CSC 139: Operating Systems Principles
Second Quiz, Spring 2017
Friday, April 21st, 2017
Instructor: Dr. Ghassan Shobaki
Section 1

Student Name: _____ Student Number: _____

Q1. Answer with TRUE or FALSE. [40 points]

1. A process that is holding resources but is not waiting for any resources cannot cause a deadlock regardless of the number of resources that it is holding. TRUE FALSE

2. We can prevent deadlocks by imposing mutual exclusion on all the resources in the system. TRUE FALSE

3. If the **Banker's algorithm** for deadlock avoidance indicates that a given request will put the system in an **unsafe state**, that request will **necessarily** cause a deadlock. TRUE FALSE

4. No matter how many processes are involved in a deadlock, it may be possible to recover from the deadlock by terminating only **one** process. TRUE FALSE

Q2. Circle the right answer. [60 points]

1. Which of the following will **not** prevent deadlocks?
   a. Don't allow a process to wait for resources if it has resources allocated to it.
   b. Make all resources non-preemptive.
   c. Impose a total ordering of all resource types, and require each process to request resources in that order.
   d. Require each process to request all the resources that it needs before it starts executing.

2. A system has one resource type with 15 instances. Given the following state of the system,

	Maximum Need	Current Allocation
P_0	10	3
P_1	6	4
P_2	12	6

   which of the following is a **safe sequence**?
   a. $<P_0, P_1, P_2>$ b. $<P_1, P_2, P_0>$ c. $<P_2, P_0, P_1>$ d. $<P_1, P_0, P_2>$ e. both b and d f. none

3. A system has one resource type with 16 instances. Given the following state of the system,

	Current Allocation	Current Request
P_0	2	5
P_1	5	8
P_2	3	2
P_3	4	9

   which processes are involved in a deadlock?
   a. P_0 and P_1 b. P_0 and P_3 c. P_1 and P_3 d. P_0, P_1 and P_3 e. all processes g. none

   Consider a system with processes P_1, P_2, P_3, P_4 and P_5. If P_1 is waiting for P_4, P_3 is waiting for P_5, P_4 is waiting for P_2, P_3 and P_5 and P_5 is waiting for P_1. Answer Questions 4 and 5 below.

4. Which processes are involved in a deadlock?
   a. P_4 and P_5 b. P_4 and P_1 c. P_4, P_5 and P_1 d. P_4, P_5 and P_3 e. P_4, P_5, P_1 and P_3 f. all processes

5. Which process(es) will resolve the deadlock if terminated?
   a. only P_4 b. only P_5 c. P_4 or P_5 d. P_4 and P_5 together e. P_4 or P_5 or P_3 f. P_4 or P_5 or P_1

6. Consider a system with processes P_1, P_2 and P_3 and resource types R_1, R_2 and R_3. There is **one** instance of each of R_1 and R_2 and **two** instances of R_3. If P_1 is currently holding an instance of R_3 and requesting an instance of R_1, P_2 is holding an instance of R_2 and requesting an instance of R_3, and P_3 is holding an instance of each of R_1 and R_3 and requesting an instance of R_2, which processes are involved in a deadlock?
   a. P_1 and P_2 only b. P_1 and P_3 only c. P_2 and P_3 only d. all three processes e. none