CS492 homework 1 – Processes & Threads

The due date for this assignment is *11:59pm Tuesday, March 27th, 2018*. This assignment is worth 5% of your final grade. No handwritten submissions will be accepted, or graded. Your submission must be doc, or pdf file with the typed solutions to the 5 problems included in this description.

This is an individual assignment. Individual assignments, as the word indicate, are to be done INDIVIDUALLY. Any sign of collaboration will result in a 0 and being reported to the Honor Board.

Problem 1. (30 pts)

Consider the following state of a system with four processes, *P1*, *P2*, *P3*, and *P4*, and five types of resources, *RS1*, *RS2*, *RS3*, *RS4*, and *RS5*:

C =

0	1	1	1	2
0	1	0	1	0
0	0	0	0	1
2	1	0	0	0

R =

1	1	0	2	1
0	1	0	2	1
0	2	0	3	1
0	2	1	1	0

E = (24144)

A = (01021)

Using the deadlock detection algorithm described in Section 6.4.2, show that there is a deadlock in the system. Identify the processes that are deadlocked.

Problem 2. (20 pts)

Can we attack the circular wait condition in the dining philosophers' problem? If so, how? Explain in a few words, why this works.

Problem 3. (30 pts)

A system has four processes and five allocatable resources. The current allocation and maximum needs are as follows:

	Allocated	*Maximum*	*Available*
Process A	1 0 2 1 1	1 1 2 1 3	0 0 x 1 1
Process B	2 0 1 1 0	2 2 2 1 0	
Process C	1 1 0 1 0	2 1 3 1 0	
Process D	1 1 1 1 0	1 1 2 2 1	

What is the smallest value of *x* for which this is a safe state?

Problem 4. (20 pts)
A system has two processes and three identical resources. Each process needs a maximum of two resources. Is deadlock possible? Explain your answer.

Late assignment (even by 2 seconds) will be given a -25% decrease penalty per day, for the first 2 days after the deadline. So, if you send an assignment 1 second late, you will receive 75% of your grade for the assignment. If you send it, 24 hours, and 1 second late, you will receive 50% of your grade for the assignment etc. After 48hrs from the deadline there will be a -90% decrease penalty, so you will receive 10% of your grade.