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Department of Computer Science and Engineering
MIDTERM EXAMINATION Spring 2019
CSE321: Operating Systems

Total Marks: 60 **Time Allowed: 1 Hour**

[Answer ANY 3 Questions. Understanding the question is a part of the exam.]

1. a) What are differences between multiprogramming, multiprocessing and multitasking? [6]

b) What is PCB? Mention its attributes. What are the differences between short-term scheduler and long-term scheduler? [2+4]

c) Draw Gantt chart, avg. waiting time and number of context switch using Preemptive Priority scheduling algorithm. [low number will be the higher priority] [4+3+1]

Process	Arrival Time (s)	Burst Time(s)	Priority
P1	0	21	4
P2	8	18	5
P3	5	10	1
P4	8	23	3
P5	20	13	2

2. a) Draw the process state diagram. What is the difference between program and process? [3+2]

b) What OS's Do? What are the differences between single thread and multithreaded process? [2+3]

c) For Peterson's problem below conditions will applied. [10]

1. Each statement will take 2ms to complete.
2. For process P0: i=0,j=1; and for process P1: i=1,j=0.
3. Context switching will occur after 4ms.
4. In critical section area carried only 3 statements.
5. In remainder section area carried only 2 statements.

Information common to both processes:

```
turn=0;
flag[0]=FALSE;
flag[1]=FALSE;
```

Complete the following table:

Note: Must consider the above conditions and information.

Process P0	Process P1
i=0,j=1;	i=1,j=0;

3. a) What are the methods used for IPC? Explain those. [2+4]

b) Given the following table draw Gantt chart and calculate avg. waiting time, avg. turnaround time, avg. response time for round robin scheduling algorithm with time quantum 50. [5+9]

Process	Burst Time	Arrival Time
P1	120	0
P2	102	135
P3	65	200
P4	148	300

4. a) "Multilevel feedback queue prevents starvation" - how? [3]

b) What is critical section? What are the requirements for a solution to the critical section problem? Explain those in brief. [1+6]

c) Given the following table draw Gantt chart and calculate, waiting time, throughput for preemptive Shortest-Remaining-Job scheduling algorithm. [4+4+2]

Process	Arrival time(s)	Burst time(s)	Priority
P1	0	8	1
P2	3	6	1
P3	7	17	1
P4	9	3	1
P5	10	20	1
P6	13	3	1
P7	15	12	1
P8	20	7	1

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Department of Computer Science and Engineering

MIDTERM EXAMINATION Fall 2019

CSE321: Operating Systems

Total Marks: 40

Time Allowed: 1 Hour 20 minutes

[Answer all Questions. Understanding the question is a part of the exam.]

CO1 1. a) **Define** BIOS. **Explain** "Parallel System" and "Multiprogrammed System". [1+4]

b) **Explain** Dual mode hardware protection of Operating System. [3]

c) **Define** System Call. **Mention** two System call of an OS. [2]

CO2 2. a) **Draw** process state diagram for process scheduling. [2]

b) **Distinguish** between two IPC models with appropriate diagram. [4]

c) **Differentiate** between Long-Term and Short-Term scheduler. [4]

CO3 3. a) Consider the following set of processes with the length of the CPU-burst time given in milliseconds. **Draw** the Gantt Charts illustrating the execution of these processes using preemptive priority (a smaller number implies a higher priority) and RR (time quantum = 2 milliseconds) scheduling. **Find** average waiting for above scheduling algorithms and identify which algorithm is the best. [8]

Process	Burst Time	Arrival Time	Priority
P1	8-2=6-2 =4-2 =2	3	3
P2	6-2=4-2 =2	5	1
P3	3-2=2	18	4
P4	3-2=1	20	1
P5	5-2=3 =1	4	2

[2]

b) **Explain** Starvation with proper example.

CO5 4. a) **Explain** Race Condition. **Explain** how "Critical Section" concept helps to solve race condition. [2+2]

b) **Demonstrate** the following table using "Peterson's algorithm for two process". Must consider the below conditions and information for application.

- Each statement will take 3ms to complete
- For process 0: i=0, j=1; and for process 1: i=1, j=0
- Context switching will occur after 12ms
- In critical section area carried only 6 statements
- In remainder section area carried only 3 statement
- Information common to both processes: turn=0;
- flag[0]=FALSE; flag[1]=FALSE;

Process 0	Process 1
i = 0, j =1	i = 1, j =0

[6]