SET: A

EAST WEST UNIVERSITY BANGLADESH

Department of Computer Science & Engineering

CSE325: Operating System (1, 2)

Term I Examination **Spring 2016**

Total Marks: 30 Instructor: Dr. Md. Shamim Akhter Time: 90 minutes

1. (4 + 6)

   a) Most hardware provides user mode and kernel mode. Applications are run in user mode, while the OS runs in kernel mode. The tricky part is **transitioning from one mode to the other**, which **is done via system call**. What are the tasks system do during the system call?

   b) Assume a uniprocessor system has three processes (P1, P2, and P3) and P1 needs four (4), P2 needs three (3), and P3 needs seven (7) seconds CPU time. Each of which needs constant amount of input waiting time (I -seconds) and output waiting time (O -seconds). How long will it take to complete the processes in

      i. **Batch processing system?**

      ii. **Multiprogrammed processing system?**

      iii. **Time-shared (time quantum= 3 seconds) processing system?**

2. (4 + 6)

   a) A process has two threads and they can run in parallel and finish faster than if they had run sequentially. There is a one-to-one mapping between user-level threads and kernel-level threads and allows one or more threads within a process to issue blocking system calls - while other threads continue to run.

      Suppose - two threads (T1, T2) and each of which needs ten (10) minutes of CPU time. In addition, T1 needs 50% I/O time wait (five (5) minutes). How long will it take to complete threads-

      i. **if they run sequentially @ uniprocessor system?**

      ii. **if they run parallel @ multiprocessor system?**

   b) When a process executes a **fork ()** system call, a duplicate process (i.e. the child process) is created. How does the code in the processes know which process is the parent and which is the child-since the code is identical in both parent and child processes? Explain, the difference between - child execution with & without **execlp()** call, and parent execution with & without **wait( )** call.

3. (5 + 5)

   a) What are the two methods ensure **the bridging between two processes** (similar/dissimilar ancestries) or Inter Process Communication (IPC)? **Disable interrupts** is a common method for the OS to guarantee mutual exclusion on a uniprocessor system. Is it appropriate for a **shared memory multiprocessor system**? Why or why not?

   b) What are the disadvantages of **lock variable method** to ensure mutual exclusion? How are the problems recovered by **Test-and-Set Lock (TSL) method**? Explain- with TSL codes.