CS 3305A: Operating Systems
Department of Computer Science
Western University
Assignment 3
Fall 2017
Due Date: Dec 8th 2017

Purpose

The goals of this assignment are the following:

- Get hands-on experience in developing mutual exclusion / semaphore / critical section techniques/algorithms.
- Gain more experience with the C programming language from an OS's mutual exclusion / semaphore / critical section perspective.

Assignment Description

Using C programming language, you will be developing a mutual exclusion algorithm for a process synchronization problem. You need to make sure that your mutual exclusion algorithm ensures that only one process can access the critical section portion of your code at a given point in time. You are allowed to use any mutual exclusion / semaphore related C systems calls. Description of the problem is given below:

Assume there are two bank accounts (acc1 and acc2) shared by a total of ten clients/users (c1 to c10). The clients are allowed to deposit money into both the accounts, withdraw money from both the accounts, and transfer money between the two accounts. Assume there are also two depositors (dep1 and dep2) who deposit money initially into both the accounts. The clients are not allowed to start their banking activities (i.e., deposit, withdraw, and transfer) until the depositors deposit the money into the accounts. An input file is provided below for illustration purpose:

```
dep1 d acc1 1000 d acc2 3000
dep2 d acc1 2000 d acc2 2000

c1 d acc1 100 w acc2 500 t acc1 acc2 25
c2 w acc1 2500 t acc1 acc2 150
...
...
c9 w acc1 1000 w acc2 500
c10 d acc1 50 d acc2 200


Illustration:

(a) dep1 d acc1 1000 d acc2 3000
```

The above line specifies the operations performed by depositor #1. Depositor #1 deposits $1000 into Account #1 and then deposits $3000 into Account #2

```
(b) c1 d acc1 100 w acc2 500 t acc1 acc2 25
```

The above line specifies the operations performed by client #1. Client #1 deposits $100 into Account #1, then withdraws $500 from Account#2, and then Transfers $25 from Account #1 to Account #2

Your program must use "Assignment_3_input_file.txt" for processing all the operations outlined in the input file. Hardcoding the input file is not allowed. A different input file may be used to test your code for marking purposes where the structure of this input file will remain the same, and only the data will be different.

Assignment related technical resources

Please visit the course website for specific technical instructions and relevant materials. Also, consult TAs, and Instructor for any question you may have regarding this assignment.