**CSCI 40300/ECE 40800**
**Operating Systems– Fall 2016**
**Quiz 7**
**Solutions**

Name: _____

| Question: | 1 | Total |
|---|---|---|
| Points: | 10 | 10 |
| Score: | | |

Normalized Total to $100 = 100 \times \text{Total}/10 =$ _____ (what will appear in Canvas gradebook).

1. (Banker's algorithm) Given a situation with multiple processes and multiple resources. The number of each resource assigned and still needed is specified in the following two tables.

| | Assigned | | | | | Still needed | | |
|---|---|---|---|---|---|---|---|---|
| Process | CDs | Plotters | Tapes | | Process | CDs | Plotters | Tapes |
| A | 2 | 1 | 0 | | A | 1 | 0 | 1 |
| B | 1 | 3 | 2 | | B | 1 | 0 | 2 |
| C | 0 | 2 | 1 | | C | 2 | 1 | 0 |

The existing number of resources is specified in the vector below.

| | CDs | Plotters | Tapes |
|---|---|---|---|
| Existing: | 5 | 7 | 4 |

(a) (6 points) Determine the *Alloc* and *Available* vector contents below:

| | CDs | Plotters | Tapes |
|---|---|---|---|
| Alloc: | *3* | *6* | *3* |
| Available: | *2* | *1* | *1* |

(b) (4 points) State a sequence of events which show that the system is in a safe state.

**Answer:** With the Alloc $= (3, 6, 3)$ and Available $= (2, 1, 1)$ given in part (a), the sequence is the following:

Let A finish, and available $= (4, 2, 1)$.

Let C finish, and available $= (4, 4, 2)$.

There is now enough for B to finish.

There could be other possible sequences, but the sequence cannot start with B. B coud request 2 Tapes and there are not 2 tapes available.