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Class Test-2

Course: Operating Systems

Course code: CSE 309

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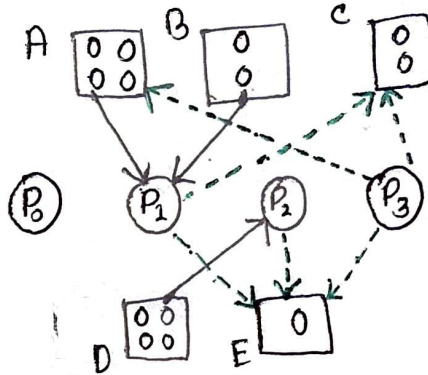
Section: 1

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1 No question Answer

Soln: Given Graph,



From the Resource allocation graph we can see there are total 4 processes ($P_0 - P_3$). And 5 resources (A-E).

Here,

$$\begin{aligned}\text{Vertices} = V &= \text{Process} + \text{resources} \\ &= 4 + 5\end{aligned}$$

$$\therefore V = 9$$

$$\begin{cases} \text{Claim Edges} = 6 \\ \text{Assignment Edge} = 3 \\ \text{Request Edge} = 0 \end{cases}$$

$$\begin{cases} \text{Instances for resource "A"} = 4 \\ \text{Instances for resource "B"} = 2 \\ \text{Instances for resource "C"} = 2 \\ \text{Instances for resource "D"} = 4 \\ \text{Instances for resource "E"} = 1 \end{cases}$$

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2 NO question Answer

Soln: We know that there are mainly 4 steps for safety algorithm.

Step-1

Work = Available

$\therefore \text{Work} = 2 \ 0 \ 2 \ 1$ (Given)

Initially, Finish [0] = False

here, $i = 1, 2, 3, 4, 5$

Finish [2] = F

Finish [3] = F

Finish [4] = F

Finish [5] = F

Step-2

Now, For $i = 1$,

$\text{Need}_1 \leq \text{Work}$

$1 \ 1 \ 0 \ 1 \leq 2 \ 0 \ 2 \ 1$

(condition False)

$i = 2$,

$0 \ 1 \ 1 \ 2 \leq 2 \ 0 \ 2 \ 1$

(condition False)

$i = 3$,

$2 \ 1 \ 0 \ 0 \leq 2 \ 0 \ 2 \ 1$

(condition False)

$i = 4$,

$0 \ 0 \ 1 \ 1 \leq 2 \ 0 \ 2 \ 1$

(condition True)

Now, we can go to step-3 for $i = 4$,

We know,

for Step-3, $Work = Work + allocation$

$$Work = 2 \ 0 \ 2 \ 1 + 2 \ 1 \ 0 \ 1$$

$$\therefore Work = 4 \ 1 \ 2 \ 2$$

And, $Finish[4] = True$

Again, $i = 5$,

$$1 \ 2 \ 2 \ 0 \leq 4 \ 1 \ 2 \ 2$$

(condition False)

Now, we have to check $i = 1, 2, 3, 5$ again (sequentially) \rightarrow

▣ for, $i = 1$,

$$1 \ 1 \ 0 \ 1 \leq 4 \ 1 \ 2 \ 2$$

(condition true)

$$Work = 4 \ 1 \ 2 \ 2 + 1 \ 0 \ 1 \ 2$$

$$\therefore Work = 5 \ 1 \ 3 \ 4$$

And, $Finish[1] = True$

$$\text{P } \underline{i = 2}, \quad 0 \ 1 \ 1 \ 2 \leq 5 \ 1 \ 3 \ 4$$

(condition true)

$$Work = 5 \ 1 \ 3 \ 4 + 0 \ 1 \ 0 \ 1$$

$$\therefore Work = 5 \ 2 \ 3 \ 5$$

And, $Finish[2] = True$.

$i = 3,$

2 1 0 0 \leq 5 2 3 5

(condition true)

Work = 5 2 3 5 + 2 1 1 0

\therefore Work = 7 3 4 5

And Finish[3] = True

$i = 5,$

1 2 2 0 \leq 7 3 4 5

(condition true)

Work = 7 3 4 5 + 0 0 1 1

\therefore Work = 7 3 5 6

And Finish[5] = True

Step-4

We can see Finish[i] = True, ~~for~~ (for $i = 1, 2, 3, 4, 5$)
i.e. for all "i"

So, the system is in a safe state.

Safe sequence = $\langle P_4, P_1, P_2, P_3, P_5 \rangle$

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✓
Ans: