THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ECX 5235 – Operating System

Final Examination – 2007 / 2008 *(Closed Book Type)*

Date : Monday, 5th of May, 2008 Time : 09:30 – 12:30

INSTRUCTIONS TO CANDIDATES
Answer any five questions. All questions carry equal mark.

1. (a) What hardware items were needed to manage a program in the memory? Briefly state how those hardware items were used. [5 marks]
   (b) Write an algorithm to deallocate memory blocks. State all of your assumptions and include comments were necessary. [15 marks]

2. (a) What are the functions of the middle-level scheduler in processor management? [4 marks]
   (b) What intrinsic characteristics of the job do processor manager uses to determine priorities of a job? [6 marks]
   (c) Briefly explain how multiple-level queues scheduling algorithm works. [10 marks]

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

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

Use Holt's deadlocks modeling method to analyze the above scenario. Is there a deadlock in the system above? [12 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. [8 marks]

4. (a) Name basic functions of device manager. [10 marks]

(b) Briefly explain what does the `asctime` function, which is found in the `time.h` header file do? [10 marks]

5. (a) What are the major entries in the volume descriptor created by file manager for each volume? Briefly describe them. [5 marks]

(b) Briefly state the advantages and disadvantages of sequential record organization. [5 marks]

(c) Consider your knowledge of the file organization and advantages and disadvantages of the methods traditionally used. Explain briefly what method you would propose for file organization on a typical ECL computer. State all your assumptions and reasons. [10 marks]

6. (a) Consider the table of processes and the four Gantt charts given below describing process scheduling by First Come First Served, Shortest Job Next, Non-preemptive Priority and Round Robin scheduling for seven processes. Time is 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

[6 marks]

(b) Which scheduling algorithm gives the best turnaround time? [8 marks]

(c) Which algorithm given in above 2.(c) gives the worst waiting time? [8 marks]

7. (a) Consider the OUSL Elementary Computer Laboratories (ECLs) spread across the country. If all the computers in the ECLs are connected via LAN and the ECLs are connected with one another via Internet briefly discuss the characteristics of the operating system you would recommend to install on the servers at every ECL. Explain your answer and state all your assumptions. [10 marks]

(b) What are the characteristics of the operating system you would recommend to install on the user computers of the ECLs described in the 7.(a) above. Again explain your answer and state all your assumptions. [10 marks]

8. (a) Compare the security protection for the following three computer configurations: Single computer, Network connected, and Internet connected. [5 marks]

(b) Consider locally networked computer laboratory at a large school. (Note: it is not connected to the internet.) What kind of security problems can there be? List the problems and state all your assumptions. [10 marks]

(c) Suggest solutions to the security problems listed in the 8.(b) above. Briefly explain there work. [5 marks]