Practice Sheet for CSE 316: Operating Systems

Dear students, Solve and Practice the following questions and come up with your doubt. Practicing more will increase the learning.

MCQ

1. Which of the following is an example of a spooled device ?
A. The terminal used to input data for a program being executed.
B. The Secondary memory device in a virtual memory system.
C. A line printer used to print the output of a number of Jobs.
D. None of the Above.

2. The time taken to switch between user and kernel modes of execution be t1 while the time taken to switch between two processes be t2.
Which of the following is TRUE?
(A) t1 > t2
(B) t1 = t2
(C) t1 < t2
(D) nothing can be said about the relation between t1 and t2

3. A thread is usually defined as a "light weight process" because an operating system (OS) maintains smaller data structures for a thread than for a process. In relation to this, which of the following is TRUE?
A On per-thread basis, the OS maintains only CPU register state
B The OS does not maintain a separate stack for each thread
C On per-thread basis, the OS does not maintain virtual memory state
D On per-thread basis, the OS maintains only scheduling and accounting information

4. The following program consists of 3 concurrent processes and 3 binary semaphores.The semaphores are initialized as S0 = 1, S1 = 0, S2 = 0. How many times will process P0 print '0'?

Process P0	Process P1	Process P2

while (true) {
wait (S0);
print '0';
release (S1);
release (S2);
}
	wait (S1);
	release (S0);
		wait (S2)
		release (S0);

A. At least twice
B. Exactly twice
C. Exactly thrice
D. Exactly once

5. Which one of the following is FALSE?
(A) User level threads are not scheduled by the kernel.
(B) When a user level thread is blocked, all other threads of its process are blocked.
(C) Context switching between user level threads is faster than context switching between kernel level threads.

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(D) Kernel level threads cannot share the code segment

6. Which of the following does not interrupt a running process?

(A) A device
(B) Timer
(C) Scheduler process
(D) Power failure

7. The following two functions P1 and P2 that share a variable B with an initial value of 2 execute concurrently.

```
P1()
{
  C = B – 1;
  B = 2*C;
}
P2()
{
  D = 2 * B;
  B = D - 1;
}
```

The number of distinct values that B can possibly take after the execution is
(A) 3
(B) 2
(C) 5
(D) 4

8. An operating system implements a policy that requires a process to release all resources before making a request for another resource. Select the TRUE statement from the following:
(A) Both starvation and deadlock can occur
(B) Starvation can occur but deadlock cannot occur
(C) Starvation cannot occur but deadlock can occur
(D) Neither starvation nor deadlock can occur

9. Which of the following statements are true?
I. Shortest remaining time first scheduling may cause starvation
II. Preemptive scheduling may cause starvation
III. Round robin is better than FCFS in terms of response time
(A) I only
(B) I and III only
(C) II and III only
(D) I, II and III

10. When an interrupt occurs, an operating system
(A) ignores the interrupt
(B) always changes state of interrupted process to ‘blocked’ and schedules another process

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(C) always resumes execution of interrupted process after processing the interrupt
(D) may change the state of interrupted process to 'blocked'and schedule another process

Solve the following questions

1. Consider the following set of processes, with the arrival times and the CPU-burst times given in milliseconds

Process	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	2	3
P4	4	1

What is the average turnaround time for these processes with the preemptive shortest remaining processing time first (SRPT) algorithm? Consider preemptive SJF.

2. An operating system uses the Banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y, and Z to three processes P0, P1, and P2. The table given below presents the current system state. Here, the Allocation matrix shows the current number of resources of each type allocated to each process and the Max matrix shows the maximum number of resources of each type required by each process during its execution.

	Allocation			**Max**		
	X	Y	Z	X	Y	Z
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. Find Need matrix and check whether system is in safe state or not?

3. Assume you have the following jobs to execute with one processor, with the jobs arriving in the order listed here:

Pi	CPU T(pi)	Arrival time
0	80	0
1	20	10
2	10	10
3	20	80

Suppose a system uses RR scheduling with a quantum of 15 .Create a Gantt chart illustrating the execution of these processes? b. What is the turnaround time for process p3? c. What is the average wait time for the processes?

4. Consider 5 processes p1,p2,p3,p4,p5 with their burst time 8,6,1,9,3 resp. and priority 4,1,2,2,3 resp. Compute average waiting time and turnaround time for following scheduling policies:

   a) FCFS

b) SJF

c) Non Preemptive priority

d) Round Robin (TQ:1)

5. Consider following snap short of the system at time t1.

Pi	Max	Allocation	Need	Available
	A B C D	A B C D	A B C D	A B C D
P0	0 0 1 2	0 0 1 2	0 0 0 0	1 5 2 0
P1	1 0 0 0	1 2 5 0	0 7 5 0	
P2	1 3 5 4	2 3 5 6	1 0 0 2	
P3	0 6 3 2	0 6 5 2	0 0 2 0	
P4	0 0 1 4	0 6 5 6	0 6 4 2	

Check whether the system is safe state or not?

6. Consider following processes with arrival time, burst time and priority

	Arrival Time	Burst Time	Priority
P1	0	5	3
P2	2	6	1
P3	3	3	2

Find avg, turnaround time and waiting time using Priority preemptive scheduling

7. Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the end.