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

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2012-2013**

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.

Question **1(One)** is **mandatory**. Answer any **2 (two)** questions from the rest of the **3(three).**

Figures in the right margin indicate marks.

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1. a) Suppose, the operating system maintains two different ready queues for Interactive and Batch processes. Interactive ready queue schedules in RR manner whereas the batch queue follows FCFS policy. To balance between the queues, 80% of the time is given to the RR queue and 20% of the time is given to the FCFS queue. Draw the Gantt chart and calculate average waiting time for each of the queue. 15
   Assume *quantum time* =2

   A set of processes have arrived at the CPU according to the chart given in Table 1:

   Table 1: Process Burst Time and Type

Process	Burst Time	Type (**I**nteractive/**B**atch)
P1	5	I
P2	16	B
P3	3	I
P4	8	I
P5	17	B

   b) For the process chart given in Table 1 draw the Gantt chart, calculate average waiting time and average turnaround time for the SJF scheduling algorithm. 10

2. a) Discuss on the process architecture of Minix3. 5
   b) What is a thread? Why is thread better than process? 3+5
   c) Discuss on Synchronous and Asynchronous I/O. 5
   d) How does the operating system protect the memory of the individual process? 7

3 a) What is a *Kernel* in an operating system? What are the things that typically make a kernel? 5+5
   b) How is *fork*() and *exec*() used together for process creation? 5
   c) 'Operating system is event driven' - Explain. 5
   d) Write down the differences between multiprocessor systems and distributed systems. 5

4. a) What is a PCB? Who maintains the PCB- Kernel or the process itself? 3
   b) Discuss on process states. 5
   c) How process scheduling has become an optimization problem? 5
   d) What is the purpose of command line interpreter? Why is it usually separate from the kernel? Is it possible for the user to develop a new command line interpreter? If possible, how? 8
   e) Given the code snippet below in Figure 1, what is the output of the line with comment 'Line A' 4

```
#include <sys/types.h>
#include <stdio.h>
#include <unistd.h>
int  main(){
    pid_t pid;
    pid=fork();
    if (pid==0){/*child process*/
        value+=10;
   }else if (pid >0){/*parent process*/
        wait(NULL);
         printf("parent:    value=%d",value);
/*Line A*/
        exit(0);
   }
}
return 0;
```

Figure 1: A process exercise program