**Comp 4735 Winter 2015**

## Lab Instructor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SET : 4D

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# Lab 4

Solve the following exercises. Work in pairs. Discuss each exercise with your lab instructor.

1. Describe, compare and contrast the concepts presented in Table 5.1.
2. Discuss the concept of race condition (5.1) and give a code example.
3. Discuss the concept of mutual exclusion.
4. Solve problem 5.3 in textbook.
   1. Sequence:
      1. P1: x = 10; // 10
      2. P2: x = 10; // 10
      3. P1: while (1)
      4. P2: while (1)
      5. P1: x = x – 1; // 9
      6. P1: x = x + 1; // 10
      7. P2: x = x – 1; // 9
      8. P1: if (x != 10) // true
      9. P2: x = x + 1; // 10
      10. P1: printf(“x is %d”, x); // “x is 10”
   2. Sequence:
      1. P1: x = 10; // 10
      2. P2: x = 10; // 10
      3. P1: while (1)
      4. P2: while (1)
      5. P1: x = x – 1; // 9
      6. P2: LD R0,X // 9
      7. P2: DEC R0 // 8
      8. P1: x = x + 1; // 10
      9. P2: STO R0; // 8
      10. P1: if (x != 10) // true
      11. P1: printf(“x is %d”, x) // “x is 8”
5. What is mutual exclusion hardware support? What are the advantages and disadvantages of this method?
6. What is a semaphore?
   1. Is the incrementation or decrementation of the counter variable safe?
   2. Is the OS aware of the semaphore?
   3. Write the pseudo-code of a semaphore’s methods. Any race condition?
7. Consider a doctor’s office with two doctors each in his room. Consider a waiting room with four chairs. If no chair is available, patients should wait outside. Solve the problem in pseudo-code with semaphores.