



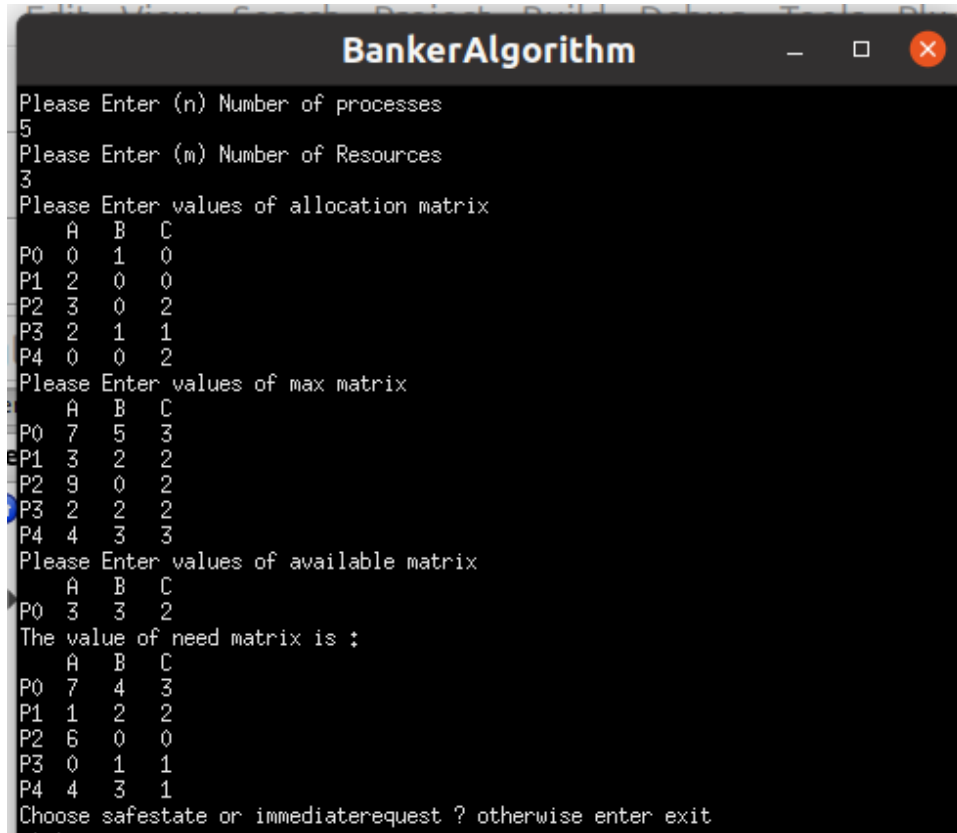
Banker's Algorithm

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Lecture Example:



```
BankerAlgorithm
Please Enter (n) Number of processes
5
Please Enter (m) Number of Resources
3
Please Enter values of allocation matrix
  A  B  C
P0  0  1  0
P1  2  0  0
P2  3  0  2
P3  2  1  1
P4  0  0  2
Please Enter values of max matrix
  A  B  C
P0  7  5  3
P1  3  2  2
P2  9  0  2
P3  2  2  2
P4  4  3  3
Please Enter values of available matrix
  A  B  C
P0  3  3  2
The value of need matrix is :
  A  B  C
P0  7  4  3
P1  1  2  2
P2  6  0  0
P3  0  1  1
P4  4  3  1
Choose safestate or immediaterequest ? otherwise enter exit
```

First: the user is asked to enter the number of processes and number of resources.

Second: user enter allocation matrix , max matrix and available matrix.

Third: the **need matrix is printed** .

Fourth The program ask if you want to check safe state of the system or ask if immediate request by one of the processes can be granted.

You can answer with **safestate** if you want safe state or answer with **immediaterequest** if you want immediate request.

```

Choose safestate or immediaterequest ? otherwise enter exit
safestate
Yes , System is in safe state and the sequence of processes are :
<P1 P3 P4 P0 P2 >
Choose safestate or immediaterequest ? otherwise enter exit

```

If Your answer is safestate:

First: The program will print **whether the system is in safe state or not** and if it is in safe state it **print the sequence of processes**.

Second: The program ask if you want to check safe state of the system or ask if immediate request by one of the processes can be granted.

```

Choose safestate or immediaterequest ? otherwise enter exit
immediaterequest
please enter the process :
1
please enter the request :
    A  B  C
P0  1  0  2
Yes , System is in safe state and the sequence of processes are :
<P1req P1 P3 P4 P0 P2 >
So,The resource can be allocated to P1
Choose safestate or immediaterequest ? otherwise enter exit

```

If Your answer is immediaterequest:

First: the program will ask you to enter the process number

Second: The program will ask you to enter the request

Third: The program will print **whether the system is in safe state or not** and if it is in safe state it **print the sequence of processes** and that **the resource can be allocated successfully to the required process** .

And if it's not in safe state it will also print that the resource cannot be allocated to the required process.

Fourth: The program ask if you want to check safe state of the system or ask if immediate request by one of the processes can be granted.

```

Choose safestate or immediaterequest ? otherwise enter exit
immediaterequest
please enter the process :
1
please enter the request :
    A  B  C
P0 1  0  2
Yes , System is in safe state and the sequence of processes are :
<P1req P1 P3 P4 P0 P2 >
So,The resource can be allocated to P1
Choose safestate or immediaterequest ? otherwise enter exit
immediaterequest
please enter the process :
4
please enter the request :
    A  B  C
P0 3  3  0
No , System is not in safe state
So,The resource cannot be allocated to P4
Choose safestate or immediaterequest ? otherwise enter exit
exit

Process returned 0 (0x0)   execution time : 504.847 s
Press ENTER to continue.

```

If Your answer is immediaterequest:

First: the program will ask you to enter the process number

Second: The program will ask you to enter the request

Third: The program will print **whether the system is in safe state or not** and if it is in safe state it **print the sequence of processes** and that **the resource can be allocated successfully to the required process** .

And if it's not in safe state it will also print that the resource cannot be allocated to the required process.

Fourth: The program ask if you want to check safe state of the system or ask if immediate request by one of the processes can be granted.

And so on , until you enter exit.

The Assignment Problem

```
BankerAlgorithm
Please Enter (n) Number of processes
5
Please Enter (m) Number of Resources
4
Please Enter values of allocation matrix
  A  B  C  D
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
Please Enter values of max matrix
  A  B  C  D
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
Please Enter values of available matrix
  A  B  C  D
P0  1  5  2  0
The value of need matrix is :
  A  B  C  D
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
Choose safestate or immediaterequest ? otherwise enter exit
safestate
Yes , System is in safe state and the sequence of processes are :
<P0 P2 P3 P4 P1 >
Choose safestate or immediaterequest ? otherwise enter exit
immediaterequest
please enter the process :
1
please enter the request :
  A  B  C  D
P0  0  4  2  0
Yes , System is in safe state and the sequence of processes are :
<P1req P0 P2 P3 P4 P1 >
So,The resource can be allocated to P1
Choose safestate or immediaterequest ? otherwise enter exit
exit

Process returned 0 (0x0)   execution time : 260.423 s
Press ENTER to continue.
█
```

First: the user is asked to enter the number of processes and number of resources.

Second: user enter allocation matrix , max matrix and available matrix.

Third: the **need matrix is printed** .

Fourth The program ask if you want to check safe state of the system or ask if immediate request by one of the processes can be granted.

You can answer with **safestate** if you want safe state or answer with **immediaterequest** if you want immediate request.

The user entered safestate:

First: The program will print **whether the system is in safe state or not** and if it is in safe state it **print the sequence of processes**.

Second: The program ask if you want to check safe state of the system or ask if immediate request by one of the processes can be granted.

The user Entered immediaterequest:

First: the program will ask you to enter the process number

Second: The program will ask you to enter the request

Third: The program will print **whether the system is in safe state or not** and if it is in safe state it **print the sequence of processes** and that **the resource can be allocated successfully to the required process** .

And if it's not in safe state it will also print that the resource cannot be allocated to the required process.

Fourth: The program ask if you want to check safe state of the system or ask if immediate request by one of the processes can be granted.

And so on , until you enter exit.

Test the executable of the assignment example :

```
nuraah@nuraah-Inspiron-15-3567: ~/Documents/GitHub/Banker_a...
Please Enter (n) Number of processes
5
Please Enter (m) Number of Resources
4
Please Enter values of allocation matrix
  A  B  C  D
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
Please Enter values of max matrix
  A  B  C  D
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
Please Enter values of available matrix
  A  B  C  D
P0  1  5  2  0
The value of need matrix is :
  A  B  C  D
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
Choose safestate or immediaterequest ? otherwise enter exit
safestate
Yes , System is in safe state and the sequence of processes are :
<P0 P2 P3 P4 P1 >
Choose safestate or immediaterequest ? otherwise enter exit
immediaterequest
please enter the process :
1
please enter the request :
  A  B  C  D
P0  0  4  2  0
Yes , System is in safe state and the sequence of processes are :
<P1req P0 P2 P3 P4 P1 >
So,The resource can be allocated to P1
Choose safestate or immediaterequest ? otherwise enter exit
exit
```

Bonus:

1. The program can handle many immediate requests And safe state after each other as in lecture example.

```
Choose safestate or immediaterequest ? otherwise enter exit
immediaterequest
please enter the process :
1
please enter the request :
  A  B  C
P0 1  0  2
Yes , System is in safe state and the sequence of processes are :
<P1req P1 P3 P4 P0 P2 >
So,The resource can be allocated to P1
Choose safestate or immediaterequest ? otherwise enter exit
immediaterequest
please enter the process :
4
please enter the request :
  A  B  C
P0 3  3  0
No , System is not in safe state
So,The resource cannot be allocated to P4
Choose safestate or immediaterequest ? otherwise enter exit
exit

Process returned 0 (0x0)   execution time : 504.847 s
Press ENTER to continue.
```

2. Error limitation if the user entered extra numbers it will be neglected .
3. ReadMe for the project .

The code link on Github [here](#):

Including code files + executable