Homework 1 – COMP 3500 Karl Sprayberry – kds0049

1.1. Show a sequence (i.e., trace the sequence of interleavings of statements) such that the statement “x is 10” is printed.

```
P1                  |         P2
x = 10              |
x = x-1; x = 9------→x = x-1
x = x+1<--------------x = 8
x = 9               |
if (x != 10) √------→x = x+1
←---------------------x= 10
                    |
printf (x) [x = 10] √                  Done
```

1.2. Show a sequence such that the statement “x is 8” is printed.

```
P1                  |         P2
x = 10              |
x = x-1; x=9------→x=x-1 (assembly)
-                   |   Load R0, x [x=9]
                    |   Sub R0 [x=8]
x=x+1(assembly)←-----------
Load R1, x[x=9]|
Add R1 [x=10]
Store R1, x[x=10]|
--------------------→Store R0,x[x=8] (replaces R1 store into x)
if (x!=10)√  ←-----------------
printf(x) [x = 8] √
```

2. What is the difference between binary and general semaphores?

Binary Semaphore – can only have 2 different values

General Semaphore – can have as many different numerical values as the creator wants

3. What is a monitor?

A monitor is a synchronization construct that allows threads to have mutual exclusion and the ability to wait (block) for a certain condition to become true.

4. What operations can be performed on a semaphore?

A semaphore can perform a Signal and Wait command