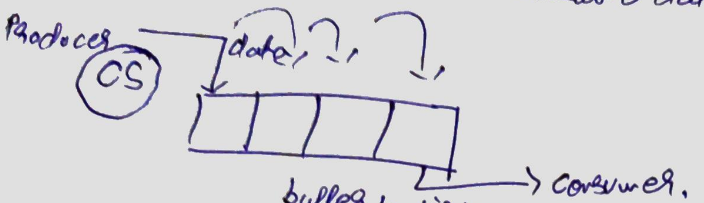
Q. LEC-18 | Producer Consumer problem

— bounded buffer problem.

⊛ Problem statement

① Producer thread ↓ Produces data

② Consumer thread ↓ Consume data.



buffer h jiske andar ~~buf~~ Producer produce krte, krte data ko buffer mae daal deta h

Consume kya krta h jb producer produce krdeta h yani ki koi bhi

N slots, starting empty, Producer produce kr ke daalega

* Mujhe ek synchronization ka method chahiye ki producer jb produce kr rha ho tb 100 produce kr ke daale or consumer uss time interfere na kare ie uthane na jae.

Problem ??

CS (buffer) → shared resource h, chahta nhi hu inconsistency ho, wai ek synchronize way thread ka access chahta hu

— sync b/w producer thread & consumer thread.

— Producer must not insert data when the buffer is full.

— consumer must not pick /remove data when buffer is empty

kyuki CPU cycle waste nhi karni

Sol^n :- Semaphores.

① m, mutex → binary sema. used to acquire lock on buffer.

② empty sema → a counting sema.
initial value is n → i.e kyuki starting mae slots khali hongi
↳ tracks empty slots.

③ full sema → tracks filled slots
- initial = 0

Producer

```
do {
  wait (empty); //wait until empty>0
                  then, empty → value-1
 wait (mutex);
 //CS, add data to buffer
 Signal (mutex);
 signal (full); // increment full
                              → value
  } while (1)
```

Consumer

```
do {
 wait (full); //wait until full>0, then
               full --;
wait (mutex);
//remove data from buffer
signal (mutex);
signal (empty); // increment empty.
} while (1)
```

→ mutex → mutual exclusion