



Ain Shams University
Faculty of Engineering
Computer and System department

Bankers Algorithm

Submitted by:

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Code: 1700157

Section: 1

Safe State Tests:

```
Enter num of resources : 3
Enter num of processes : 5

Enter Allocation array for P0 : 0 1 0
Enter Allocation array for P1 : 2 0 0
Enter Allocation array for P2 : 3 0 2
Enter Allocation array for P3 : 2 1 1
Enter Allocation array for P4 : 0 0 2

Enter Max array for P0 : 7 5 3
Enter Max array for P1 : 3 2 2
Enter Max array for P2 : 9 0 2
Enter Max array for P3 : 2 2 2
Enter Max array for P4 : 4 3 3

Enter Available array
3 3 2

Need Matrix
P0  R0  R1  R2
P0  7   4   3
P1  1   2   2
P2  6   0   0
P3  0   1   1
P4  4   3   1

Do you want to check safety? (1=yes 2=no)
your choice : 1
Yes , Safe state <P1,P3,P4,P0,P2>

Do you want to make request? (1=yes 2=no)
your choice : 2

Do you want to test agian?(y/n)
```

```
Enter num of resources : 3
Enter num of processes : 5

Enter Allocation array for P0 : 0 4 0
Enter Allocation array for P1 : 2 0 0
Enter Allocation array for P2 : 3 0 2
Enter Allocation array for P3 : 2 1 1
Enter Allocation array for P4 : 0 0 2

Enter Max array for P0 : 7 5 3
Enter Max array for P1 : 3 2 2
Enter Max array for P2 : 9 0 2
Enter Max array for P3 : 2 2 2
Enter Max array for P4 : 4 3 3

Enter Available array
3 0 2

Need Matrix
P0  R0  R1  R2
P0  7   1   3
P1  1   2   2
P2  6   0   0
P3  0   1   1
P4  4   3   1

Do you want to check safety? (1=yes 2=no)
your choice : 1
No

Do you want to make request? (1=yes 2=no)
your choice : 2

Do you want to test agian?(y/n)
```

Requests Tests:

```
Enter num of resources : 3
Enter num of processes : 5

Enter Allocation array for P0 : 0 1 0
Enter Allocation array for P1 : 2 0 0
Enter Allocation array for P2 : 3 0 2
Enter Allocation array for P3 : 2 1 1
Enter Allocation array for P4 : 0 0 2

Enter Max array for P0 : 7 5 3
Enter Max array for P1 : 3 2 2
Enter Max array for P2 : 9 0 2
Enter Max array for P3 : 2 2 2
Enter Max array for P4 : 4 3 3

Enter Available array
3 3 2

      Need Matrix
      R0    R1    R2
P0     7     4     3
P1     1     2     2
P2     6     0     0
P3     0     1     1
P4     4     3     1

Do you want to check safety? (1=yes 2=no)
your choice : 1
Yes , Safe state <P1,P3,P4,P0,P2>

Do you want to make request? (1=yes 2=no)
your choice : 1
enter index of process: 1
enter request of process 1 : 1 0 2

      Need Matrix
      R0    R1    R2
P0     7     4     3
P1     0     2     0
P2     6     0     0
P3     0     1     1
P4     4     3     1

Yes , Safe state <P1req,P1,P3,P4,P0,P2>

Do you want to test agian?(y/n)
```

```
Enter num of resources : 3
Enter num of processes : 5

Enter Allocation array for P0 : 0 4 0
Enter Allocation array for P1 : 2 0 0
Enter Allocation array for P2 : 3 0 2
Enter Allocation array for P3 : 2 1 1
Enter Allocation array for P4 : 0 0 2

Enter Max array for P0 : 7 5 3
Enter Max array for P1 : 3 2 2
Enter Max array for P2 : 9 0 2
Enter Max array for P3 : 2 2 2
Enter Max array for P4 : 4 3 3

Enter Available array
3 0 2

      Need Matrix
      R0    R1    R2
P0     7     1     3
P1     1     2     2
P2     6     0     0
P3     0     1     1
P4     4     3     1

Do you want to check safety? (1=yes 2=no)
your choice : 2

Do you want to make request? (1=yes 2=no)
your choice : 1
enter index of process: 1
enter request of process 1 : 1 0 2
No
```

```

Enter num of resources : 4
Enter num of processes : 5

Enter Allocation array for P0 : 0 0 1 2
Enter Allocation array for P1 : 1 0 0 0
Enter Allocation array for P2 : 1 3 5 4
Enter Allocation array for P3 : 0 6 3 2
Enter Allocation array for P4 : 0 0 1 4

Enter Max array for P0 : 0 0 1 2
Enter Max array for P1 : 1 7 5 0
Enter Max array for P2 : 2 3 5 6
Enter Max array for P3 : 0 6 5 2
Enter Max array for P4 : 0 6 5 6

Enter Available array
1 5 2 0

      Need Matrix
      R0      R1      R2      R3
P0      0      0      0      0
P1      0      7      5      0
P2      1      0      0      2
P3      0      0      2      0
P4      0      6      4      2

Do you want to check safety? (1=yes 2=no)
your choice : 1
Yes , Safe state <P0,P2,P3,P4,P1>

Do you want to make request? (1=yes 2=no)
your choice : 1
enter index of process: 1
enter request of process 1 : 0 4 2 0

      Need Matrix
      R0      R1      R2      R3
P0      0      0      0      0
P1      0      3      3      0
P2      1      0      0      2
P3      0      0      2      0
P4      0      6      4      2

Yes , Safe state <P1req,P0,P2,P3,P4,P1>

Do you want to test agian?(y/n)

```

GUI:

Check the safety of the system.

Bankers Algorithm

num processes: 5 Enter

num resources: 4

Allocation matrix (0)

P0 ->	0	0	1	2
P1 ->	1	0	0	0
P2 ->	1	3	5	4
P3 ->	0	6	3	2
P4 ->	0	0	1	4

Add row

Max matrix (0)

P0 ->	0	0	1	2
P1 ->	1	7	5	0
P2 ->	2	3	5	6
P3 ->	0	6	5	2
P4 ->	0	6	5	6

Add row

Available matrix: 1 5 2 0

Need Matrix

	R0	R1	R2	R3
P0	0	0	0	0
P1	0	7	5	0
P2	1	0	0	2
P3	0	0	2	0
P4	0	6	4	2

Output

☒ safe sequence ☐ Request

Yes, Safe state
<P0,P2,P3,P4,P1>

check Clear

Check the request.

Bankers Algorithm

num processes: 5 Enter

num resources: 4

Allocation matrix (0)

P0 ->	0	0	1	2
P1 ->	1	0	0	0
P2 ->	1	3	5	4
P3 ->	0	6	3	2
P4 ->	0	0	1	4

Add row

Max matrix (0)

P0 ->	0	0	1	2
P1 ->	1	7	5	0
P2 ->	2	3	5	6
P3 ->	0	6	5	2
P4 ->	0	6	5	6

Add row

Available matrix: 1 5 2 0

Need Matrix

	R0	R1	R2	R3
P0	0	0	0	0
P1	0	7	5	0
P2	1	0	0	2
P3	0	0	2	0
P4	0	6	4	2

Output

☐ safe sequence ☒ Request

Request process: 1

Request resources: 0 4 2 0

Yes, Safe state
<P0,P2,P3,P4,P1>
Yes, Safe state
<P1req,P0,P2,P3,P4,P1>

check Clear

How to use the GUI:

- First Enter the number of processes and resources in their fields
- Then, press Enter.

- Now the Allocation matrix, Max matrix and Available matrix will be Enabled.
- In the Allocation matrix and Max matrix you will need to press (Add row) button after entering each row in the test field. (enter values with space separated ex: 1 2 3).
- After that enter the Available matrix space separated values.

- Now if you want to check the safety, you need to check the safety option and click on check button.

- If you want to check request, you need to choose the request option and insert your request in the specified fields. Then, press check button.

Bankers Algorithm

num processes: 5 Enter

num resources: 3

Allocation matrix (0)

P0 ->	0	1	0
P1 ->	2	0	0
P2 ->	3	0	2
P3 ->	2	1	1
P4 ->	0	0	2

Add row

Max matrix (0)

P0 ->	7	5	3
P1 ->	3	2	2
P2 ->	9	0	2
P3 ->	2	2	2
P4 ->	4	3	3

Add row

Available matrix

3	3	2
---	---	---

Need Matrix

	R0	R1	R2
P0	7	4	3
P1	1	2	2
P2	6	0	0
P3	0	1	1
P4	4	3	1

Output

```
Yes , Safe state
<P1,P3,P4,P0,P2>
Yes , Safe state
<P1req,P1,P3,P4,P0,P2>
```

☐ safe sequence ☒ Request

Request process: 1

Request resources: 1 0 2

check Clear

- At the end if you want to check another system press clear button to restart it.

Test cases used:

3

5

0 1 0

2 0 0

3 0 2

2 1 1

0 0 2

7 5 3

3 2 2

9 0 2

2 2 2

4 3 3

3 3 2

3

5

0 4 0

2 0 0

3 0 2

2 1 1

0 0 2

7 5 3

3 2 2

9 0 2

2 2 2

4 3 3

3 0 2

4

5

0 0 1 2

1 0 0 0

1 3 5 4

0 6 3 2

0 0 1 4

0 0 1 2

1 7 5 0

2 3 5 6

0 6 5 2

0 6 5 6

1 5 2 0