FUE

OS 2- 2019/2020

Synchronization and Inter-Process Communication (IPC)

1. **What is meant by (IPC). What are its basic roles.**
2. **Explain , using figures, the problem of race condition.**
3. **What is meant by “critical section”. Illustrate using figure/**example
4. **What are the basic conditions that provide correct mutual exclusion**
5. **Given (N) processes : (P0, P1 ,P2, … Pn-1,) all running on a multiprocessor system but need to update some shared variables or data files. When a process leaves its critical section, it calls some function that assigns one of the other processes according to some criteria (randomly , arrival time, Priority,….) to enter its critical section. Write the suitable function to handle such situation for process Pi, where i = 0, 1,….or n-1. You may need to Modify strict alternation code.**

1. **Define the term (Semaphore). What are the operations associated with it. Illustrate how to use it to solve the reader-writer and dinning philosophers problems (write a simple pseudo code for each case).**
2. **Given 6 process : each of processes Pi, i = 0,1,2,3,4, is coded as follows :  
   repeat {  
    down(mutex)  
    {Critical Section}  
    up(mutex)**

**}  
forever**

**what happened if The code for P5 is identical except that it uses up(mutex) before entering C.S. instead of down(mutex). ?**

1. **Programming assignment**

Implement at least 3 of the following using Java, C++ or C#

1)the producer-consumer problem using sleep and wakeup

2) Peterson’s algorithm

3) The reader-writer problem

4) The producer-consumer problem using semaphore

5) Dinning Philosophers problem

6) Sleeping barber problem..

