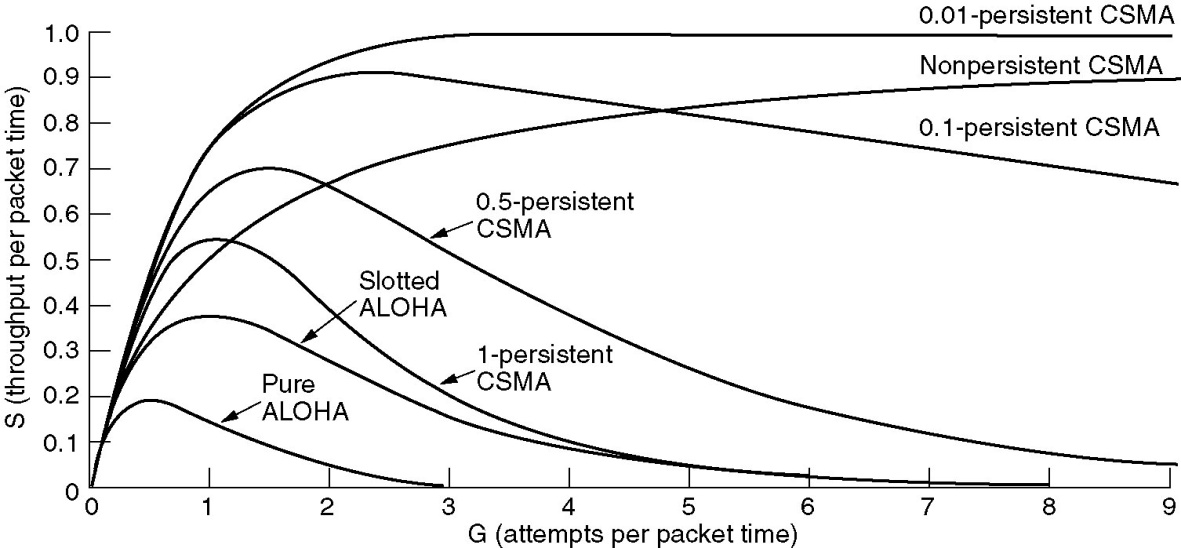
B = (-1, -1, +1, -1, +1, +1, +1, -1)

C = (-1, +1, -1, +1, +1, +1, -1, -1)

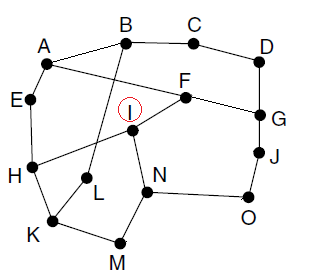
D = (-1, +1, -1, -1, -1, -1, +1, -1)

Please show that these chip sequences are valid. (8 %)

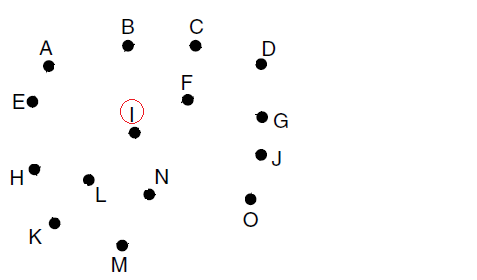
1. Please compare the “Go Back n protocol” and the “Selective Repeat protocol”. (2 %)
2. Given that the range of sequence number is 0 ... 127, determine the maximum window size for **both receiver and sender** for:
   * 1. Go Back n (2 %)
     2. Selective Repeat (2 %)
3. Consider the following graph

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1. What can this graph tell you about 0.01-persisnt CSMA versus 1-persistent CSMA? (2 %)
2. What can this graph tell you about the Slotted ALOHA versus Pure ALOHA? (2 %)
3. Consider the following subnet.



Please build the sink tree (spanning tree), starting from router I. Please be aware that you need to show how you derive your final sink tree (e.g., show me another tree with the steps on it, so I can know how you build your final sink tree). (4 %)



1. Draw the RZ, NRZ-I, Manchester, and Differential Manchester signals for the bit stream 011011.(11%)
2. Please first describe how the Go-back-n protocol works and then for each possible daemon (you need to list at least three), how does the protocol solve it?. Finally, suppose that the window size change to degenerates to 1, how is the above protocol comes? And what if the size inflates to infinite? (11%)
3. Consider next first figure about the process of email from [gates@microsoft.com](mailto:gates@microsoft.com) to Chris. Please describe how the email works under this scenario. The second figure shows the user accesses the web page in the MIT web site. Please describe how the web accessing works under this scenario. Please list the possible daemons and their solutions during their operations. (11%)

