Branch : CSE & IT Batch : Hinglish

Operating System

Process Synchronization/Coordination

DPP 03

[MSQ]

1. Producer Consumer problem has_____.

(a) Competition (b) Co-operation
(c) Inconsistency (d) Data loss

[MCQ]

2. Purpose of "entry section" in synchronization mechanism is.

(a) To allow all processes to access shared resource concurrently.
(b) To allow one process at a time to enter into critical section.
(c) To indicate the program is started
(d) None of these

[MSQ]

3. What are the requirements of critical section problem?

(a) Mutual exclusion (b) Bounded waiting
(c) Deadlock (d) Consistency

[MCQ]

4. Mutual exclusion is_____.

(a) Any number of process can enter into critical section if it is free.
(b) No process present in Non-CS should block the other process from entering into CS.
(c) No two process may be simultaneously present in CS.
(d) None of these.

[MCQ]

5. Consider two processes.

Process X	Process Y
while(true){	while (true){
x = l;	y = 1;
while(y= =l){	while (x = =1){
// critical section	// critical section
x = 0;	x = 0;
}	}
}	}

Assume x and y shared variables and initialized to 0.

Which of the given condition are satisfied by the above code?

(a) Mutual exclusion and progress
(b) Mutual exclusion
(c) Progress
(d) No mutual exclusion

[MCQ]

6. If Bounded waiting condition is not satisfied, it can cause.

(a) Inconsistency (b) Data-loss
(c) Starvation (d) Deadlock

[MSQ]

7. Which of the following is/are incorrect?

(a) Process cannot be pre-empted from CS.
(b) Process can enter CS without going into entry section.
(c) Process can complete/leave CS without going into exit section.
(d) Process can be preempted from entry, exit and critical section.

[NAT]

8. How many of the following are software type solution for synchronization?

(i) Lock variable (ii) Monitor
(iii) Peterson's solution (iv) Semaphore
(v) Test and set Lock instruction set. (vi)Strict algorithm
(vii) Swap

[NAT]

9. Consider the following program segments for two different processes (P_1 & P_2) executing concurrently; 'a' & 'b' are not shared variables, 'x' is shared and starts at '0'.

P_1	P_2
for (a = 1; a< =4; ++a)	for (b =1; b< =4;++b)
x = x +1;	x = x + 1;

If P_1 and P_2 execute only once and concurrently, then the final minimum possible value of x is_____.

Answer Key

1. **(a, b, c & d)**
2. **(b)**
3. **(a, b)**
4. **(c)**
5. **(d)**
6. **(c)**
7. **(a, b & c)**
8. **(2)**
9. **(4)**

Hint & Solutions

1. (a, b, c & d)

Both co-operation and competition is present in producer consumer problem. Producer is incrementing the value of count variable and consumer is decrementing the value. If they both execute at same time then both processes (producer & consumer) are competing for shared variable "count".

Therefore, this leads to inconsistent result and data loss. Option, a, b, c & d all are correct.

2. (b)

Main purpose of "entry section" in synchronization mechanism is to allow only one process from N processes to enter into critical section at a time.

3. (a, b)

The critical section problem needs a solution to synchronize the different processes. The solution to the critical section problem must satisfy the following conditions:

(1) Mutual exclusion
(2) Progress
(3) Bounded waiting

Therefore, a, b are correct option.

4. (c)

Mutual exclusion implies that only one process can be inside the critical section at any time. If any other process require the CS, it must wait until CS is free. No two processes may be simultaneously present in CS.

5. (d)

Here, both processes can enter into critical section simultaneously, so no mutual exclusion.

Therefore, option (d) is correct.

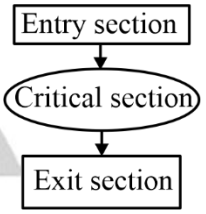
6. (c)

If Bounded wait condition is not satisfied, it means one process is getting chance to enter CS again and again, and other processes are starving for CS, so this can lead to starvation for other processes.

7. (a, b & c)

Process can be pre-empted from critical section, entry section and exit section. So, option 'a' is incorrect and option 'd' is correct.

Process cannot enter into critical section without going to entry section.



Process is said to have leave/left "CS" only if it completes exit section.

Therefore, option (b) and (c) are incorrect.

8. (2)

Lock variable and Peterson algorithm are software type solution. Strict alternation is also software type solution.

Monitor and semaphore are OS based solution.

TSL instruction set hardware type solution.

Strict algorithm and swap are no solution.

9. (4)

If P_1 gets pre-empted during its first iteration and then completing 4 iterations of P_2 and completing first iteration of P_1, followed by it's remaining iterations.

Then, we would have executed only 4 iteration of P_1 and thus, the final minimum possible value of x is 4.