Roll No:
IT TEA

9th Assignment

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Aim: Baker's algorithm for deadlock detection and avoidance

Problem statement: WAJ Program to implement Banker's algorithm

Theory:

- The banker's algorithm is a resource allocation & deadlock avoidance algo that test for safety by simulating the allocation of predetermine max possible amount of all resources.
then makes an "s state" check to test for possible activities before deciding wether allocation should be allowed to continue

- following DS used to implement Banker's algorithm

Available :-
- It is a 1-d array of size 'm' indicating the num of available resources of each type

max :-
It is 2-D array of size mxn that define the max demand of each Process in system

Allocation :-
It is 2-D array of size mxn that define num of resources of each type currently allocated to each Process

Need :-

- It is 2-D array of size n x m that indicate remaing resources need of each process

② Safety algorithm :-

i) let work & finish be vectors of len m and n resp
initialize work = Available
finish [i] = false for i = 1, 2, 3, 4 - - - - n

ii) find an i such that both
a) finish [i] = false
b) Need i <= work if no goto step 4

iii) work = work + Allocation [i]
finish [i] = true
goto step 2

iv) if finish [i] = true for all i
then the system in safe state

Example :-

Process	Allocation			max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

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que1) Content of need matrix

Need [i,j] = max [i j] - Allocation [i j]

Process	Need		
	A	B	C
P0	7	4	3
P1	1	2	2
P2	6	0	0
P3	0	1	1
P4	4	3	1

que2) If system is in safe state ? what is sequence

① m = 3 n = 5

work = available.

W = [3 | 3 | 2]

	0	1	2	3	4
Finish =	F	F	F	F	F

② i = 3

$Need_3$ = 0, 1, 1

$Finish_3$ = false & $Need_3$ < work

So P_3 sequence must kept is safe state

③ W = W + A

W = [7 | 5 | 5]

A B C

F =	T	T	F	T	T

④ For i = 4

$Need_4 = 4, 3, 1$

$Finish_4$ = false & $Need_4$ < work

So P4 must be kept in safe sequence

⑤ W = W + A

W = | 7 | 4 | 5 |

	0	1	2	3	4
F =	F	T	F	T	T

⑥ for i = 0

$Need_0 = 7, 4, 3$

F[0] is false Need < work.

So P0 must be kept in safe sequence

Conclusion:

Thus we have implement Banker's Algorithm