EAST WEST UNIVERSITY BANGLADESH
Department of Computer Science & Engineering

CSE325: Operating System

Make up Exam FALL **2016**

Total Marks: 20 Instructor: Dr. Md. Shamim Akhter Time: 60 min

1. When a process executes a **fork ()** system call, a duplicate process (i.e. the child process) is created. Explain the difference between - child execution with & without **execlp()** call, and parent execution with & without **wait( )** call.

```
pid_t pid;
pid = fork();
if ( pid == 0 ) {
    execlp("ps", "ps", "-ax", 0);
}
else if (pid < 0) {
    printf("fork failed.\n");
    exit(1);
}
else {
    wait(NULL);
}
exit(0);
```

2. A process has two threads (T1, T2) and each of which needs twenty (20) minutes of CPU time. T1 execution (CPU time) includes 10 min Input and 5 min Output waiting time. How long will it take to complete threads:
   a) if they run @ uniprocessor system and T2 schedules before T1?
   b) if they run @ uniprocessor system and T1 schedules before T2?
   c) if they run @ multiprocessor system?

3. Assume that the system resources are being used except for the processor and memory. Now consider the following events and identify which state (after the event) each process is in:
   i. P1 executes a command to read from disk.
   ii. P5's time interrupt occurs.
   iii. P7 executes a command to write to disk.
   iv. An interrupt occurs from disk P1's read is complete.
   v. P9 terminates.
   vi. An interrupt occurs from disk P7's write is complete.

4. Suppose the hypothetical processor has three I/O instructions: LOAD, ADD and STORE.
   16-bit instruction format is as follows:

Opcode (4-bit)	Address (12-bits)

0101(5) Opcode means Load AC from I/O and the 12-bit address identifies a particular external device.
0011(3) Opcode means Add to AC from memory and the 12-bit address identifies memory location.
0111(7) Opcode means Store AC to I/O and the 12-bit address identifies a particular external device.

Assume that the next value retrieved from device 5 is 3 and that location 952 contains a value of 4.

Execute the following program and find the values of PC, AC and IR at each step.

400	5 0 0 5	PC=400 AC=? IR=?
401	3 9 5 2	PC=? AC=? IR=?
302	7 0 0 6	PC=? AC=? IR=?