

Bankers Algorithm

ID-1938520113

1. Allocation ABC \rightarrow 2 1 0

Process	Allocation			MAX			Need			Available
	A	B	C	A	B	C	A	B	C	
P ₀	1	1	2	4	3	3	3	2	1	5 3 4
P ₁	2	1	2	3	2	2	1	1	0	2 1 0 ✓
P ₂	4	0	1	9	0	2	5	0	1	4 6 4 6
P ₃	0	2	0	7	5	3	7	3	3	4 2 2 10 4 7
P ₄	1	1	2	1	1	2	0	0	0	4 2 2 ✓

P₀, Need (3 2 1) \leq Available (~~5~~ 2 1 0) = False

\therefore Available = 2 1 0

P₁ ✓, Need (1 1 0) \leq Available (2 1 0) = True

$$\begin{aligned} \text{New Available} &= \text{Available} + \text{Allocation} \\ &= 210 + 212 \\ &= 422 \end{aligned}$$

P₂, Need (5 0 1) \leq Available (4 2 2) = False

\therefore Available = 4 2 2

P₃, Need (7 3 3) \leq Available (4 2 2) = False

\therefore Available = 4 2 2

P₄ ✓, Need (0 0 0) \leq Available (4 2 2) = True

$$\begin{aligned} \text{New Available} &= 422 + 112 \\ &= 534 \end{aligned}$$

P_0 , Need (321) \leq Available (534) = True

\therefore New Available = 534 + 112

= 646

P_2 , Need (501) \leq Available (646) = True

New available = 646 + 401

= 1047

P_3 , Need (733) \leq Available (1047) = True

New available = 1047 + 020

= 1067

\therefore Safety Process Sequence = ~~P0~~

$P_1 \rightarrow P_4 \rightarrow P_0 \rightarrow P_2 \rightarrow P_3$

2. Available \rightarrow 1 5 2 0

Process	Allocation				Max				Need				Available			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	0	0	0	0	1	5	2	0
P_1	1	0	0	0	7	5	0	0	7	5	0	0	1	5	3	2
P_2	1	3	5	4	2	3	5	6	1	0	0	2	2	5	3	2
P_3	0	6	3	2	0	6	5	2	0	0	2	0	3	8	8	6
P_4	0	0	1	4	0	6	5	6	0	6	4	2	3	1	1	8

P_0 , Need (0000) \leq Available (1520) = True

\therefore new available = 1520 + 0012

= 1532

$$P_1, \text{Need}(0750) \leq \text{Available}(1532) = \text{True} \quad \text{True}$$

$$\therefore \text{Available} = 1532 + 1000 = 2532$$

$$P_2, \text{Need}(1002) \leq \text{Available}(2532) = \text{True}$$

$$\text{Available} = 2532 + 1354$$

$$= 3886$$

$$P_3, \text{Need}(0020) \leq \text{Available}(3886) = \text{True}$$

$$\text{Available} = 3886 + 0632$$

$$= 31418$$

$$P_4, \text{Need}(642) \leq \text{Available}(31418) = \text{True}$$

$$\text{Available} = 31418 + 0014$$

$$= 3141212$$

Sequence $\rightarrow P_0 \rightarrow P_1 \rightarrow P_2 \rightarrow P_3 \rightarrow P_4$

3 Available ABC - 2 3 0

Process	Allocation A B C	Max A B C	Need A B C	Available A B C
P ₀	0 1 0	7 5 3	7 4 3	7 4 3 ✓
P ₁	3 0 2	3 2 2	0 2 0	2 3 0 ✓
P ₂	3 0 2	9 0 2	6 0 0	5 3 2 ✓
P ₃	2 1 1	2 2 2	0 1 1	5 3 2 ✓
P ₄	0 0 2	4 3 3	4 3 1	7 4 3 ✓

P₀, Need (7 4 3) ≤ Available (2 3 0) = False

P₁ ✓, Need (0 2 0) ≤ Available (2 3 0) = True
Available = 2 3 0 + 3 0 2 = 5 3 2

P₂, Need (6 0 0) ≤ Available (5 3 2) = ~~True~~ False
Available = 5 3 2 + ~~3 0 2~~ = ~~8 3 4~~

P₃ ✓, Need (0 1 1) ≤ Available (5 3 2) = True
Available = 5 3 2 + 2 1 1 = 7 4 3

P₄ ✓, Need (4 3 1) ≤ Available (7 4 3) = True
Available = 7 4 3 + 0 0 2 = 7 4 5

P₀ ✓, Need (7 4 3) ≤ Available (7 4 5) = True
Available = 7 4 5 + 0 1 0 = 7 5 5

P₂ ✓, Need (6 0 0) ≤ Available (7 5 5) = True
Available = 7 5 5 + 3 0 2 = 10 5 7

∴ Sequence: P₁ → P₃ → P₄ → P₀ → P₂