ID #16950 Muhammad Asif

Q3 Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock-free.

Ans 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, on process must be able to obtain two resources. This process requires no more resources and therefore it will return its resources when done.

Q8 Can a system detect that some of its processes are starving? if you answer "yes" explain how it can, if you answer "no" explain how the system can deal with the starvation problem.

Ans 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 means

maintaining a rollback count for each process, and including this at part of the cost factor in the selection process for a victim for preemption/rollback.

Q2 is it possible to have a deadlock involving only one single process? Explain your answer.

Ans Deadlock with one process is not possible Here is the explanation.
A deadlock situation can arise if the following four conditions hold simultaneously in a system.

- Mutual Exclusion.
- Hold and wait.
- No Preemption.
- Circular-wait.

it is not possible to have circular wait with only one process. the 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.

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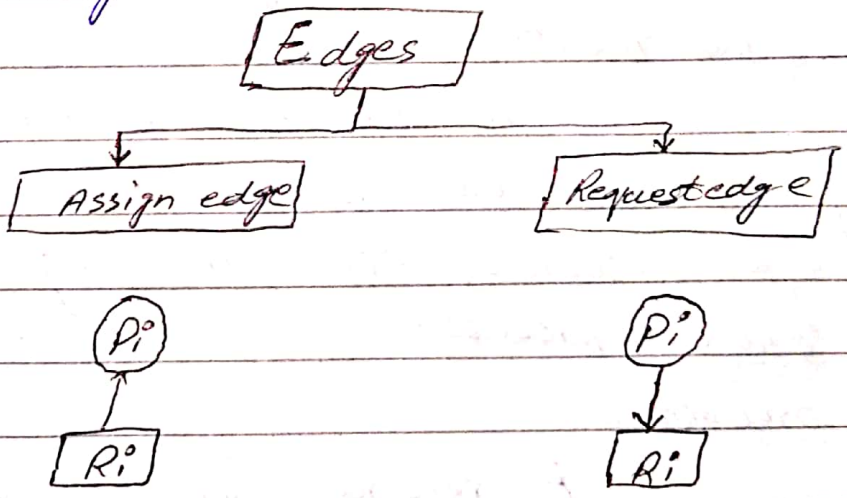
Q4 what is a resource allocation graph? How do you obtain a wait-for graph from it? Explain their uses.

Ans The resource allocation graph is the pictorial representation of the state of a System.
A resource can have more than one instance. Each instance will be represented by a dot inside the rectangle



Edges in RAG are also of two types. one represents assignment and other represents the wait of a process for a resource.

Q1 Explain the necessary condition that may lead to deadlock situation
2). What are the various methods for handling deadlock.

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A deadlock situation on a resources can arise if and only if all of the following conditions hold simultaneously in a system.

1) Mutual exclusion.

At least one resource must be held in a non-shareable mode. otherwise, the processes would not be able prevented from using the resource when necessary.

2) Hold and wait:

A process is currently holding at least one resource and requesting additional resources which are being held by other process.

3) NO preemption:-

A resource can be released only voluntarily by the process holding it.

4) Circular wait:-

each process must be waiting for a resource which is being held by another process which in turn is waiting for the first process to release the resource.

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There are mainly four methods for handling delock.

1) Deadlock ignorance:-
it is the most popular method and it acts as if no deadlock and the user will restart

2) Deadlock prevention:-
it means that we design such a system where there is no chance of having a deadlock.

3) Deadlock avoidance:-
Here whenever a process enters into the system it must declare maximum demand. To the deadlock problem before the deadlock occur.

4) Detection and recovery:-
When the system is in deadlock then one method is to inform the operates and then operator deal with deadlock manually and the second method system will automatically recover from deadlock.

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Q6

Ans

FCFS :-

The fcfs schedule is
345, 128, 874, 692, 475, 105 and 376.
Total head movement = (345-123) + (874-123) +
(874)-692) + (692-475) + (475-105) + (376-105)
= 2013.

ii) SSTF.

The sstf schedule is
345, 123, 105, 0, 376, 475, 692 and 874
Total head movement = (345-123) + (123-105)
+ (105-0) + (0-376) + (376-475) + (475-692) +
(692-874) = 1219.