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Assignment - 3

Q1) Fill in the blanks

1) With deadlock detection, requested resources are granted to processes.

2) All deadlocks involve conflicting needs for resources by two or more processes.

3) Several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place is called race condition.

4) The request and release of resources are system calls.

5) A semphore is a process synchronization tool.

Q2) Choose Correct Options

1) A semaphore is a shared integer variable.
Ans a) that cannot drop below.

2) Process synchronization can be done on c) both hardware and software level.

3) A monitor is a module that encapsulates d) all of the mentioned.

4) To enable a process to wait within the monitor

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Ans: a) a condition variable must be declared as condition.

5) Which of the following variable wait within the to enable a process.

Ans: A. a condition is defined by a condition variable.

6) What is the reusable resource?

Ans: that can be used by one process at a time and is not depleted by that use.

7) The disadvantage of a process being allocated all its resources before beginning its execution is

Ans: B. low resource utilization.

8) For non sharable resources like a printer, mutual exclusion:

Ans: A. Must exist

9) The number of resources requested by a process:

Ans: C) must not exceed the total number of resources available in the system.

10) A problem encountered in multitasking when a process is perpetually denied necessary resources is called: b) starvation

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Q3) Answer the following questions

1) What is meant by critical section problem? How monitors help in process synchronisation?

Ans: The critical section problem is used to design a set of protocols which can ensure that the race condition among the processes will never arise. The monitor is supported by programming languages to achieve mutual exclusion between processes.

2) Explain about resource allocation graph (RAG)?

Ans: Resource Allocation Graph is explained to us what is the state of the system in terms of processes and resources. Like how many resources are available, how many are allocated & what is the request of each process. Everything can be represented in terms of the diagram.

3) State the structure of semaphore highlighting how it can be used for process synchronization.

Ans: Semaphore was proposed by Dijkstra in 1965 which is a very significant technique to manage concurrent processes by using a simple integer value, which is known as Semaphore. Semaphore is simply an integer value, which is known as a semaphore. Semaphore is simply an integer variable that is shared between threads. This variable is used to solve the critical section problem. & to achieve process synchronisation in

the multiprocessing environment.

4) Describe in detail about readers & writers problem and dining philosopher problem.

Ans: The readers - writers problem is a classical problem of process synchronization, it relates to a data set such as a file that is shared between more than one process at a time. Among these various processes, some Readers — which can only read the data set; they do not perform any updates, some are writers — can both read & write in the data sets. Dining Philosphers problem states that there are 5 philosophers who care engaged in two activities Thinking and Eating. Meals are taken communally in a table with five plates and five forks in a cyclic manner.

5) Consider the following snapshot of a system: P0-P4 are 5 processes present and A, B, C, D are the resources. The maximum need of a Process and the allocated resources details are given in the table. Answer the following based on banker's algorithm.

(1) What is the content of NEED matrix?
(2) Is the system in a safe state?
(3) If a request from process P0 arrives for (0, 2, 0) can the request be granted immediately.

	Allocation	max	Available
	ABC	ABC	~~A~~BC
P0	010	753	332
P1	200	322	
P2	302	902	
P3	211	222	
P4	002	433	

Ans: 1) Need[i,j] = Max[i,j] − Allocation[i,j]. So, the content of Need matrix is:

Process	Need		
	A	B	C
P0	7	4	3
P1	1	2	2
P2	6	0	0
P3	0	1	1
P4	4	3	1

2) Yes, the system is in a safe state.

3) Yes.