

Operating System: Reader-Writer Problem

By: Vishvadeep Gothi



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**AIR- 19, 119, 440, 682
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**ME from IISc Bangalore
Mtech BITS Pilani in Data
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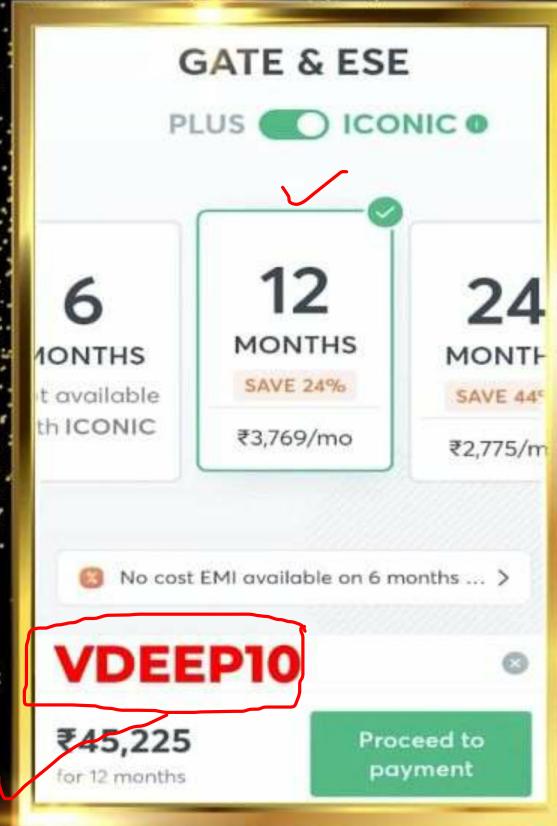
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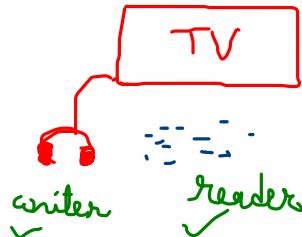
C.S. problem → Producer - consumer

Are You Ready??

Reader-Writer Problem

Consider a situation where we have a file shared between many people:

- ◎ If one of the people tries editing the file, no other person should be reading or writing at the same time, otherwise changes will not be visible to him/her
- ◎ However, if some person is reading the file, then others may read it at the same time



Reader-Writer Problem: Solution

- ◎ If writer is accessing the file, then all other readers and writers will be blocked
- ◎ If any reader is reading, then other readers can read but writer will be blocked

Reader-Writer Problem: Solution

- ◎ Variables:
 - **mutex**: Binary Semaphore to provide Mutual Exclusion
 - **wrt**: Binary Semaphore to restrict readers and writers if writing is going on
 - **readcount**: Integer variable, denotes number of active readers

- ◎ Initialization:
 - **mutex**: 1
 - **wrt**: 1
 - **readcount**: 0

Writer() Process

```
writer()
{
    wait(wrt)
    // perform writing
    signal(wrt)
}
```

Reader() Process

```
Reader()
{
    wait(mutex)
    readcount++;
    if (readcount == 1)
        wait(wrt)
    signal(mutex)
    //perform reading
    wait(mutex)
    readcount--;
    if (readcount == 0)
        signal(wrt)
    signal(mutex)
}
```

→ a writer is writing

wrt = 10

→ a reader comes

mutex = 0

rc = 1

stuck at wait(wrt)

→ second reader comes

Stuck
at mutex

Next Class

✓ Dining Philosopher Problem



✓ Classical Problems on
Synchronization





IF YOU DONT WANT TO MAKE MISTAKES,
THEN LEARN FROM MISTAKES OF OTHERS..

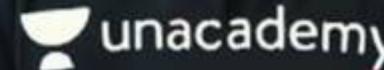
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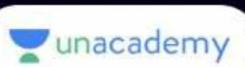
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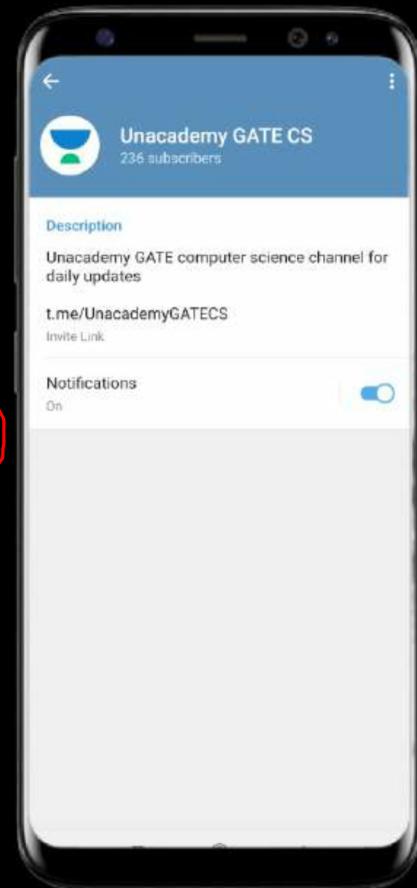
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