Assignment 4

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T #01

1. We can model a situation where there is an unsafe state but no deadlock.

   No Deadlock:

   ```
   Thread 1                 Thread 2
   Lock X
   Lock Y
   OS interrupts Thread 1 and passes control to Thread 2
                       Thread 2, unable to lock needed resources
   Unlock X
   Unlock Y
                            Lock X
                            Lock Y
   ```

   We can model a situation where there is an unsafe state and a deadlock.

   Deadlock:

   ```
   Thread 1                 Thread 2
   Lock X
   OS interrupts Thread 1 and passes control to Thread 2
                            Lock Y
   Deadlock, Thread 1 needs Y, Thread 2 needs X.
   ```

1. The smallest value of x to keep the system in a safe state is **1**. The process sequence would have to be P3, P0, P2, P1.

Need					
	A	B	C	D	E
P0	0	1	0	0	2
P1	0	2	1	0	0
P2	1	0	3	0	0
P3	0	0	1	1	1

   If we start with A: 0 B:0 C:1 D:1 E:2 resources, then P3 can execute because it has enough allocated and enough available resources to execute. After it has finished executing then we can move two P0 which will have enough of resource A and resource B to execute, which was the limiting factor. Then P2 can execute because we will have all of resource C. Then P1 can execute because we will have enough of resource A and B.

2. Solution in banker.cpp