Manav-17.

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Assignment

Q.1 What is Race condition, explain with example.

→ A race condition is an undesirable situation that occurs when a device or system attempts to perform two or more operations at the same time, but because of nature of device or system the operations must be done in proper sequence to be done correctly. Example of race condition is light switch. In some homes, there are multiple light switches connected to a common ceiling light. When these types of circuits are used, the switch position becomes irrelevant. If light is on, moving either switch from its current position turns off the light. Similarly, if the light is off, then moving either switch from its current position turns the light on.

Q.2 Explain classical problems of synchronisation in detail.

→ The classic problems are:

1. Bounded-Buffer Problem

This problem is generalized in terms of producer-consumer problem. Solution to this problem is creating two counting semaphores "full" and "empty" to keep track of current number of full and empty buffers respectively. Producers produce a product and consumers consume the product, but both use of one of the containers each time.

2. Readers - writers problem:

Q.3 →

Suppose that a database is to be shared among several concurrent processes. Some of these processes may want only to read the database, whereas others may want to update the database. We distinguish between these two types of processes by referring to the former as readers and to latter as writers. We require that the writers have exclusive access to shared database while writing to database. In other words, no reader should wait for other readers to finish simply because a writer is waiting. Also, we can refer as if a writer is waiting to access the object, no new readers may start reading.

3. Dining - Philosophers problem:

Consider five philosophers who spend their lives thinking and eating. The philosophers share a circular table surrounded by five chairs, each belonging to one philosopher. In the center of table is a bowl of rice and the table is laid with five single chopsticks. One chopstick may be picked up by any one of its adjacent followers but not both. This problem involves the allocation of limited resources to a group of processes in a deadlock-free and starvation-free manner.

Q3. What is deadlock?

→ Deadlock is a situation where a set of processes are blocked because each process is holding a resource and waiting for another resource acquired by some other process. Consider an example when two trains are coming towards each other on the same track and there is only one track, none of the train can move once they are in front of each other. A similar situation occurs in operating systems when there are two or more processes that hold some resources held by others.