

Operating System: Process Synchronization

By: Vishvadeep Gothi



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**AIR- 19, 119, 440, 682
in GATE**



**ME from IISc Bangalore
Mtech BITS Pilani in Data
Science**



**14+ Years of Teaching Experience,
10+ Years in GATE/IES**



Subjects Taken:
Computer Organization & Architecture,
data structure, operating system,
C-Programming, Data science,
Machine Learning, Python,
coding interview problems,





Vishvadeep Gothi

#1 Educator in CS & IT · GATE & ESE

- GATE AIR-19, 119, 440, 682 - ME from IISc, - MTech BITS Pilani (Data Science) - 14 years experience

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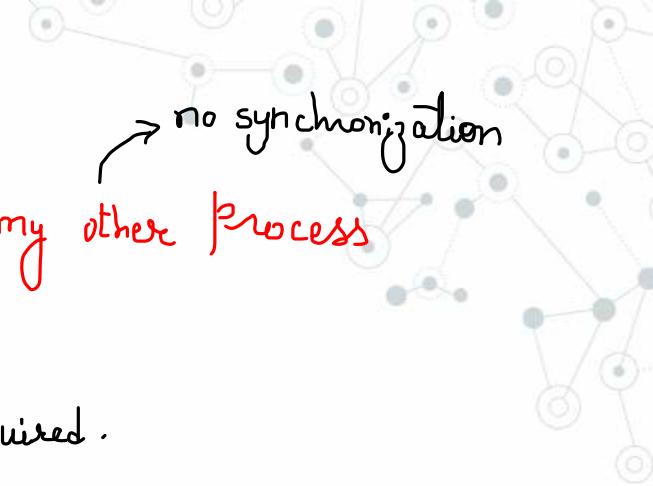
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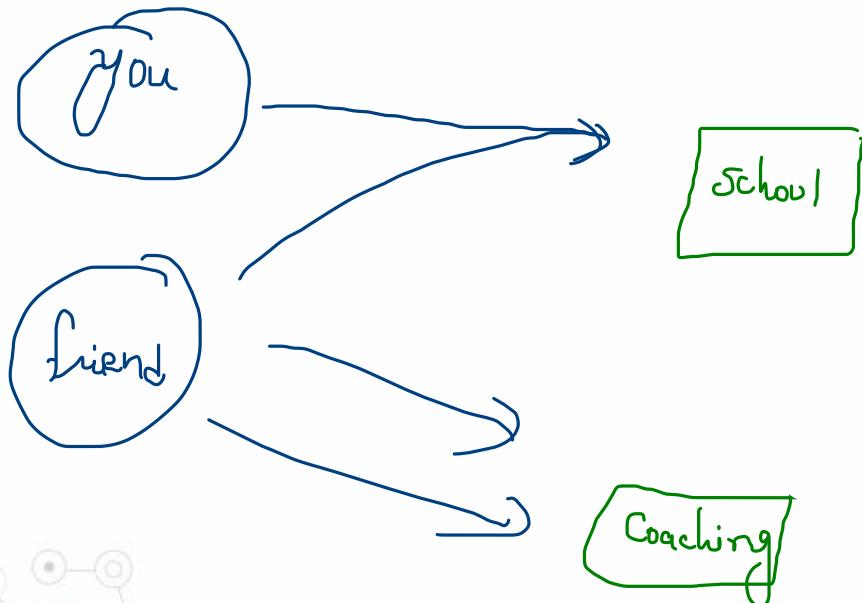
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Types of Processes

- 
1. Independent → no any communication with any other process
 2. Cooperating/Coordinating/Communicating
↓
can affect other process
are
can be affected by other process.
- ↳ synch. required.

Need Of Synchronization

↳ in communicating processes



7am - 1pm school
1 PM - 4PM home
4PM - 6PM coaching
6 - 8 PM playing

Problems Without Synchronization

- Problems without Synchronization:

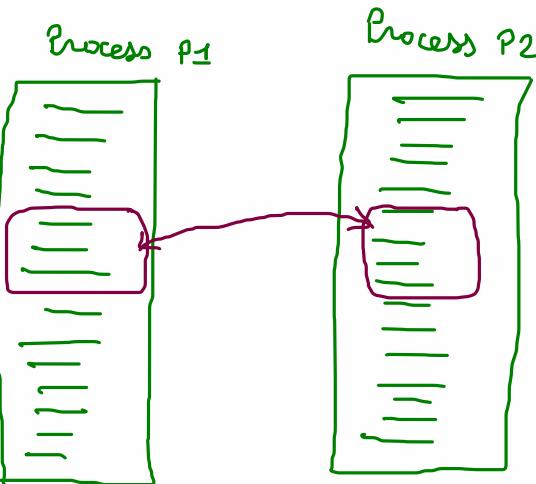
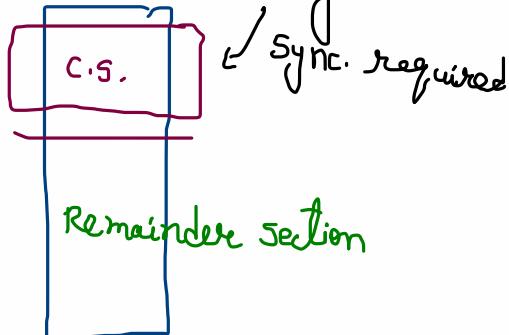
- Inconsistency ✓
- Loss of Data ✓
- Deadlock ✓

Critical Section

Communication happens

The critical section is a code segment where the shared variables can be accessed.

Process



Where Synchronization Required?

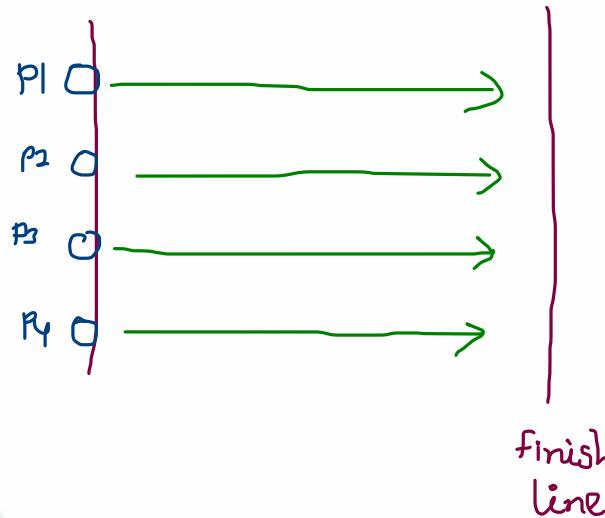
→ only in critical section



Race Condition

→ because of lack of synchronization.

A race condition is an undesirable situation, it occurs when the final result of concurrent processes depends on the sequence in which the processes complete their execution.



Process P1

```
R1 = a  
R1 = R1 + 2  
a = R1
```

$R1 = 5$
 $R1 = 7$

Memory
 $a = 5$

Process P2

```
R3 = a  
R3 = R3 + 5  
a = R3
```

$R3 = 5$
 $R3 = 10$

if P1 finishes first

$a = \cancel{5} + 10$

if P2 finishes first

$a = 5 + \cancel{10}$

Solution of Critical Section Problem

- ◎ Requirements of Critical Section problem solution:
 1. Mutual Exclusion
 2. Progress
 3. Bounded Waiting

Next Class

Solutions of Critical Section Problem

✓ Peterson's Solution

I am tomorrow \Rightarrow Data structure revision



BST & AVL

12 PM 6pm \Rightarrow

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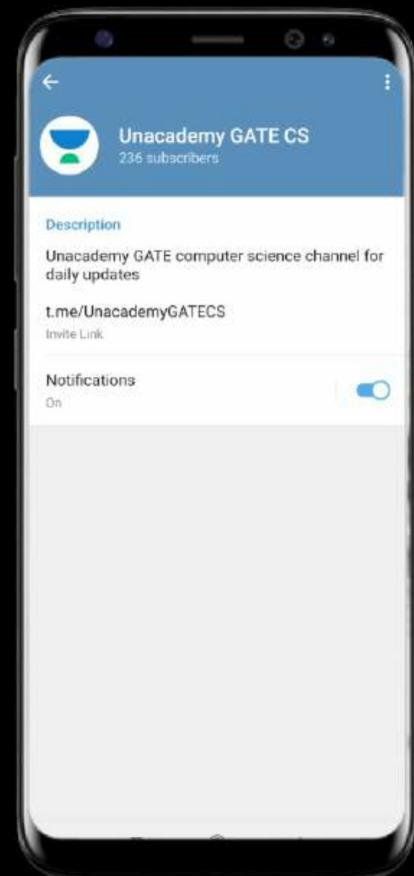
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