pay Thursday

DATE 1 10/8/19

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5. Process Sychronization.

1) Synchronization Concept.
2) Critical sect^n Problem.
3) Simaphore.
4) dealoc & starvation.
5) Classical Problem of Sychronization
6) bounded buffer Problem.
7) readers writers Problem
8) dinning filosophore Problem – weightage max.

(only one: 2)
(only one: 7, 8)

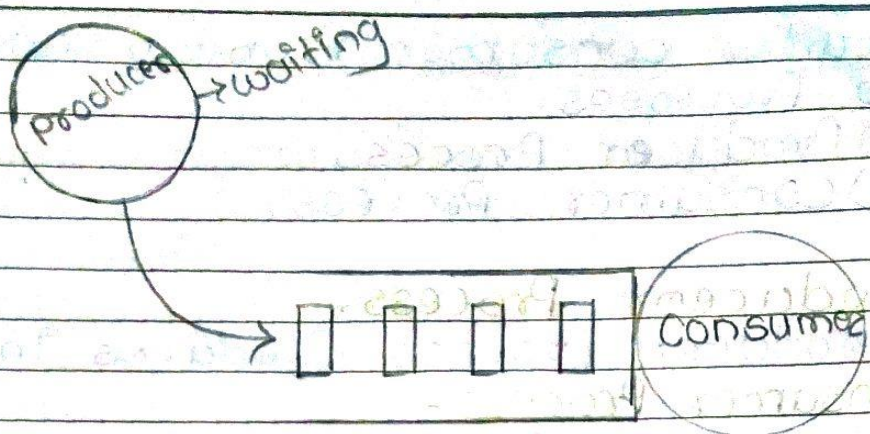
* Synchronization Concept &
Q. Explain and define Synchronization?

⇒ def^n:-
"Synchronizat^n is the mechanism to ensure the orederly exicution of Co-operating Process es that share logical address space so that data Consistency is maintain."

* Producer consumer Problem (bounded buffer Problem)
Q. Explain Producer Consumer Problem with suitable diagram
or
Explain bounded buffer Problem with diagram.

i) Procuder consumer Problem consist of two Processes.
   1) Producer Process
   2) Consumer Process

1) Produceor Process -
   Producer Process Produces info.
2) Consumer Process -
   Consumer process consume that information.
ii) the Producer-Consumer Problem share a common fixed sized buffer.
iii) In this case Consumer must wait at the time of buffer is empty.
iv) Producer must wait if the buffer is full.
v) empty & full Simaphore Count the no. of empty & full buffer respectively.
vi) a Soln to Producer-consumer Problem must satisfied following Condn.
   (1) Producer must not overwrite full buffee.
   (2) Consumer must not Consume & an empty buffer
   (3) mutual exclusive - (only one access) Producer & consumer must access buffers in mutual exclusive manner.
vii) It is also called as bounded buffer problem.



e.g Producer-consumer Problem:

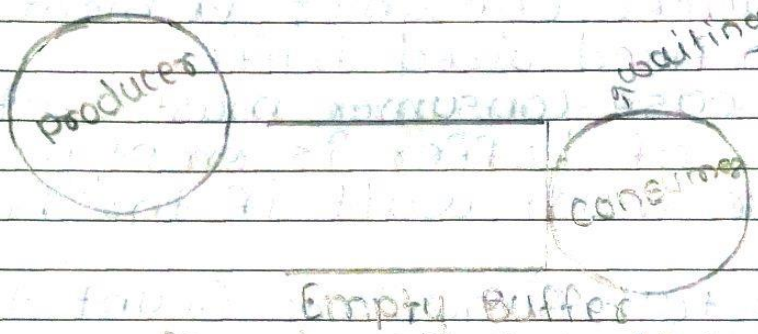


Fig:- bounded buffer problem.

* Critical Section Problem ⇒

4marks what is Critical section ? explain Soln to the Critical section Problem.

Ans def^n :- "Critical Section Problem can be defined as the Critical section is a piece of code that access shared resourcess that must not be concurrently access by more than one Process.".

ii) consider a system consist of nth co-operating Processes {P1, P2, P3 ..... Pn}
iii) each process has segment of code called a Critical section.
iv) in which the process may be changing the common variables, updating tables, reading & writting file & so on.
v) the imp features of C.S is that when one Process is exicuting in it's C.S then no other Process is allowed to enter into the C.S.
vi) i.e only one Process can be activated at a time in a C.S.
vii) thus, the exicution of C.S by the Process is mutually exclusive in time.
viii) each Process must request Permission to entee into the Critical section the section of code that implementing this request is called as entry section.
ix) Critical section may be followed by Exit sect & remender section i.e remainder code.

most imp ⇒ Soln to solve the Critical section Problem.

1) mutual exclusion :-
if one Process is exicuting in it's C.S then no other Process is allowed to enter into the C.S i.e only one Process can be activated at time in C.S

2) Progress ⇒

if no Process is exicuting in it's Critical section and some Processes wish to enter into Critical section then only those Processes that are not exicuting in their remainder section can be participates in deciding which will enter into the Critical section

③ Bounded waiting -

1) there exist a bound on the no of times that the other Processes are allowed to enter their Critical section after a Process has made request to enter into the Critical sectionand before that request is guranteed.

```
do
{
    [Entry section]

    Critical section;

    [Exit section]

    Remainder section
}
while ();
```

fig:- Soln to the Critical section Problem.

* Simaphore ⇒

What is simaphore ? write short note on simaphore ? write types of simaphore ? various operation of simaphore.

4m

Ans def" :-

"Simaphore is an Synchronization tool that can be used to solve Critical sectn Problems."

i) semaphore is a shared integer variable with non-negative values.

ii) on which process can process performed follow two operations-

iv) i) wait P(s) / down

ii) Signal V(s) / up

iii) intialization.

v) P & V are respectively called as P is called wait & V is called signal

vi) it is guarantee that one's the semaphore operation has started no other process can access the semaphore.

vii) until the operations has completed. Or blocked.

⇒ viii) Operation on semaphore ⇒

there are three basic operations Can be done by Semaphore :-

1) wait P(s) / down

2) Signal V(s) / up

3) intialization.

1) wait P(s) / down ⇒

(2)

i) this operation decreases the value of semaphore by 1.
ii) if it is greater than zero
iii) When the resultant value is negative then the process is exicuting the wait operation is blocked.

(2) Signal (up) ⇒
i) the signal operations increases the value of semaphore by 1.
ii) If the value is not positive then the one of processes blocked in wait operation is unblocked.

(3) Intialications ⇒
i) the semaphore may be intialize to non-negative values ie is positive values only
ii) Intialication contains the positive value

* types of semaphore ⇒
  1) Counting semaphore
  2) Binary semaphore.

1) Counting Semaphore ⇒
i) In the counting semaphore integer value may range over an unrestricted domain.
ii)

2) Binary Semaphore ⇒
i) It is an semaphore with an integer value that can range only betn 0 & 1.
ii) Binary semaphore can be simple to implement than the counting semaphore

(3)

* dinning filosophere Problem :-

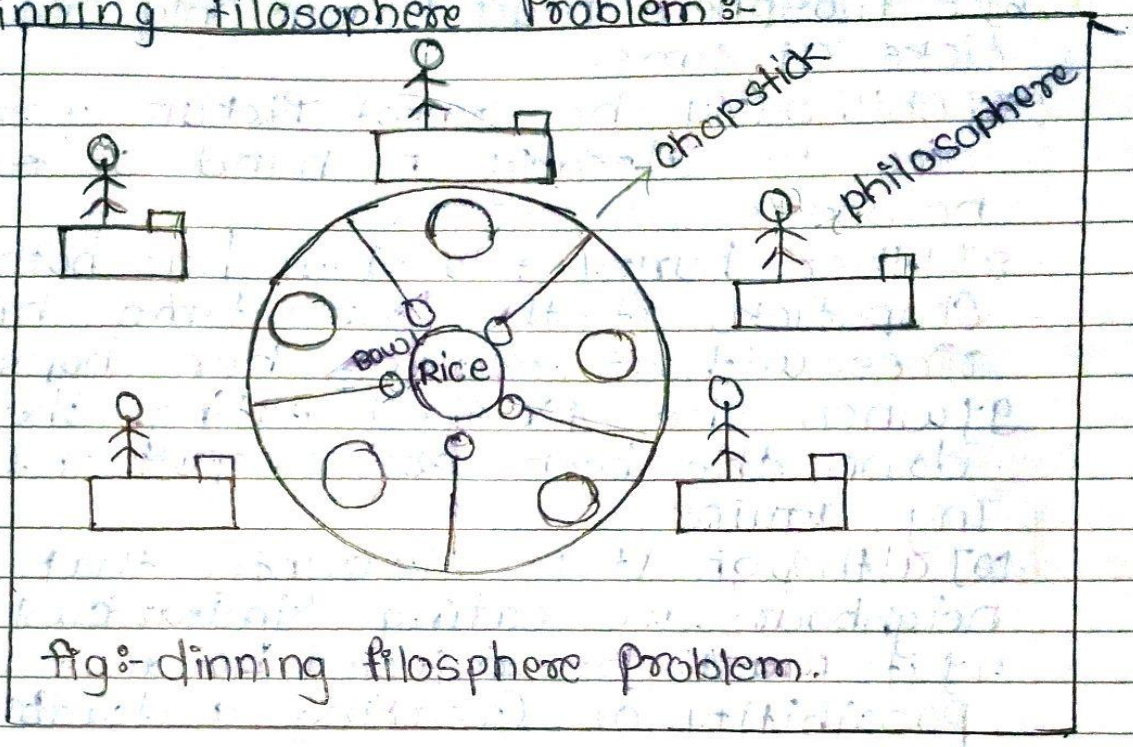


fig:- dinning filosphere problem.

Q Explain Dinning filosphere Problems with Suitable diagram.
4m

1) Consider the 5 filosphere who spent their time in eating and thinking.
2) the filosphere share Common Circular table surrounded by 5 chairs each belonging to 1 filosphere.
3) In the center of table their bowls of rice and table is laid with 5 single Chopsticks.
4) when filosphere thinks he doesnot intereact With his Colloques from time to time
5) A filosphere gets hungry & tries to pickup two chopsticks that are close to her.

(4)

6] A filosphere may pickup only one chopsticks at time.
7] obiviously he cannot pickup chopsticks i.e is already in hand of ~~bebte~~ neibours
8] When hungry filosphere has both her chopsticks at the same time he eats rices. without relasing her chopsticks.
9] when she finished eating she puts down the both her chopsticks & thinking agains.
10] Although it is guarantee that no to neighbours are eating Similtanously.
11] it must be rejected because it has possibility of Creating a deadlock.

⇒ Solution to the dinning filosphere Problem=

Case 1] Allowed at most four filosphere to be sat in simultaneously at the table.
Case 2] Allowed the filosphere to pickup her Chopstick only both if chopstick are. Available.
Case 3] odd filosphere Pickup first left chopsticks & then her right chopstick.
Case 4] even filosphere pickup the first right chopsticks & then her left Chopsticks.

* Classical Problem of Synchronization or reader-writer Problem ⇒

Q Explain the reader-writer Problem in detail.
Explain classical Problem of Synchronization

Ans I] Reader-writer Problem is also known as classical Problem of Synchronization.

II] Reader-writer Problem consist of two processes i.e Reader process & writer process.

III] A db is shared amount of several processes some Processes wants to read only data such Processes are called as readee Processes.

IV] some other Processes may want to read & write i.e update the shared object such processes are known as writer Process

V] If more than one readee process access the object simultaneously then their is not Problem.

VI] If two or more writer Processes wants to access the object simultaneously then it might result into the Problem.

Sol^{n}: VII] To ensure that this difficulties do not arised we required that writee Processes have exclusive access to shared object

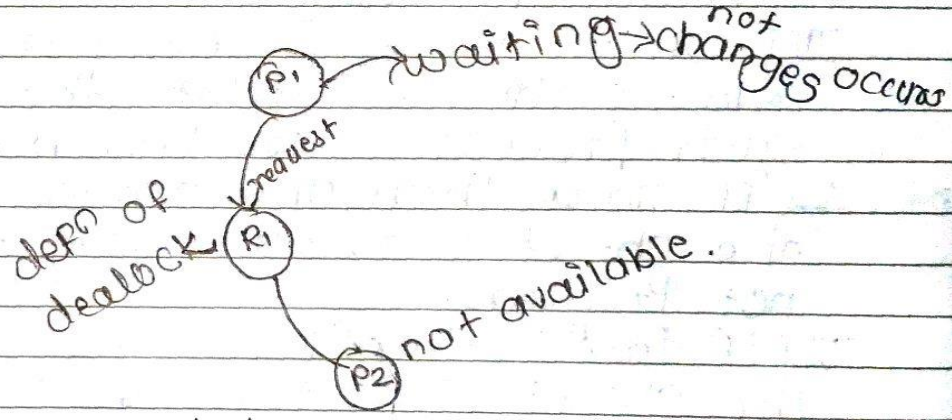
VIII] this Problem is referred as readee writee Problems.

IX] No reader should wait for other readee to finished. Simply, because writer is waiting.

X] Sol^{n} to the Reader-Writer Problems:—

1) many readers can perform reading concurrently.
2) reading is prohibited while writer is writing.
3) only one writer can perform writing at a time.

⇒ defn starvation ⇒
"starvation is process in which one or more process gets block forever & never get a chance to enter into the critical section."



1) Explain bounded buffer problem in detail with diagram.
2) what is critical sectn & soln to the C.S
3) explain dinning filosphere problem in detail with diagram.
4) explain classical problem of synchronizatn
5) what is simaphore & explain types & operatn in details.