

Philadelphia University Faculty of Engineering Department of Computer Engineering		Date:- 13/05/2015 Allowed time:- 60 minutes
Operating Systems (630422) Second Exam		
Student Name: - ID: -		

Question 1: choose the correct answer of the following: 10 points

1. ____ is the number of processes that are completed per time unit.
A) CPU utilization B) Response time C) Turnaround time D) Throughput
2. ____ allows a thread to run on only one processor.
A) Processor affinity B) Processor set C) NUMA D) Load balancing
3. ____ involves the decision of which kernel thread to schedule onto which CPU.
A) Process-contention scope B) System-contention scope
C) Dispatcher D) Round-robin scheduling
4. A significant problem with priority scheduling algorithms is ____.
A) complexity B) determining the length of the next CPU burst
C) starvation D) determining the length of the time quantum
5. The two general approaches to load balancing are ____ and ____.
A) soft affinity, hard affinity B) coarse grained, fine grained
C) soft real-time, hard real-time D) push migration, pull migration
6. An instruction that executes atomically ____.
A) must consist of only one machine instruction B) executes as a single, uninterruptible unit
C) cannot be used to solve the critical section problem D) All of the above
7. A mutex lock ____.
A) is exactly like a counting semaphore B) is essentially a boolean variable
C) is not guaranteed to be atomic D) can be used to eliminate busy waiting
8. ____ occurs when a higher-priority process needs to access a data structure that is currently being accessed by a lower-priority process.
A) Priority inversion B) Deadlock C) A race condition D) A critical section
9. Which of the following statements is true?
A) A safe state is a deadlocked state.
B) A safe state may lead to a deadlocked state.
C) An unsafe state is necessarily, and by definition, always a deadlocked state.
D) An unsafe state may lead to a deadlocked state.
10. Suppose that there are ten resources available to three processes. At time 0, the following data is collected. The table indicates the process, the maximum number of resources needed by the process, and the number of resources currently owned by each process. Which of the following correctly characterizes this state?

Process	Maximum Needs	Currently Owned
P ₀	10	4
P ₁	3	1
P ₂	6	4

A) It is safe. B) It is not safe. C) The state cannot be determined. D) It is an impossible state.

Question 2: Explain the difference between response time and turnaround time. 2 points

Question 3: Explain the process of starvation and how it can be solved.

2 points

Question 4: What are the three conditions must be satisfied in order to solve the critical section problem?
2 points

1-

2-

3-

Question 5: What are the four conditions that must all hold simultaneously to have a deadlock situation.
2 points

1-

2-

3-

4-

Question 6: Suppose you have three resource types A (10 instances), B (5instances), and C (7 instances) And at a particular point of time we have the following allocation data. Use banker algorithm to determine wither the system is in safe state or not.
2 points

	<u>Allocation</u>	<u>Max</u>	<u>Available</u>
	A B C	A B C	A B C
P_0	0 1 0	7 5 3	3 3 2
P_1	2 0 0	3 2 2	
P_2	1 0 2	9 0 2	
P_3	2 1 1	2 2 2	