



ECX 5235 – Operating System

Final Examination – 2005 / 2006

(Closed Book Type)

Date : Thursday, 27th of April 2006

Time : 09:30 – 12:30

INSTRUCTIONS TO CANDIDATES

Answer any five questions. All questions carry equal mark.

1. (a) Compare in point form the first memory allocation scheme against the multi-user memory management systems. [5 marks]
- (b) Write an algorithm to load a job in a fixed partition. State all of your assumptions and include comments where necessary. [15 marks]
2. (a) What is the difference between the job scheduler and the process scheduler? [2 marks]
- (b) Briefly describe the functions of the Process Control Blocks. [8 marks]
- (c) Consider following set of processes given in table below, with the length of the CPU-burst time given in milliseconds.

Job	Arrival Time	CPU-Burst Time	Priority
A	0	5	6
B	0	8	1
C	1	4	4
D	1	3	5
E	2	7	3
F	4	2	7
G	6	1	2

A smaller priority number implies a higher priority. Draw four Gantt charts that illustrate the execution of these processes using First Come First Served, Shortest Job Next, a Non-preemptive Priority, and Round Robin scheduling. Choose proper quantum size for Round Robin scheduling and clearly state your assumptions. [10 marks]

3. (a) Consider the scenario given in table below, where "P" indicates a process and "R" indicated a resource.

Time	Action
1	P2 requests and is allocated R2
2	P4 requests and is allocated R4
3	P2 requests and is allocated R1
4	P3 requests R1
5	P1 requests and is allocated R3
6	P4 requests R3
7	P2 releases R1, which is allocated to P3
8	P3 requests R3
9	P1 releases R3, which is allocated to P4
12	P4 releases R3, which is allocated to P3

Use Holt's deadlocks modeling method to analyze the above scenario. Is there a deadlock in the system above? [10 marks]

(b) Consider the situation given above in 3.(a). Name the situations when the system was in critical condition and indicate what kind of action occurring next in the system could have created a deadlock situation. [10 marks]

4. (a) The job of the I/O channel in an I/O subsystem is to keep up with the I/O requests from the CPU and pass them down the line to the appropriate control unit, to control the transmission of data between main memory and the control unit. State what kind of information is passed from the CPU to the I/O channel at the start of an I/O command? [4 marks]

(b) The interrupt vector for a mouse device for x86 microprocessor under DOS is 33. Write a function using C program code to display mouse cursor on screen at position (10, 12) ("position" function). Indicate which C libraries you need to call. [16 marks]

5. (a) What are the four tasks performed by the file manager? [4 marks]

To answer next set of questions of this topic, please use the special page attached at the end of this question paper.

(b) Consider the storage allocation map given at the end of this question paper. What is the storage allocation scheme used? State all your assumptions. [2 marks]

(c) The file manager has just added fourth record to the fifth file (File 5 / Record 4). Meanwhile, the user has created a new file (File 9), which consist of three records (Record 1, Record 2, and Record 3). Indicate where the file manager would store these records using the storage map provided on the last page. [7 marks]

(d) Provide the appropriate directory entry of the file manager for determined storage allocation scheme for the complete storage map, including the data entered in above 5.(c). (The table for the directory is printed on the back side of the last page of this question paper. Please use it to answer this question. Please note that there might be extra rows and columns in it. Use only the amount you need.) [7 marks]

6. (a) Consider network model shown in Figure 1.

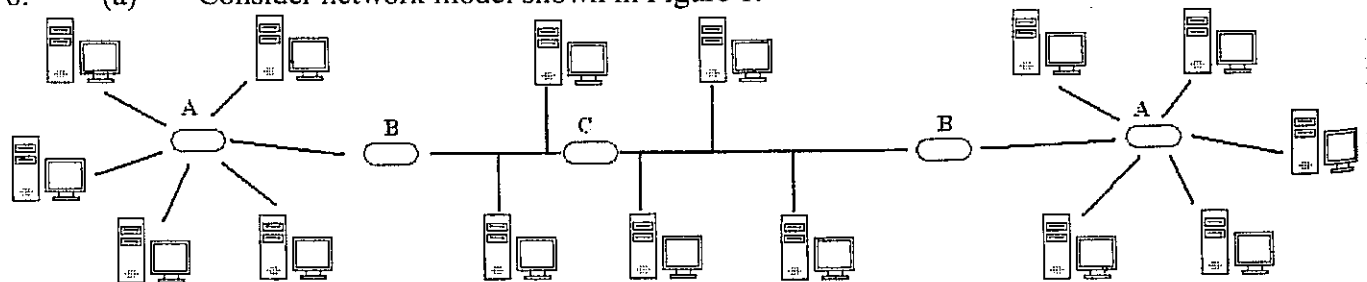


Figure 1. A network model.

What are the connecting devices shown by A, B, and C? [6 marks]

(b) Describe the working of the connecting device indicated as A in Figure 1. [7 marks]

(c) Describe how sites are addressed. [7 marks]

deadlock
0 marks]
n was in
uld have
0 marks]
from the
trol the
kind of
nd?
marks]
Write a
10, 12)
marks]
marks]
of this
is the
marks]
rd 4).
ecord
ecords
arks]
orage
5.(c).
estion
s and
arks]
ks]
ks]
ks]

7.

- (a) Assume you are asked to network OPD division at Kandy Hospital. The doctors would like to provide each patient with medical record to keep track of patient's illnesses and be able to predict in time the kind of illnesses a patient might develop. Also this system should warn the doctors of any possible epidemics in the area.
All medical records will be kept on a server and each doctor's office will be provided with a computer. This way the patient has only to provide his NIC and doctors will be able to get all his medical records immediately online.
Evaluate this system from the point of view of security. What kind of information should be accessed by authorized personnel only and why? Please write your answers in a point form (very briefly). [7 marks]
- (b) What kind of security breaches possible in such system? Suggest counter measures. [7 marks]
- (c) What ethic violations might take place in this system and by whom? [6 marks]