

SAMARTH COLLEGE OF COMPUTER SCIENCE, BELHE

Assignment no.1

Sub: Operating Systems- II

Submission Date: 12/01/2024

Q.1 Consider a system with 5 Processes {P0,P1,P2,P3,P4} and four resources types {A, B, C, D}. There are 3 instances of type A, 14 instances of type B, 12 instances of type C and 12 instances of type D. The allocation and maximum Demand matrices are as follows:

Allocation					Max				
	A	B	C	D		A	B	C	D
P0	0	6	3	2	P0	0	6	5	2
P1	0	0	1	2	P1	0	0	1	2
P2	1	0	0	0	P2	0	7	5	0
P3	1	3	5	4	P3	2	3	5	6
P4	0	0	1	4	P4	0	6	5	6

Answer the following questions using Banker's algorithm.

1. What are the contents of the need array?
2. Is a System in a safe state?
3. If the request from process P4 arrives for {0,0,4,1} can the request be immediately granted?

Q.2 Consider a system with 7 processes A through G and six types of resources R through W with one resource for each type. Resource ownership is as follows:

A holds nothing but wants T, B holds nothing but wants S

C holds nothing but wants S, D holds U and wants S and T

E holds T and wants V, F holds W and wants S

G holds V and wants U

Is the system deadlocked, and if so, which processes are involved?

Q3. Consider the following sets P, R and E:

$P = \{P1, P2, P3\}$

$R = \{R1, R2, R3, R4\}$

$E = \{P1 \rightarrow R1, P2 \rightarrow R3, R1 \rightarrow P2, R2 \rightarrow P2, R2 \rightarrow P1\}$

Also consider the following number of instances per resource type:

(i) One instance of resource type R1 and R3

(ii) Two instances of resource type R2.

(iii) Three instances of resources type R4.

Consider the resource – allocation graph for the above problem. Check Whether the system is in the deadlock.

Q.4 Explain the term 'select a victim and rollback' in the context of deadlock recovery.

Q.5 Consider given snapshot of system. A system has 5 processes and 3 types of resources A,B,C

	Allocation				Max		
	A	B	C		A	B	C
P0	2	8	5	P0	3	10	6
P1	2	2	3	P1	3	4	3
P2	3	2	2	P2	3	7	8
P3	1	1	3	P3	1	2	3
P4	3	3	4	P4	3	8	7

Available		
A	B	C
0	2	1

Answer the following questions using Banker's Algorithm:

- What is the context of the need matrix?
- Is the system in safe state? If yes, Give the safe sequence.

Q.6 Answer the Following Terms: (in Short)

- 'Wait for a graph' is used for deadlock avoidance in the System. True/False? Justify.
- What is deadlock? state different methods to handle deadlock.
- What is Starvation?
- State the necessary conditions for a deadlock to occur.
- Define request edge and claim edge