OPERATING SYSTEMS – CS 320

Due Date: Thursday, December 4, 2014

Assignment # 1

100 marks

Question 1 [10]

Compare and differentiate process creation mechanism in Unix and Windows operating systems.

Question 2 [10]

a) Write down code for orphan and Zombie?

b) What will be the output of following code? Also draw process tree.

```
int main (int argc,char * argv[])
{
        Int n=4,i=0;
        for(i=0;i<n;i++){
        fork();
        printf("pucit in loop"); }
        printf("pucit outside the loop");
}
```

Question 3 [20]

Many scheduling algorithms are parameterized. For instance, the round-robin algorithm requires a parameter to indicate the **time quantum**. The multi-level feedback (MLF) scheduling algorithm requires parameters to define the **number of queues**, the **scheduling algorithm for each queue**, and the **criteria to move processes between queues** (and perhaps others. . .). Hence, each of these algorithms represents a set of algorithms (e.g., the set of round-robin algorithms with different quantum sizes). Further, one set of algorithms may *simulate* another (e.g., round-robin with infinite quantum duration is the same as first-come, first-served (FCFS)). For each of the following pairs of algorithms, answer the following questions:

1. **Priority scheduling and shortest job first (SJF)**
   a) State the parameters and behavior of priority scheduling
   b) State the parameters and behavior of SJF
   c) Can SJF simulate priority scheduling for all possible parameters of priority scheduling? (How or why not: State how to set SJF scheduling parameters as a function of priority scheduling parameters or explain why this cannot be done.)
   d) Can priority scheduling simulate SJF for all possible parameters of SJF?(How or why not?)
2. **Multilevel feedback queues and first come first served (FCFS)**
   a) State the parameters and behavior of multi-level feedback queues
   b) State the parameters and behavior of FCFS
   c) Can FCFS simulate multi-level feedback for all possible parameters of multi-level feedback?
   d) Can multi-level feedback scheduling simulate FCFS for all possible parameters of FCFS?(How or why not?)
3. **Priority scheduling and first come first served (FCFS)**
   a) Can FCFS simulate priority scheduling for all possible parameters of priority scheduling? (How or why not?)
   b) Can priority scheduling simulate FCFS for all possible parameters of FCFS? (How or why not?)
4. **Round-robin and shortest job first (SJF)**
   a) State the parameters and behavior of round robin
   b) Can round robin simulate SJF for all possible parameters of SJF? (How or why not?)
   c) Can SJF simulate round robin for all possible parameters of round robin? (How or why not?)

Question 4 [10]

Draw the graph and compute waiting time and turnaround time for the following processes using **FCFS**, **SJF** and **SRTF**.

Process	Arrival Time	Burst Time
P0	0	7
P1	3	9
P2	6	5
P3	8	12
P4	10	6
P5	11	5
P6	12	3

Question 6

Draw the graph and compute turnaround time for the following processes using **RR** &**VRR** Scheduling algorithm. Consider a time slice of 4 sec. Every even number process performs I/O after every 4 sec of its running life. I/O takes 8 seconds. [15]

Process	Arrival Time	Burst Time
P1	0	4
P2	1	5
P3	4	11
P4	5	9
P5	7	6
P6	10	10
P7	12	7
P8	14	5

Question 7

Schedule the following processes using RR and VRR. The processes P1, P2 and P3 have arrived at time units 0, 1 and 2 respectively. The number inside the parenthesis indicates the time units for CPU and I/O Bursts. Assume a time quantum of 4 time units. [15]

P1	CPU Burst (6)	I/O Burst (8)	CPU Burst (3)	I/O Burst (4)	CPU Burst (5)

P2	CPU Burst (7)	I/O Burst (5)	CPU Burst (2)

P3	CPU Burst (5)	I/O Burst (5)	CPU Burst (4)	I/O Burst (4)	CPU Burst (3)

Question 8

Draw the graph for the following processes using **MLFB** Queue Scheduling algorithm. [10]

Q1 - RR - 20 sec
Q2 - RR - 50 sec
Q3 - FCFS

Process	Arrival Time	Burst Time
P1	10	100
P2	50	120
P3	60	180
P4	65	110
P5	80	70

Question 9 [10]

Consider three processes P1, P2 and P3 arrived at time unit 0. The nice values for P1, P2 and P3 are 10, 15 and 20 respectively. Calculate the priority# for each process for the first six iterations using Unix system V scheduling.

Submission Instructions:

- **DONOT let any one copy your assignment. In case of a copy both students will be awarded a ZERO may be some negative marks as well.**
- You have to submit your assignment in **HAND written** form on plain A4 Sheets.
- Attach a cover sheet showing the assignment title, course and your personal information.
- Simply staple the papers of your assignments and hand over to CR of your class. Respective CRs should submit all the assignments to me in my office not later than 2:00 PM on Thursday, December 4, 2014.
- Late submissions will NOT be accepted.