CS & IT ENGINEERING

Operating System

Process Synchronization

Lecture No. 2

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Topic to be covered

Process Synchronization

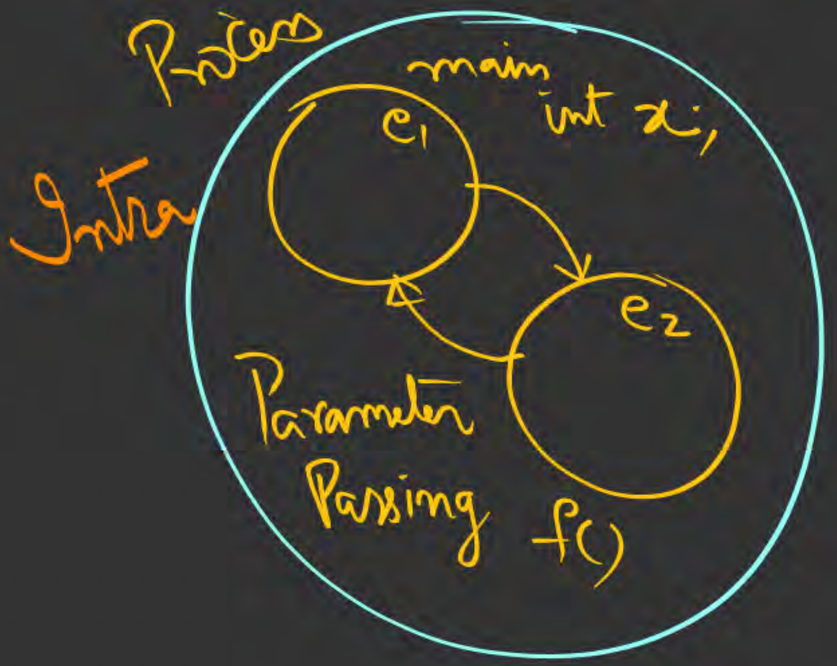
1.Need for Synchronization
2.Types of sync
3.Critical section problem

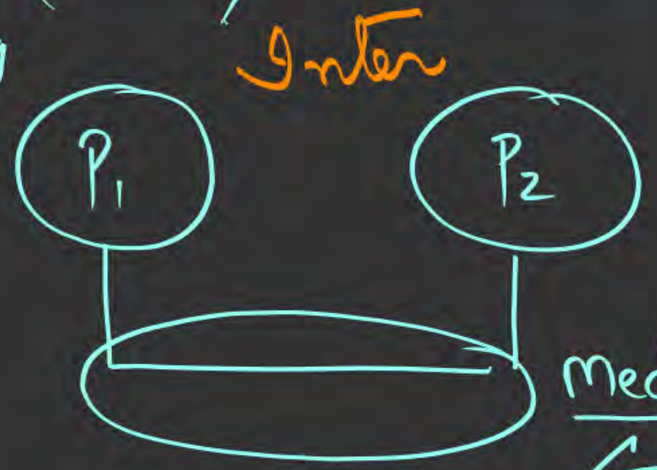
Processes

- Independent
- Communicating
- Coordinating

I.P.C → Intra " "

(Inter) Process Communication





Medium (Shared)

<I.P.C Mechanisms>

<Pipes + Shared Memory>

Synchronization:

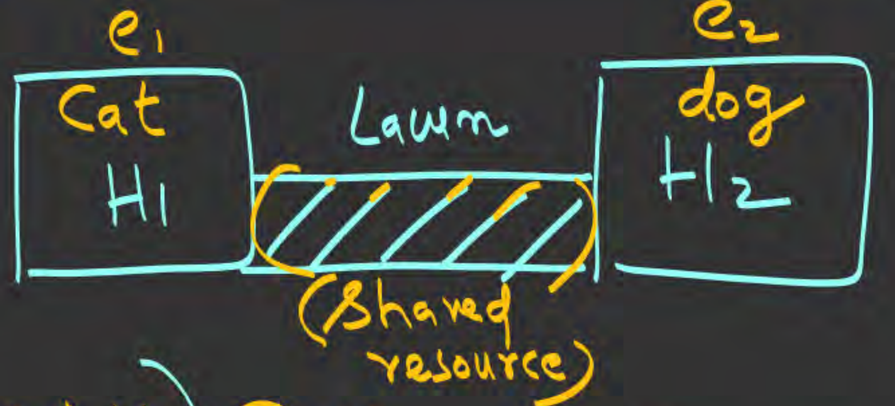
Need for Synchroniz:

Lack of Synch. in IPC Environment Leads to the Following Problems:

1. Inconsistency [Incorrectness] → wrong results
2. Loss of data
3. Deadlock [Lockup] [Infinite Blocking of Processes]
   Stalemate

Ex:

1) Sharing a Lawn among Neighbors



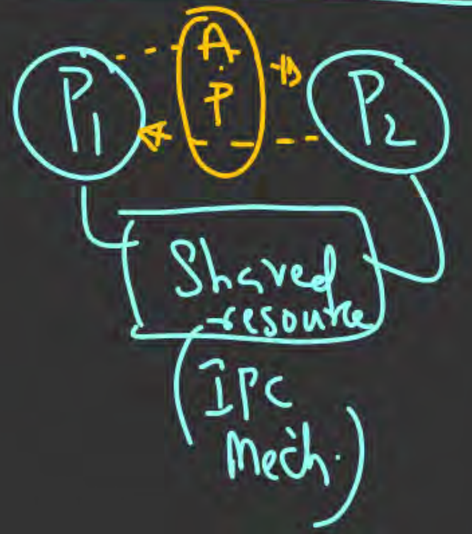
(Agreement Protocol)

2) (More Milk) Problem: Paying Guest

Paste it Note

Synchronization / Coordination : (It is agreed upon Protocol in an IPC environment, to make sure that there is no Inconsistency, data loss or deadlock)

IPC Environment

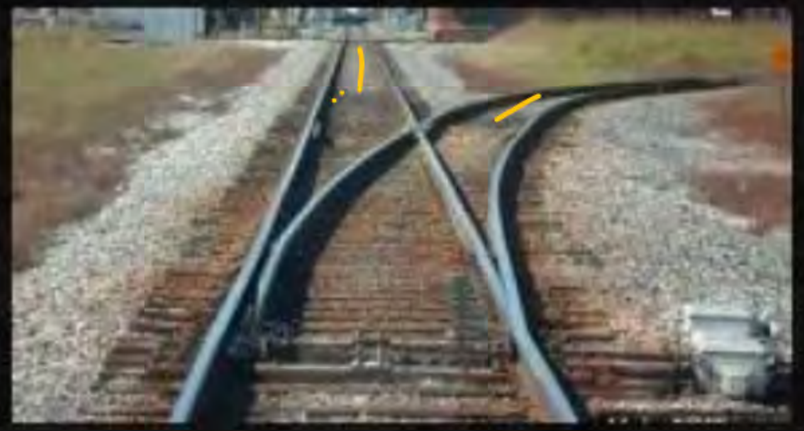


Process Synchronization

Synchronization involves the orderly sharing of system resources by processes.

We can think of this intersection as a system resource that is shared by two processes.

- The car process and the train process
- One process is active at a time - No conflict
- Both process are active - Conflict



Consider a machine with a single printer:

Depending upon whether the printer is already being Used by another process or not, the operating system must decide whether:

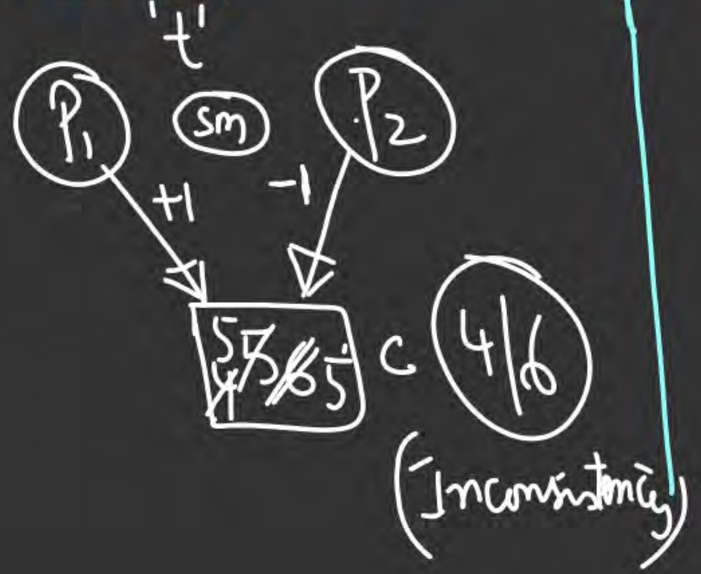
- To grant the printing request (if the printer is free),
- Or to deny the request and classify the process as a waiting process until the printer becomes available.

⇒ Types of Synchronization

1) Competitive / Competition

defn: Two/more Processes are said to be in Competitive Synch. iff they Compete / Contend for the accessibility of a shared resource;

Ex:

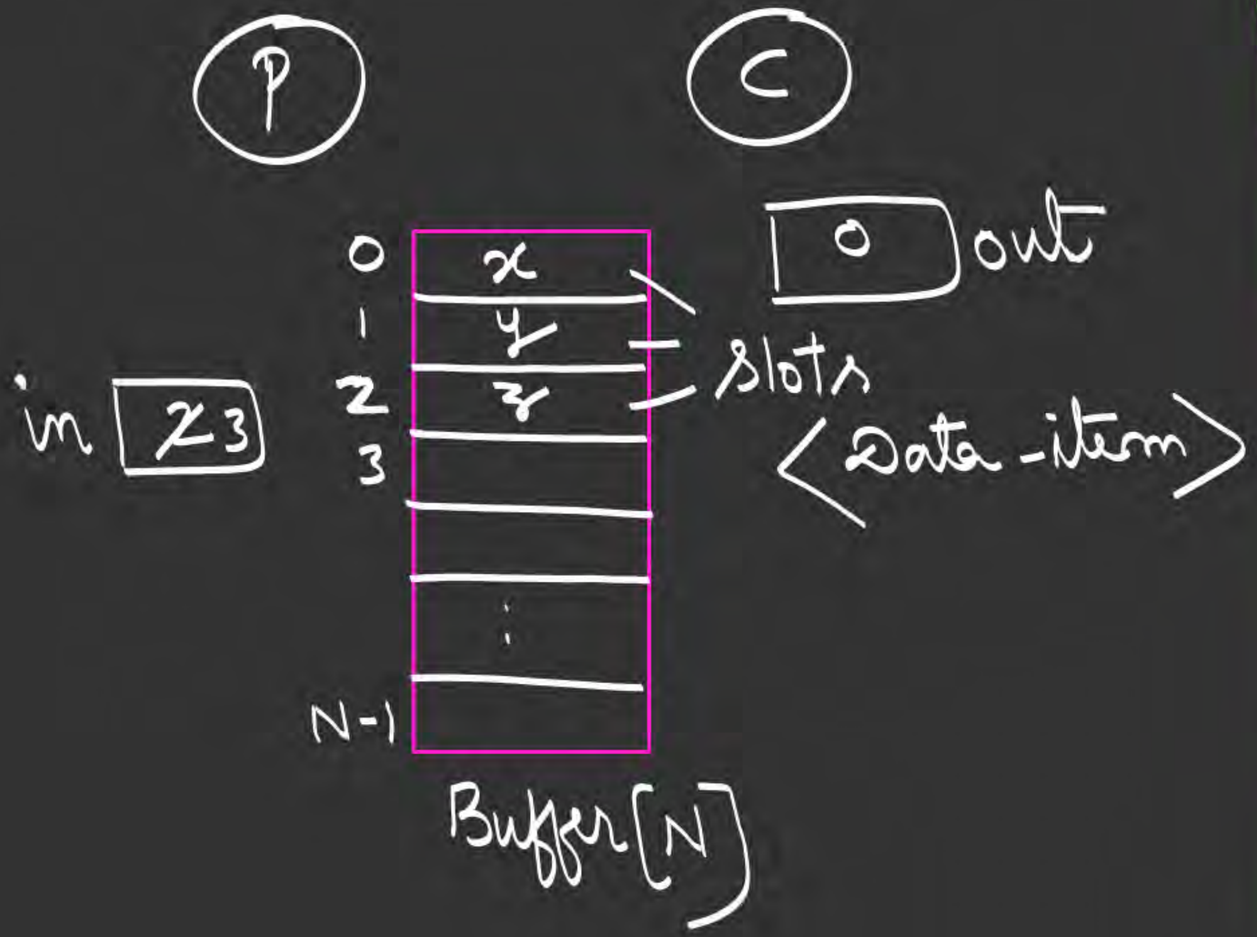


2) Cooperative ✓

defn: Two/more Processes are said to be in Cooperative Synch. iff they get affected by each other; i.e execution of one Process affects the other process; <dependency>

Ex: <Producer - Consumer - Problem>

Producer Consumer :



Condition :

(i) Full Buffer

(ii) Empty Buffer

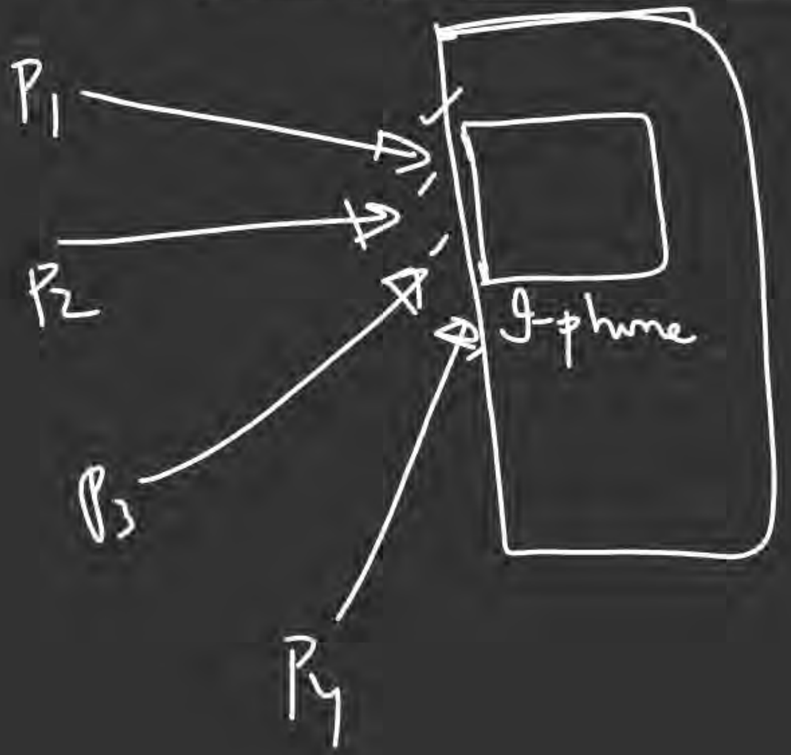
Note 1: Lack of Synch. among competing Processes may lead to either Inconsistency, Data loss

Note 2: Lack of Synch. among co-operating Processes may lead to Deadlock;

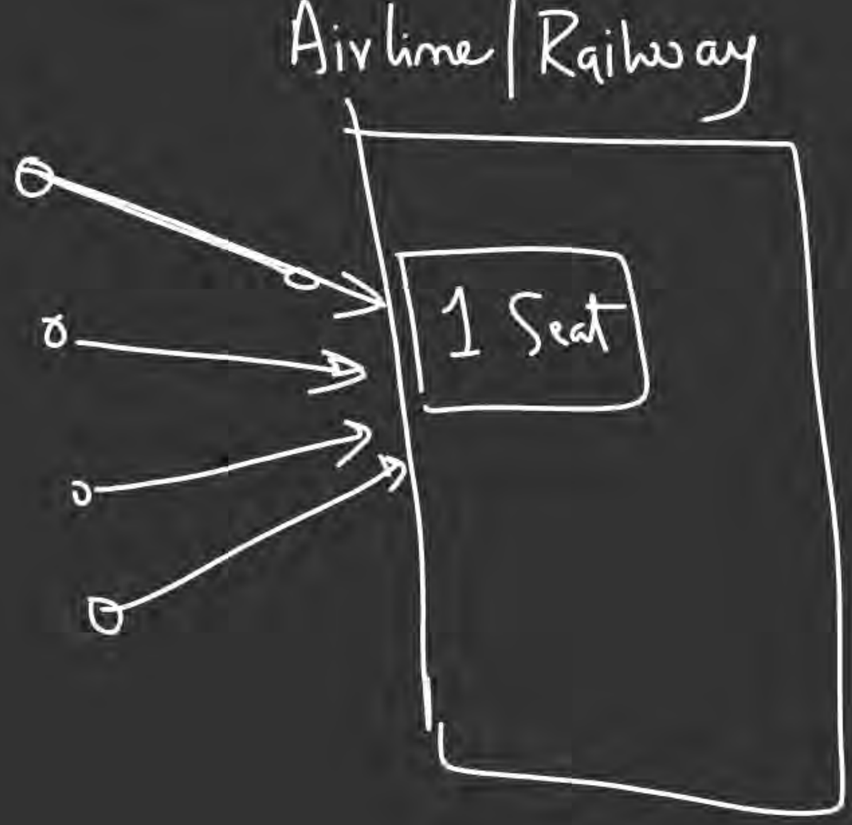
Note 3: An application of an IPC environment may involve either <Competition> (or) <Cooperation> (or) Both types of Synch.

Examples of Compet. Synch.

① Amazon Purchase

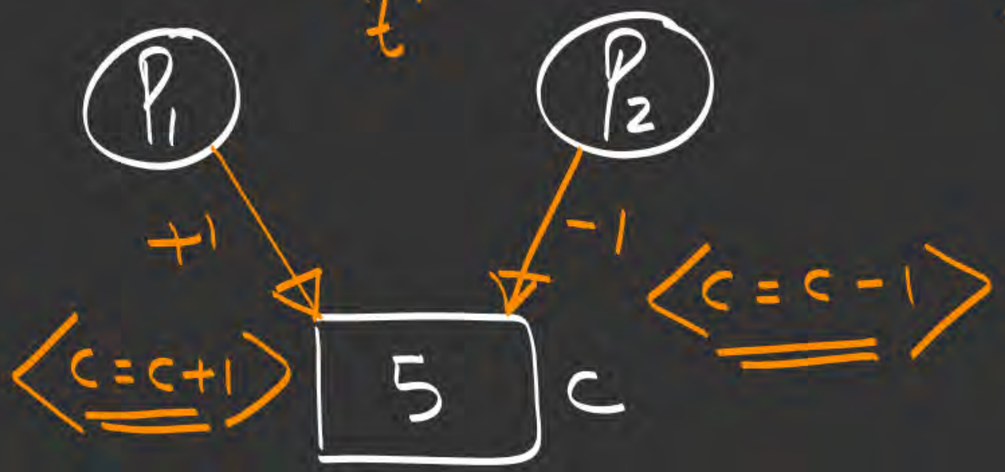


② Reservation System



Eg: To Prove Inconsistency

Realistic OS environment like WIN / UNIX / LINUX



"Final Consistent value must be 5"

Sometimes, it is possible to get 5 & other times it is also possible to get 4/6

THANK YOU
GW
SOLDIERS !