DEPARTMENT OF SOFTWARE ENGINEERING

The University of Lahore

Faculty of Information Technology

Assignment Cover Letter

(Individual Work)

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SAP ID	70082385	Title of Assignment	03
Course Code	CS 11303	Due Date	26/12/2022
Course Name	Operating Systems	Submission Date	26/12/2022
Section	T		

The assignment should meet the below requirements:

1- Assignment (hard copy) is required to be submitted on clean paper and soft copy as per lecturer's instructions.
2- Soft copy assignment also requires the signed (hardcopy) submission of this form, which automatically validates the softcopy submission.
3- The above information is complete and legible.
4- Compiles pages are firmly attached.
5- Assignment has been copied (softcopy & hardcopy) for each student ahead of the submission.

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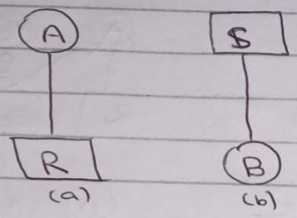
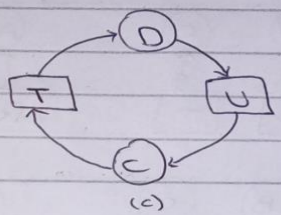
Question-1

Question 1.

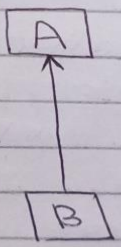




So, this process can complete until it gets the required resource and it can't released the already present resources before complete. So the system is in a deadlock.

This graph also helps us to make plan in order to prevent deadlock, we just have to prevent occuring of a loop in the graph.

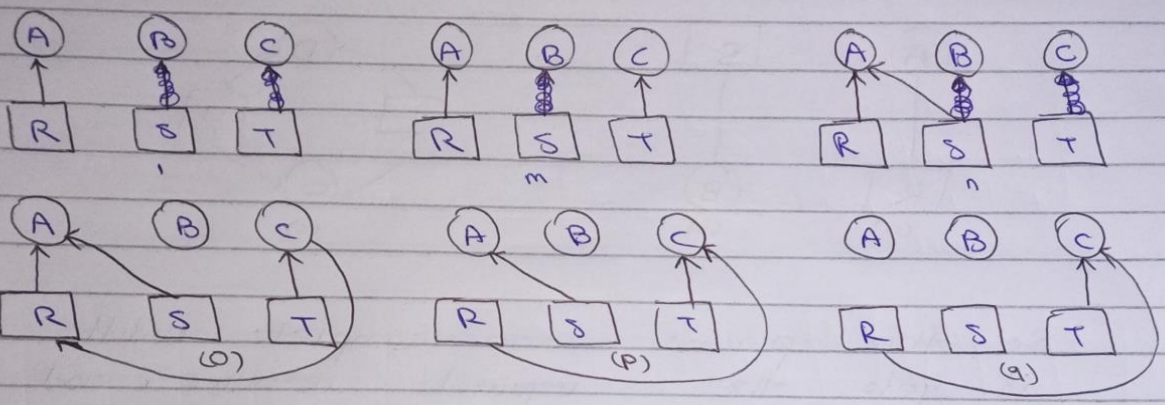
The resource graph can be illegal if one process is requesting for another process instead of a resource.



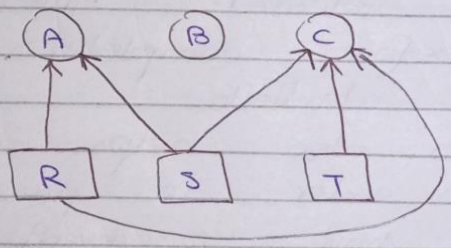
Here B process is requesting for A

Question-2

Question 2:



Step (o):

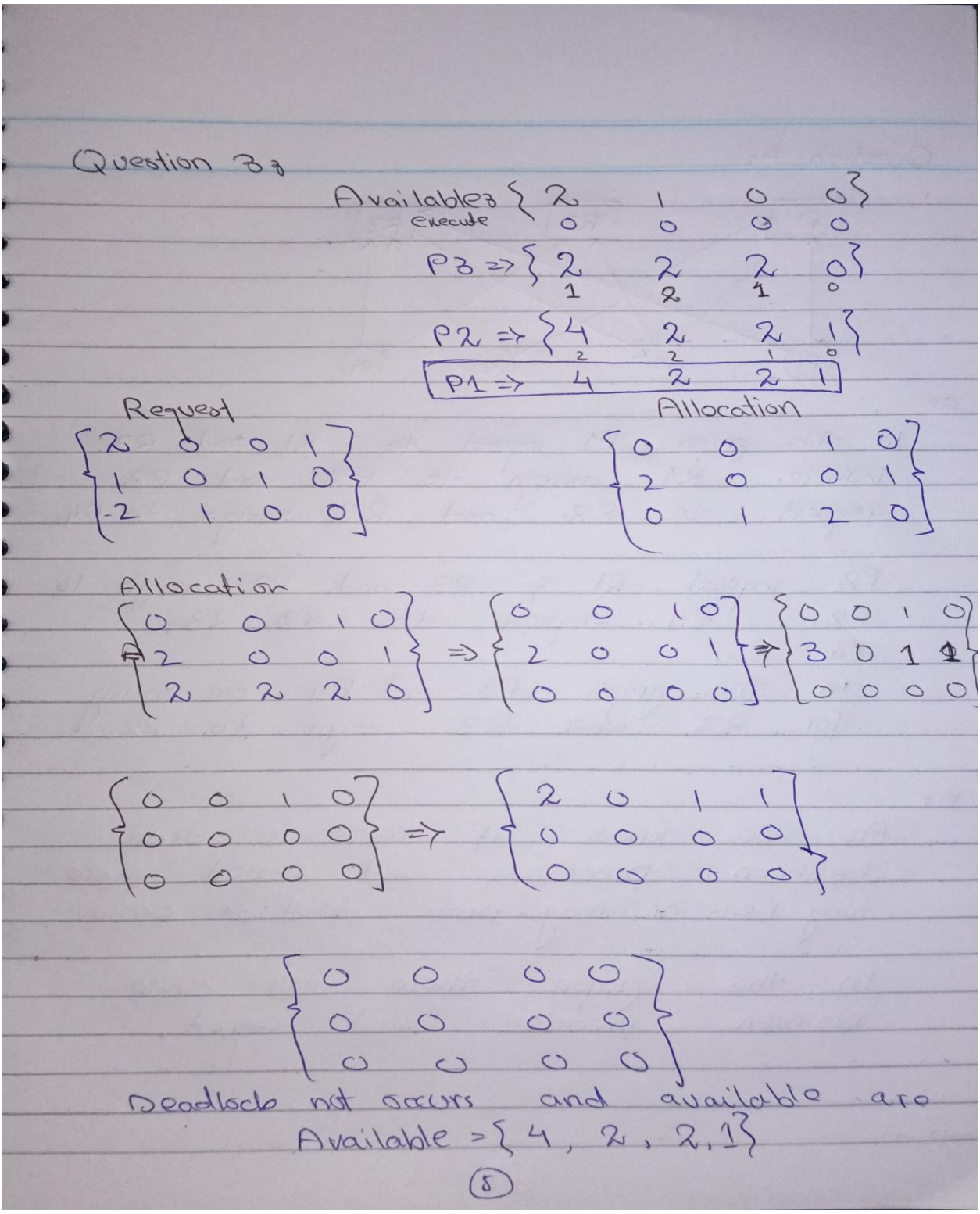


As we look C. request S instead of R but deadlock won't occurs because no cycle will be formed when an arrow is added from S to C.

As we added another arrow from R to C. In here deadlock lock won't occurs because no cycle will be formed. ~~when an arrow is added~~

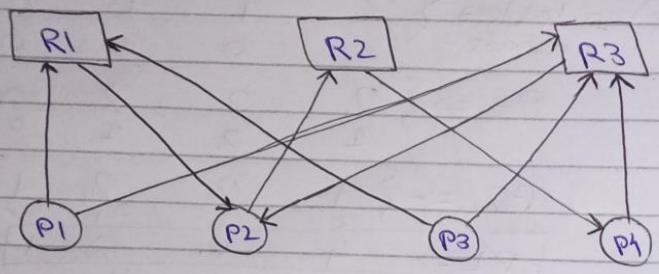
C can be access S after A released it.

Question-3


Question 3:
Available: { 2 1 0 0 }
execute { 0 0 0 0 }
P3 => { 2 2 2 0 } → { 1 2 1 0 }
P2 => { 4 2 2 1 } → { 2 2 1 0 }
P1 => 4 2 2 1
Request
Allocation
Allocation
Deadlock not occurs and available are
Available = { 4, 2, 2, 1 }
(5)

Question-4

Question 4:



a:

In this graph P1 request to R1 and R3. Where R1 assign to P2 and P2 request to R2 and R2 assign to P4.

P2 request R1 & R3 and R3 assign to P2. P4 request to R3.

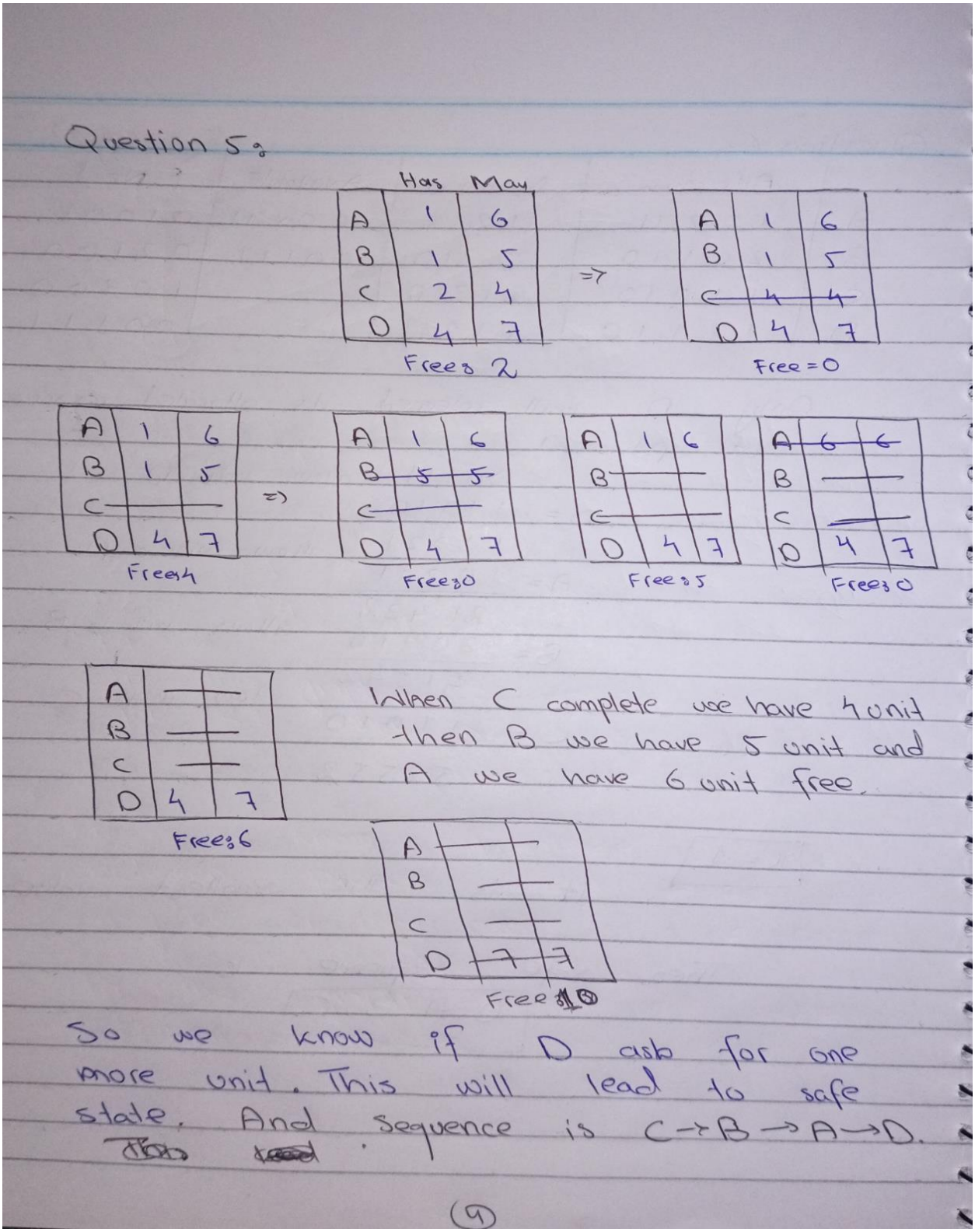
In this graph P3 and P4 are waiting for R3 wher R3 assign to P2.

b:

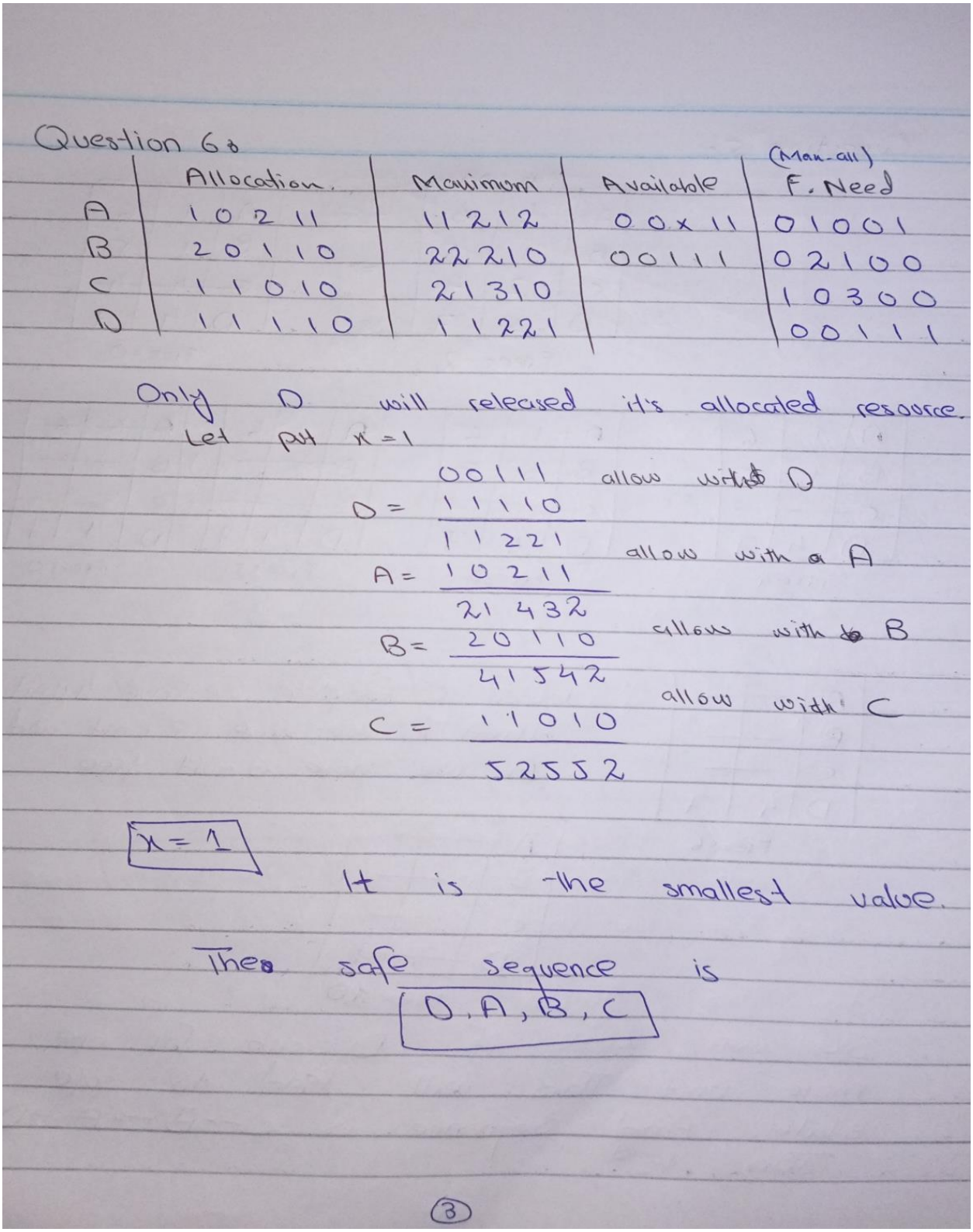
As we know if there is circle between processes and request there may be or may not deadlock occurs.

In this graph there will circle between processes and request.

Question-5


Question 5:
Has Max
A 1 6
B 1 5
C 2 4
D 4 7
Free: 2
=>
A 1 6
B 1 5
C 4 4
D 4 7
Free = 0
A 1 6
B 1 5
C
D 4 7
Free: 4
=>
A 1 6
B 5 5
C
D 4 7
Free: 0
A 1 6
B
C
D 4 7
Free: 5
A 6 6
B
C
D 4 7
Free: 0
A
B
C
D 4 7
Free: 6
When C complete we have 4 unit then B we have 5 unit and A we have 6 unit free.
A
B
C
D 7 7
Free: 10
So we know if D ask for one more unit. This will lead to safe state. And sequence is C → B → A → D.
(4)

Question-6



Question 6:

	Allocation	Maximum	Available	(Max-all) F. Need
A	1 0 2 1 1	1 1 2 1 2	0 0 x 1 1	0 1 0 0 1
B	2 0 1 1 0	2 2 2 1 0	0 0 1 1 1	0 2 1 0 0
C	1 1 0 1 0	2 1 3 1 0		1 0 3 0 0
D	1 1 1 1 0	1 1 2 2 1		0 0 1 1 1

Only D will released it's allocated resource.

Let put x = 1

D = 00111 + 11110 = 11221 allow with D

A = 10211 + 11221 = 21432 allow with A

B = 20110 + 21432 = 41542 allow with B

C = 11010 + 41542 = 52552 allow with C

x = 1

It is the smallest value.

The safe sequence is

D, A, B, C