

**LOKNAYAK JAI PRAKASH INSTITUTE OF TECHNOLOGY  
CHAPRA, BIHAR**

**Subject:** Operating System

**Assignment- 4**

**Subject Code:** 061403

1. What do you understand by Race condition? Give few examples of arising of race condition in concurrent processing
2. Define Semaphore. Explain types of Semaphore. Give a scheme for implementation of semaphore primitives.
3. What do you mean by Critical Section Problem? What is the solution to the Critical section problem?
4. Explain Inter-process Communication of Readers Writers Problem.
5. Explain Inter-process Communication of Dining Philosopher Problem.
6. Discuss the Peterson's solution for the Race condition with Algorithm.
7. Explain the concept of implementing Inter-process Communication through Shared memory mechanism using suitable example.
8. Each process  $P_i, i = 1, 2, \dots, 9$  is coded as follows-

1. repeat
2. P(mutex)
3. { Critical Section }
4. V(mutex)
5. forever

The code for  $P_{10}$  is identical except that it uses V(mutex) in place of P(mutex). What is the largest number of processes that can be inside the critical section at any moment?

9. The following program consists of 3 concurrent processes and 3 binary semaphores. The semaphores are initialized as  $S_0 = 1, S_1 = 0$  and  $S_2 = 0$ .

| Process P0   | Process P1  | Process P2  |
|--|---|---|
| <pre> while (true) {     wait (S0);     print '0'     release (S1);     release (S2); }                     </pre> | <pre> wait (S1); release (S0);                     </pre> | <pre> wait (S2); release (S0);                     </pre> |

How many times will process P0 print '0'?

1. At least twice
2. Exactly twice
3. Exactly thrice
4. Exactly once

10. Write short notes on the following:

- a. busy waiting
- b. Independent Process & Cooperative Process
- c. Mutual Exclusion
- d. Progress
- e. Bounded Waiting