Lesson 17

Objectives

- Recovery from deadlock
- Process Termination
- Resource Preemption

Recovery from deadlock

Once the system is in deadlock it can be recovered. Processes and resources are two main entities involved in the deadlock. There are two techniques in this regard to recover a system from deadlock.

1. Process Termination
2. Resource De-allocation (preemption)

1. Process Termination

In this technique process/s taking part in deadlock may be aborted. There are two approaches.

1.1 Full abortion

In this technique all processes that are taking part in deadlock are terminated regardless of any criteria. In this technique deadlock ends for sure but cost of recovery is quite high since system have to restart all the processes.

1.2 Partial Termination

In this technique processes are terminated one by one until deadlock is recovered. For this, we have to choose which process to be terminated first. Order of abortion depends upon following factors.

- Priority of the process.
- How long process has computed, and how much longer to completion.
- Resources the process has used.
- Resources process needs to complete.
- How many processes will need to be terminated?
- Is process interactive or batch?

2. **Resource De-allocation (preemption)**

   In this technique the resources (bone of contents) are preempted from processes forcefully. Now the issue is to select the victim process whose resource to be preempted. The important factor is cost, so a resource with minimum cost will be preempted.

   Roll back another point in this regard is to save the process in some safe state so that it could be restarted from that state.

   Starvation Same process may be picked again and again that may cause starvation in that process to avoid this number of roll back may be included in cost factor.

Combined Approach to Deadlock Handling

Combine the three basic approaches

- prevention
- avoidance
- detection

Allowing the use of the optimal approach for each of resources in the system.

- Partition resources into hierarchically ordered classes
- Use most appropriate technique for handling deadlocks within each class.

Assignment

A traffic deadlock

A traffic deadlock is shown in the figure below.

- Explain how and where four necessary and sufficient conditions exist
- Suggest how to recover the system from deadlock
- Give any suggestion for future deadlock prevention and avoidance