Exam: Sessional Assignment

SPRING 2020

Subject: OPERATING SYSTEM

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Q.1:

Ans.1: **Deadlock:-**

Deadlock is a situation where a set of processes are blocked because each process is holding a resource and acquired by some other process.

Consider an example:- When two trains are coming toward each other on same track and there is only one track none of the train can move once they are in front of each other similarly situation occur in operating system.

Necessary condition:-

There are four conditions that are necessary to achieve deadlock.

i. **Mutual exclusion:-**

At least once resource must be held in a non sharable mode: if any other process requests their resources , then that process must wait for the resource to be released.

ii. **Hold & wait:-**

A process must be simultaneously holding at least once resources and waiting for at least one resource that is currently being held by some other process.

iii. **No – preemption:-**

Once a process is holding a resource (i.e once its request has been granted) then that resource cannot be taken away from that process until the process voluntarily release it.

iv. Circular wait:-

A set of process (P_0 , P_1 , P_2 -----P_q) must exist such that every P[i] is waiting for P[(i+o%(N+1)] (note that this condition implied the hold and wait condition.

Q.2:

Ans.2: Deadlock with one process is not possible.

Here is it explanation:

A deadlock situation can arise if the following four condition hold simultaneously in a system.

- Mutual exclusion
- Hold and wait
- No preemption
- Circular – wait

It is not possible to have a circular wait with only one process thus failing a necessary condition for circular wait. There is no second process to form a circle with the first one. So it is not possible to have a deadlock involving only one process.

Q.3

Ans.3: Suppose the system is deadlocked this implies that each process is holding one resource and is waiting for one more. Since there are three processes and four resources one process must be able to obtain two resources. This process require no more resource and therefore it will returns its resource when done.

Q.4

Ans.4: Resources allocation graph:-

The resource allocation graph is the pictorial representation of the state of the system. As its name suggest, the resources allocation graph is the complete information about all the process with are holding some resource are waiting for some resource.

It also contains the information about the all the instances of all resources whether they are available or being used by the process.

In resource allocation graph the process represented by a circle while the resource is represent by a rectangle.

Vertices:- Vertices are mainly of two types resources and processes each of them will be represented by a different shapes. Circle represent process while rectangle represent resource.

Edge:- Edges are also of two types, one represent assignments and other represent the wait of process for a resource. The above image each show of them. A process is shown as waiting for resource if the tail of an arrow is attached to the process.

Q.5

Ans.5: Detection of starvation requires future knowledge since no amount of record keeping statistics on processes can determine if it is making ''progress'' or not. However, starvation can be prevented by 'aging' a process. This mean maintaining a rollback count for each process and including this as part of the cost factor in the selection.

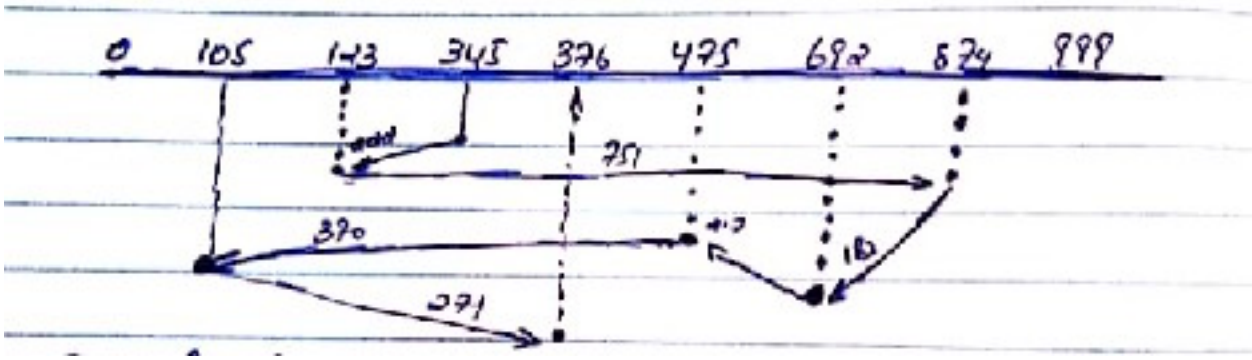
Process for a victim for preemption / roll back.

Q.6

Ans.6:

i. FCFS:-

FCFS is the simplest of all the disk scheduling algorithms. In FCFS, the requests are addressed in the order they arrive in the disk queue.



Total R/w head movement:-

222+751+182+217+370+271=2013

ii. SSTF:-

In SSTF (Shortest seek time first) request having shortest seek time are executed first. So the seek time of every request is calculated in advance in queue and than they are scheduled according to their circulated seek time.