

UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2000/2001

September/October 2000

CSI504 - Computer Networks

Duration : [3 hours]

INSTRUCTION TO CANDIDATE:

- Please ensure that this examination paper contains **TEN** questions in **THREE** printed pages before you start the examination.
 - Answer **ALL** questions.
 - You can choose to answer either in Bahasa Malaysia or English.
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ENGLISH VERSION OF THE QUESTION PAPER

1. We have two important network architectures, the OSI reference model and the TCP/IP reference model.
 - (a) Describe the two models.
 - (b) Explain the differences between the two models.

(10 marks)

2. One of the problems to be solved in a link layer prior to establishing communication between two devices is the contention, which is expressed, in the following questions. What happens if both of the devices try to transmit at the same time? Does one device always win? Which one? Is there some rules to determine the behavior of devices?

Describe the techniques used to solve the above listed problems on:

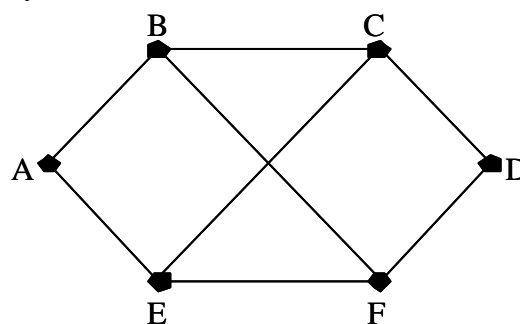
- (a) A Token ring link
- (b) An Ethernet link

(10 marks)

3. Explain the difference between *repeater*, *bridge*, *router* and *gateway*.

(10 marks)

4. Consider the subnet of the figure below. Distance vector routing is used, and the following vectors have just come in to router C: from B (5,0,8,12,6,2); from D: (16,12,6,0,9,10); from E (7,6,3,9,0,4). The measured delays to B, D, and E, are 6,3, and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the expected delay.



(10 marks)

5. When transferring a file between two computers, (at least) two acknowledgement strategies are possible. In the first one, the file is chopped up into packets, which are individually acknowledged by the receiver, but the file transfer as a whole is not acknowledged. In the second one, the packets are not acknowledged individually, but the entire file is acknowledged when it arrives. Discuss these two approaches.

(10 marks)

6. One issue of network layer design is the service provided to the transport layer. The discussion centers on the question of whether the network layer should provide connection-oriented service or connectionless service.
- (a) What is the principle difference between connectionless communication and connection-oriented communication?
 - (b) Give two example applications for which connection-oriented service is appropriate, and two example applications for which connectionless service is best.
- (10 marks)
7. Imagine that a two-way handshake rather than a three-way handshake were used to set up connections. In other words, the third message was not required. Are deadlocks now possible? Give an example or show that none exist.
- (10 marks)
8. An organization decides to implement multimedia applications on a LAN having 200 users. One user can require a maximum data rate of up to 500 Kbps. The speed of the LAN is 10 Mbps, and it is estimated that as many as 50 users will be using multimedia applications at the same time. Explain possible limitations of the LAN and suggest a LAN configuration that will support the applications on the network.
- (10 marks)
9. Imagine that someone in the Computer School at USM has just written a new program that he wants to distribute by FTP. He puts the program in the FTP directory **ftp/pub/free/newprog.c**.
- (a) What is the URL for this program likely to be?
 - (b) Describe what procedures are executed on the Internet when a user works with FTP.
- (10 marks)
10. E-mail systems differ in the manner in which multiple recipients are handled. In some systems, the originating user agent or message transfer agent makes all necessary copies and these are sent out independently. An alternative approach is to determine the route for each destination first. Then a single message is sent out on a common portion of the route and copies are only made when the routes diverge; this process is referred to as mail-bagging. Discuss the relative advantages and disadvantages of both methods.
- (10 marks)