

ASSIGNMENT 1

CS 550 -- Spring 2011

*Lane Department of Computer Science and Electrical Engineering
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TOTAL POINTS: 50

Problem 1. (20 points)

The online notes present a correct solution to the mutual exclusion problem for N processes by Eisenberg and McGuire. No analysis is given. Provide an analysis showing that each of Dijkstra's four conditions is met by this algorithm.

Problem 2. (20 points)

A certain restaurant has 20 tables that seat 4 persons, and 5 tables that seat 8 persons. Customers arrive randomly requesting varying numbers of seats. Customers requesting up to 4 seats are seated at a small table. Customers requesting 5-8 seats are seated at a large table. Customers requesting more than 8 seats are sent to a different restaurant.

In general arriving customers are served in FIFO order. However, some customers have reservations. Tables are not set aside in advance, but customers with reservations are sent to the front of the line when they arrive.

Write a monitor providing procedures for customers and for the restaurant host to carry out this system as effectively as possible.

Problem 3 (10 points)

Construct a set of tables for a batch system with 5 processes and 4 resource types, in which each process has a declared limit on the number of units of each resource it can request. Your tables should show the following conditions:

1. The current state is not deadlocked but it is unsafe.
2. If P_1 requests 2 more units of R_3 , then P_1 , P_3 , and P_4 will be deadlocked.