Q: Consider a system with 3 processes that share 4 instances of the same resource type. Each process can request max of N instances. The largest value of N that will always avoid deadlock.

(1) 1 (2) 2 (3) 3 (4) 4

(P) No of Processes = 3
(R) No of Resources = 4

$$\boxed{R \geq P(N-1) + 1}$$

N = max requirement of each resource

Class 10: Dead Lock Part 2

Sahi Prep Hai Toh Life Set Hai

$4 \geq 3(N-1) + 1$

$3 \geq 3N - 3$

$6 \geq 3N$

$N \leq 2$

Q: An OS has 3 process each requires 2 unit of resource R. The min value of R such that the system will never ever in deadlock.

	need
P1	2
P2	2
P3	2

Ans Trick

P1	2	2-1=1
P2	2	2-1=1
P3	2	2-1=1

3 + ← Max value at which deadlock will occurs

Min value $3+1 = 4$ Deadlock not occur

Content :-

1. **Banker's Algorithm:** It is a deadlock avoidance algorithm. It is used to avoid deadlocks, by maintaining the system in a safe state. The algorithm operates as follows :
   a. When a new process is admitted into the system , the process has to pre-declare its maximum requirement of resources they may occur any time during its execution. The process will be admitted for execution only if its maximum requirement of the resources is within the system capacity of resources. The processes admitted for execution can be safely executed in some sequence called SAFE SEQUENCE.
   b. Whenever, a process request allocation of resources(of course within its maximum requirement, already declared).

Q: P1 P2 P3

Max demand: 3 4 5

Min no of resources so the system will not deadlock

(1) 3

(2) 7

(3) 9

(4) 10

<P1, P2, P3>

gradeup

Question: Find the safe sequence:

Total Resources = 13

	Allocation	Maximum
P_0	5	10
P_1	4	6
P_2	1	2

10

Solution:

	Allocation	Maximum	Need (Max - Allocation)
P_0	5	10	5
P_1	4	6	2
P_2	1	2	1
Total	10		

Avc = 13 − 10 = 3

$3 + 4^{P1} = 7$

$7 + 1^{P2} = 8$

$8 + 5^{P0} = 13$

N.W Allocated Maximum Available

	Allocated	Maximum
A	10211	11213
B	20110	22210
C	11010	21310
D	11110	11221

00X11

Free = 13 – 10 = 3

Free Resources = 3+4 =7 ---- >P_2

7+1 = 8 ------- > P_3

8+ 5 = 13 ------- > P_1

<P_2,P_3,P_1> → Safe Sequence

<P_1 P_2 P_3>

incorrect Q:

Marks to all

The smallest value of X for which the system is in safe state is ______

(1) 1 (2) 3 (3) 2 (4) 0

Already asked NET

<P1, P3, P4, P0, P2>

Question :

ABC

Total resources :- 10 5 7

	Allocation	Maximum	Need
	ABC	ABC	
P_0	010	753	743
P_1	200	322	122
P_2	302	902	600
P_3	211	222	011
P_4	002	433	431

725

Free resources = 3 3 2

free = 10 5 7
7 2 5
3 3 2

332 + 200 (P1) = 532

532 + 211 (P3) = 743

743 + 002 (P4) = 745

745 + 010 = 755

755 + 302 = 1057

Free = 230 + 302 = 532 <P1, P3, P4, P0, P2> & 2 resource of C.

Make changes in P1

ABC
102

Free = 532 + 211 = 743

Free = 743 + 002 = 745

Free = 745 + 010 = 755

Free = 755 + 302 = 1057

1) No

2) Yes, P1 P3 P4 P0 P2

3) yes, P1 P3 P4 P2 P0

4) yes P2 P3 P0 P4 P1

Free = 332 − 102
= 230 Free

Solution :-

	Allocation	Maximum	Need
	ABC	ABC	ABC
P_0	010	753	743
P_1	302 200	322	122 020
P_2	302	902	600
P_3	211	222	011
P_4	002	433	431
Total	**725**		

332 + 200 =532 -----P_1
532 + 211 = 743 ---- P_3
743 + 002 = 745 --- P_4
745 + 010 = 755 ----P_0
755 + 302 = 1057 ----P_2

$<P_1,P_3,P_4,P_0,P_2>$ ---→ safe sequence

P1 allocation = 200 + 102
= 302

P1 need = 122 − 102
= 020

gradeup