Philadelphia University
Faculty of Engineering
Department of Computer Engineering

Date:- 31/12/2015
Allowed time:- 60 minutes

Operating Systems (630422) Second Exam

Student Name: - ……………………………………………….................. ID: - ……………………………

Question 1: chose the correct answer for the following questions. 10 points

1- Which of the following is true of cooperative scheduling?
A) It requires a timer.
B) A process keeps the CPU until it releases the CPU either by terminating or by switching to the waiting state.
C) It incurs a cost associated with access to shared data.
D) A process switches from the running state to the ready state when an interrupt occurs.

2- Which of the following scheduling algorithms must be nonpreemptive?
A) SJF B) RR C) FCFS D) priority algorithms

3- ______ allows a thread to run on only one processor.
A) Processor affinity B) Processor set C) NUMA D) Load balancing

4- With _______ a thread executes on a processor until a long-latency event (i.e. a memory stall) occurs.
A) coarse-grained multithreading B) fine-grained multithreading
C) virtualization D) multicore processors

5- A race condition ____.
A) results when several threads try to access the same data concurrently
B) results when several threads try to access and modify the same data concurrently
C) will result only if the outcome of execution does not depend on the order in which instructions are executed
D) None of the above

6- In Peterson's solution, the ____ variable indicates if a process is ready to enter its critical section.
A) `turn` B) `lock` C) `flag[i]` D) `turn[i]`

7- A(n) _______ refers to where a process is accessing/updating shared data.
A) critical section B) entry section C) mutex D) test-and-set

8- One necessary condition for deadlock is ____, which states that at least one resource must be held in a nonsharable mode.
A) hold and wait B) mutual exclusion C) circular wait D) no preemption

9- A cycle in a resource-allocation graph is ____.
A) a necessary and sufficient condition for deadlock in the case that each resource has more than one instance
B) a necessary and sufficient condition for a deadlock in the case that each resource has exactly one instance
C) a sufficient condition for a deadlock in the case that each resource has more than once instance
D) is neither necessary nor sufficient for indicating deadlock in the case that each resource has exactly one instance

10- Suppose that there are 12 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	5
P_1	4	1
P_2	8	4

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

Question 2: Distinguish between coarse-grained and fine-grained multithreading. **2 points**

Question 3: Assume you had a function named update() that updates shared data. Write a code to describe how a mutex lock named mtx might be used to prevent a race condition in update(). **2 points**

Question 4:- What are the three general ways that a deadlock can be handled? **1 point**

Question 5: What is one way to ensure that a circular-wait condition does not occur? **1 point**

Question 6: Given the following data collected from the system. Using banker's algorithm determine whither the system in safe state or not. **4 points**

A (10 instances), *B* (5instances), and *C* (7 instances)

	Allocation	*Max*	*Available*
	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	3 0 2	9 0 6	
P_3	2 1 1	2 2 2	
P_4	0 0 2	4 3 6	

Good Luck