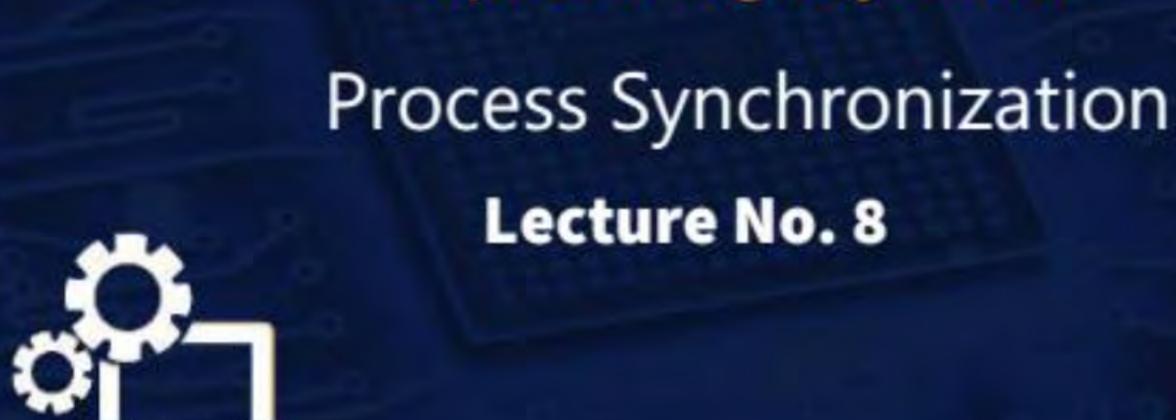
CS & IT ENGINERING

Operating System





By- Dr. Khaleel KhanSir





TOPICS TO BE COVERED

Counting Semaphore

Binary Semaphore

Problem Solving with

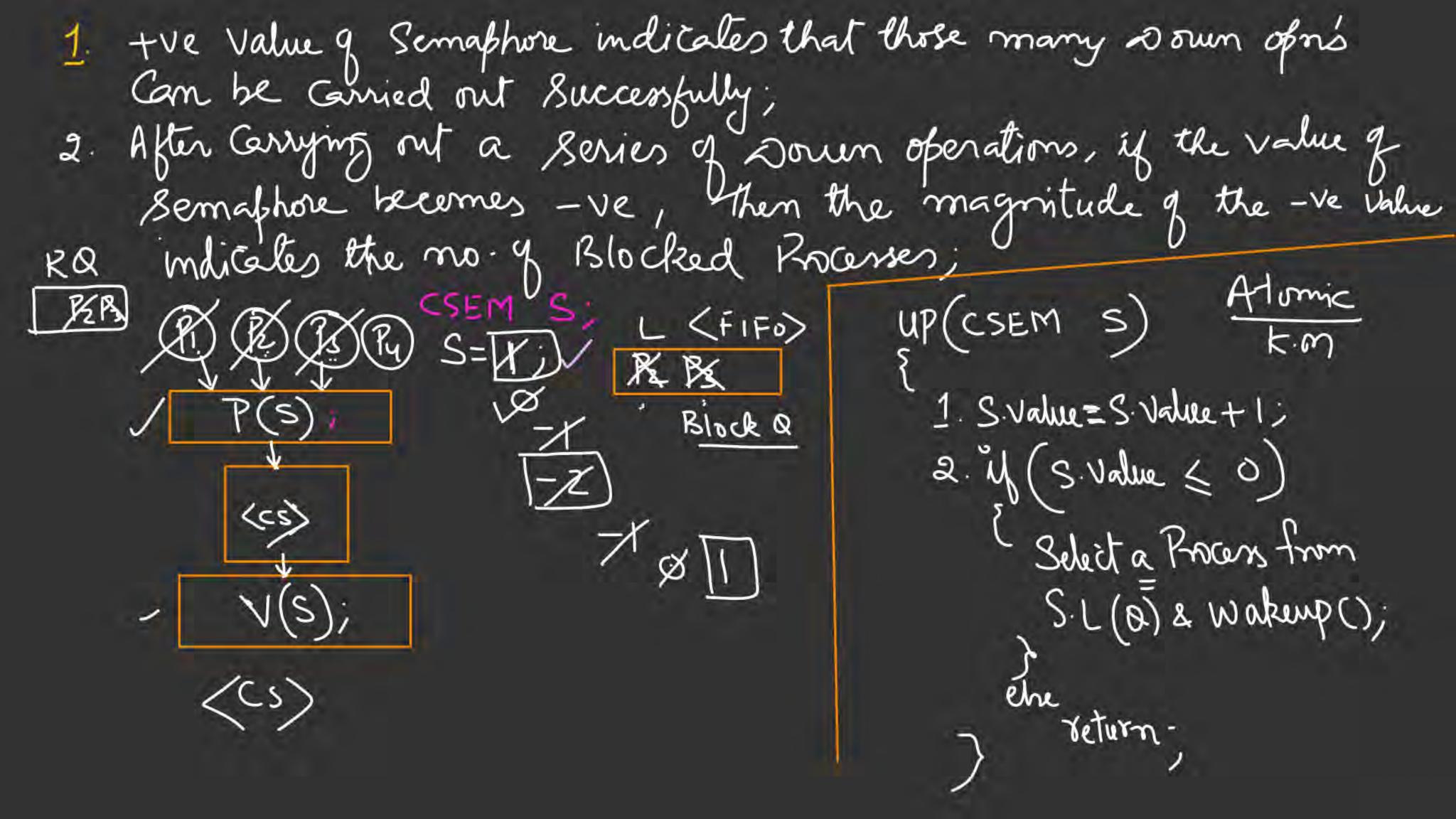
Semaphore

General Semaphine Sypedif CSEM SI stuct S. Value = 1; (S=1); int values; DOWN (S); QueueType L; < Neut-Strunt >) CSEM; List of PCB's of these Processes that gets blocked, while Performing Down opn unsuccentrally

DOWN (CSEM S) 1. S. Value = S. Volue - 1; 2. if (S. Value < 0) // uman put this process Pcs in S.L(a) & Block the Process (sleep)

return; | burners

How many DOWN oprio Can be Carried out by Knowses Successfully?



Office S=8; Operations:
$$10P; 10; 15P; 20; 6P; 30$$

$$-2 -1 -16 -14 -20 -17$$

$$S=?$$

Q2) CSEM $S = \chi$; $(\chi - 12) + 4 - 6 + 3 - 8 + 1) = -6$ obns: 127; 4V; 6P; 3V; 8P; 1V

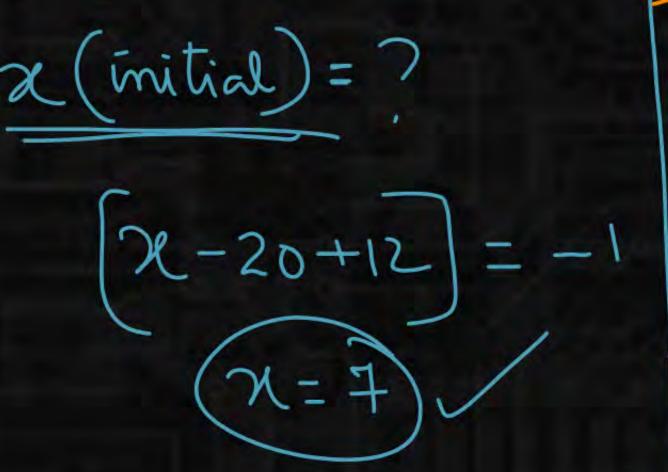
$$\chi - 18 = -6$$

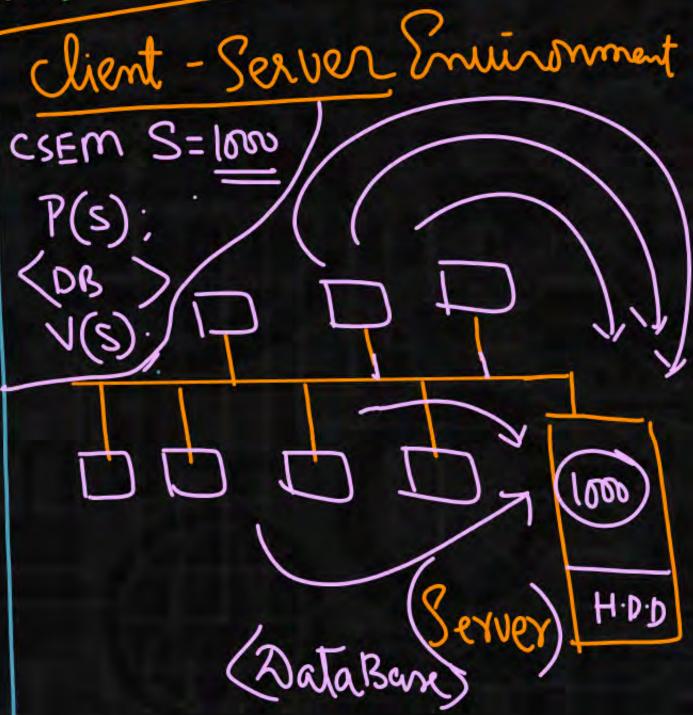
$$\chi = 18 - 6 = 12$$

P1 P2 P3 - -- P17



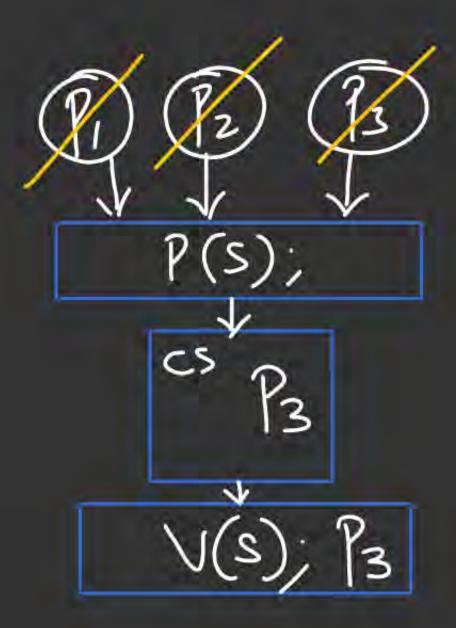
Consider a non-negative counting semaphore S. The operation P(S) decrements S, and V(S) increments S. During an execution, 20 P(S) operations and 12 V(S) operations are issued in some order. The largest initial value of S for which at least one P(S) operation will remain blocked is ______.





BINARY SEMAPHORE (0,1) Typedet BSEM Stryct S=1; enum Value (o, i) DDWN(S); < Nent-Stmmt> - QueueType L',) BSEM; > list of PCB's of those Processes that gets blocked while performing DOWN opin throuscenfully !

```
DOWN (BSEM S)
  if (S. Value = = 1)
      S. value = 0; / Success//
veturn;
      put this process (PCB)
      in S.L(a) &
     13/ock-il- (sleep());
```



```
BSEM
  UP (BSEM S)
    if (S.L(a) is NOT Empty
       Select a Process
from S.L(Q) &
          Wakeup ();
     élse S+Value=1
```

Cases of Binary Semaphines

3. BSEM S;

S=0;

V(s); 0 > if \(\text{a}' \) is NoT Empty

S\(\text{-} \) if \(\text{a}' \) is Empty

Status = success

4. BSEM S; S=1; \(\text{implies cs's Gree & 'a' is } \)
\(\text{V(s);} \)
\(\text{S=1} \)
\(\text{Status=} \text{Success} \)

BSEM S=1; omis: 10P; 2X; 18P; 3V; 4P; 5X; 2) Sizeq'Q'L

L 772522 36(21)

(i) As long as there is a process in "Cs" & Processes in Block Q' then the value of BSEM must be 'O';



