155

B.Sc. Engg./HD CSE (5th semester) (59) 26 February 2012 (Morning)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2011-2012**

DURATION: 1 Hour 30 Minutes **FULL MARKS: 75**

CSE 4501: Operating Systems

Programmable calculators are not allowed. Do not write anything on the question paper.

There are **4 (four)** questions. Answer any **3 (three)** of them.

Figures in the right margin indicate marks.

---

1. a) What is an operating system? List the tasks of an operating system as the manager of dumb hardware. 10

   b) What is user mode and kernel mode? How and when the transition occurs between the two modes? 5

   c) Briefly discuss file protection mechanism of a typical operating system. 5

   d) Suppose you are to design a smart home environment which includes sensors, actuators, middlewares, and servers. Identify scenarios where the following will be used: 5
      i. Client-Server architecture
      ii. Asynchornous message passing
      iii. Real-time OS

2. a) Briefly discuss the minix3 process tree. 7

   b) What is Inter Process Communication (IPC)? Describe the common techniques to perform IPC. 10

   c) What is context-switching? Where and when context-switching is done inside the OS? 3

   d) Discuss how an operating system can predict the next burst time of a process. 5

3. a) What is a ready queue? How ready queue is implemented in Minix3? 5+4
If only two levels of ready queues are maintained, what should be a good algorithm for scheduling interactive and batch jobs?

b) Draw the Gantt chart and find the average waiting time for *SJF(pre-emptive), RR, FCFS* Scheduling for the following chart: 15+1

Process	Burst Time	Arrival Time
P1	5	0
P2	6	3
P3	1	3
P4	8	5
P5	7	7

Consider *quantum time*=3 unit.

Again Consider quantum time =2 unit and calculate the average waiting time for the above three algorithms.

Which algorithm may cause starvation?

4. a) Discuss the two process related system calls. 6

b) What is an Interrupt? How interrupts are handled in operating system? 2+4+3
Is it possible to design an operating system without interrupt? Discuss.

c) How does an operating system protect the memory of each process? 5

d) What is a micro kernel? Can we consider minix as a micro kernel? 5