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

ECX 5235 – Operating Systems

Final Examination – 2010 / 2011 *(Closed Book Type)*
Date: 05th, April 2011 **Time: 1400 – 1700 hrs**

<INSTRUCTIONS>

There are **two** sections; **SECTION A** and **SECTION B**.
SECTION A has 1 general question; **Q01** is **mandatory**.
SECTION B has 4 questions; **Q02** to **Q05**. Answer to **3** selected questions on your preference.

SECTION A

[Q01.]
(I.) The operation of a CPU can be described in terms of a simple loop, where each time through the loop one instruction is executed.

Describe the basic process of instruction execution. Description is sufficient in point form with a graphical illustration. *(10 Marks)*

(II.) Traps and interrupts are two events that disrupt the normal sequence of instructions executed by the CPU.

a.) Define trap with 2 examples of trap condition. *(02 Marks)*

b.) Define interrupt and briefly explain the process of executing an interrupt service routine with a block diagram. *(06 Marks)*

c.) What characteristic is common to traps, interrupts, supervisor calls, and subroutine calls? *(02 Marks)*

(III.) What are the main tasks of an operating system on following four areas?
d.) Processor Management
e.) Memory Management
f.) File Management
g.) Device Management
*(02*4 Marks)*

(IV.) The kernel is the essential center of a computer operating system.

h.) List 3 main tasks of kernel. *(06 Marks)*

i.) The system BIOS is what starts the computer running when you turn it on. List the steps that a typical boot sequence involves. *(06 Marks)*

SECTION B

Answer to 3 questions.

[Q02]

(I) The files of a computer system is a major resource which is used by the users as well as by the operating system.
List 5 facilities that must be provided by a good file system. ***(05 Marks)***

(II) A random access file with contiguous allocation take less time to read/write then a random access file with a non contiguous allocation using block chaining. Explain. ***(10 Marks)***

(II) A file system specifies only the operation read, write, and execute. The types of users are owner, group and the world. What is the size of the protection mask for this system? Justify your answer. ***(05 Marks)***

[Q03]

(I) Write short notes about the following memory allocation schemes:
a.) Single User Contiguous Scheme
b.) Fixed partitions
c.) Dynamic Partitions

(3*3 Marks)

(II) Five processes given in the below table are executed in the logical stack of 1 MB of system memory as follows:
Start address of Memory stack 0000 0000
End address of Memory stack 000F 9FFF

Process	Size	Time(s)
P1	250KB	0.5
P2	300KB	5.0
P3	125KB	0.5
P4	600KB	3.0
P5	780KB	1.0

Table 1: Sequential process list

Write a pseudo-code to illustrate the execution of processes by considering **Single User Contiguous Scheme** ***(11 Marks)***

[Q04]

(I) List 2 objectives of processor scheduling. ***(02 Marks)***

(II) Briefly describe 2 different types of process scheduling methods. ***(02 Marks)***

(III) Draw a chart to illustrate the execution of processes listed in the *Table 2* given below for following two process scheduling methods.

a.) Shortest Job First

b.) Shortest Remaining Time

NOTE: Please state assumptions clearly if any. ***(04 Marks)***

Process	Arrival Time	Process Time
P1	0.000	4
P2	2.001	7
P3	3.001	2
P4	3.002	2

Table2: Process scheduling data

(IV) At each scheduling method calculate

a.) the average turnaround time

b.) the wait time

c.) the average throughput

(2*3 Marks)

(V) Briefly explain why non pre-emptive scheduling can become 'unfair' to some processes. ***(04 Marks)***

(VI) What are the functions of the middle-level scheduler in processor management? ***(02 Marks)***

[Q05]

(I) What is the most significant limitation of the Network-Operating System? Briefly explain. ***(06 Marks)***

(II) How does object based Distributed Operating System view the computer system? Briefly explain. ***(06 Marks)***

(III) Write a pseudo-code program to illustrate the prevention of circular waits in Distributed Operating System? ***(08 Marks)***