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System Software Lab

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Experiment 4

Bankers Algorithm

AIM

Implement the banker’s algorithm for deadlock avoidance.

THEORY

The banker’s algorithm is a resource allocation and deadlock avoidance algorithm that tests for safety by simulating the allocation for predetermined maximum possible amounts of all resources, then makes an “s-state” check to test for possible activities, before deciding whether allocation should be allowed to continue.

For the Banker's algorithm to work, it needs to know three things:

- How much of each resource each process could possibly request[MAX]
- How much of each resource each process is currently holding[ALLOCATED]
- How much of each resource the system currently has available[AVAILABLE]

Resources may be allocated to a process only if the amount of resources requested is less than or equal to the amount available; otherwise, the process waits until resources are available.

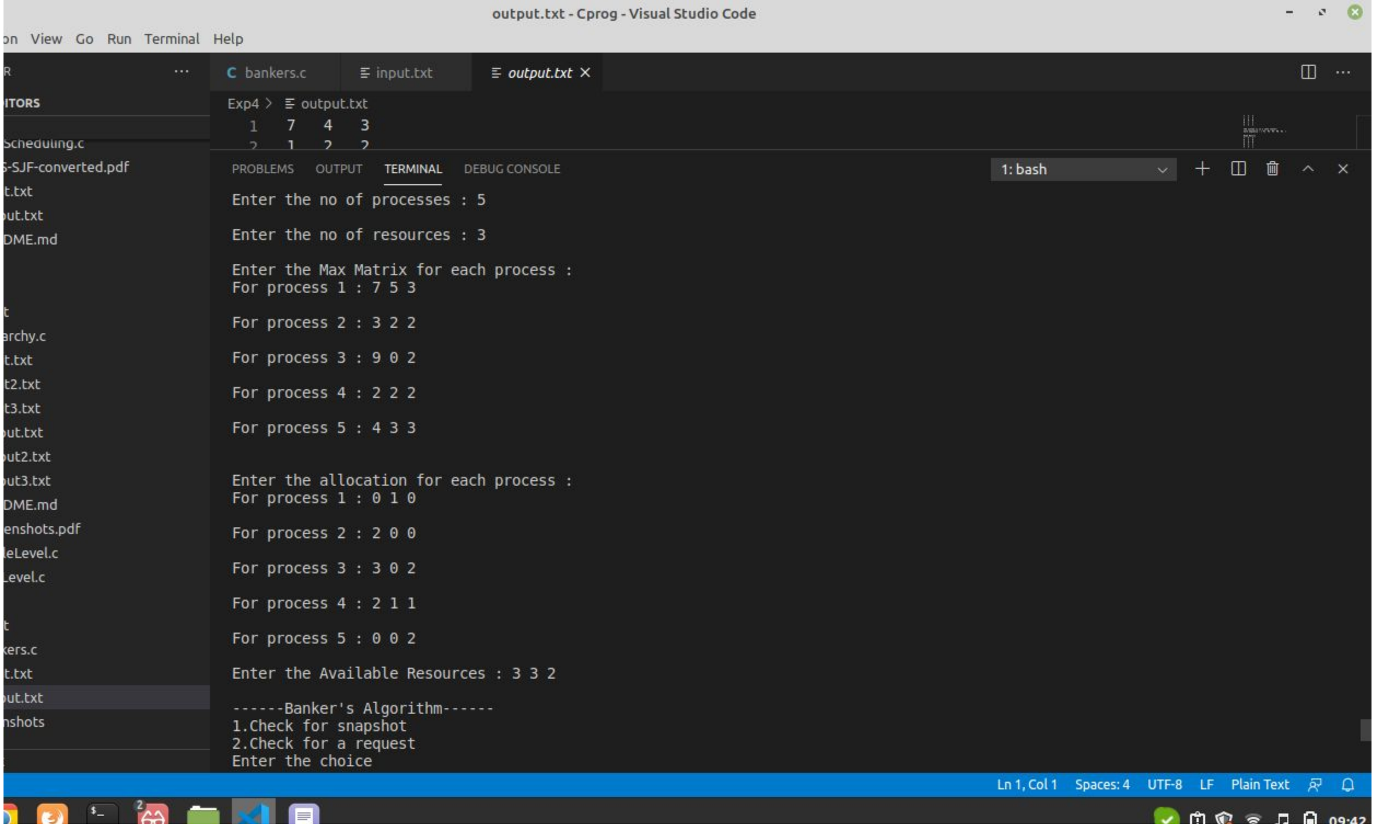
Some of the resources that are tracked in real systems are memory, semaphores and interface access.

The Banker's Algorithm derives its name from the fact that this algorithm could be used in a banking system to ensure that the bank does not run out of resources, because the bank would never allocate its money in such a way that it can no longer satisfy the needs of all its customers[2]. By using the Banker's algorithm, the bank ensures that when customers request money the bank never leaves a safe state. If the customer's request does not cause the bank to leave a safe state, the cash will be allocated, otherwise the customer must wait until some other customer deposits enough.

RESULT

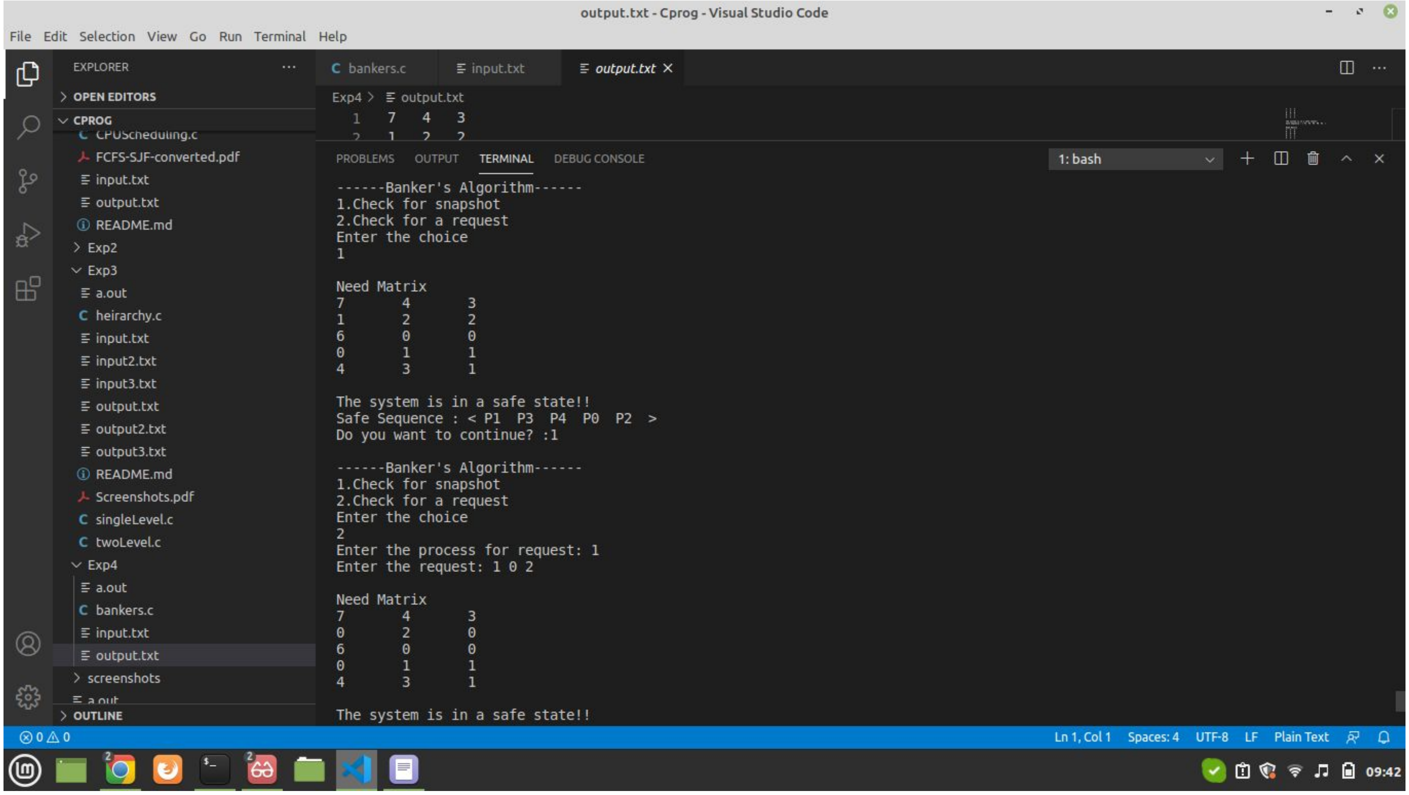
Banker’s algorithm was implemented for m process and n resources and the output were written to the output file.

Output Screenshots



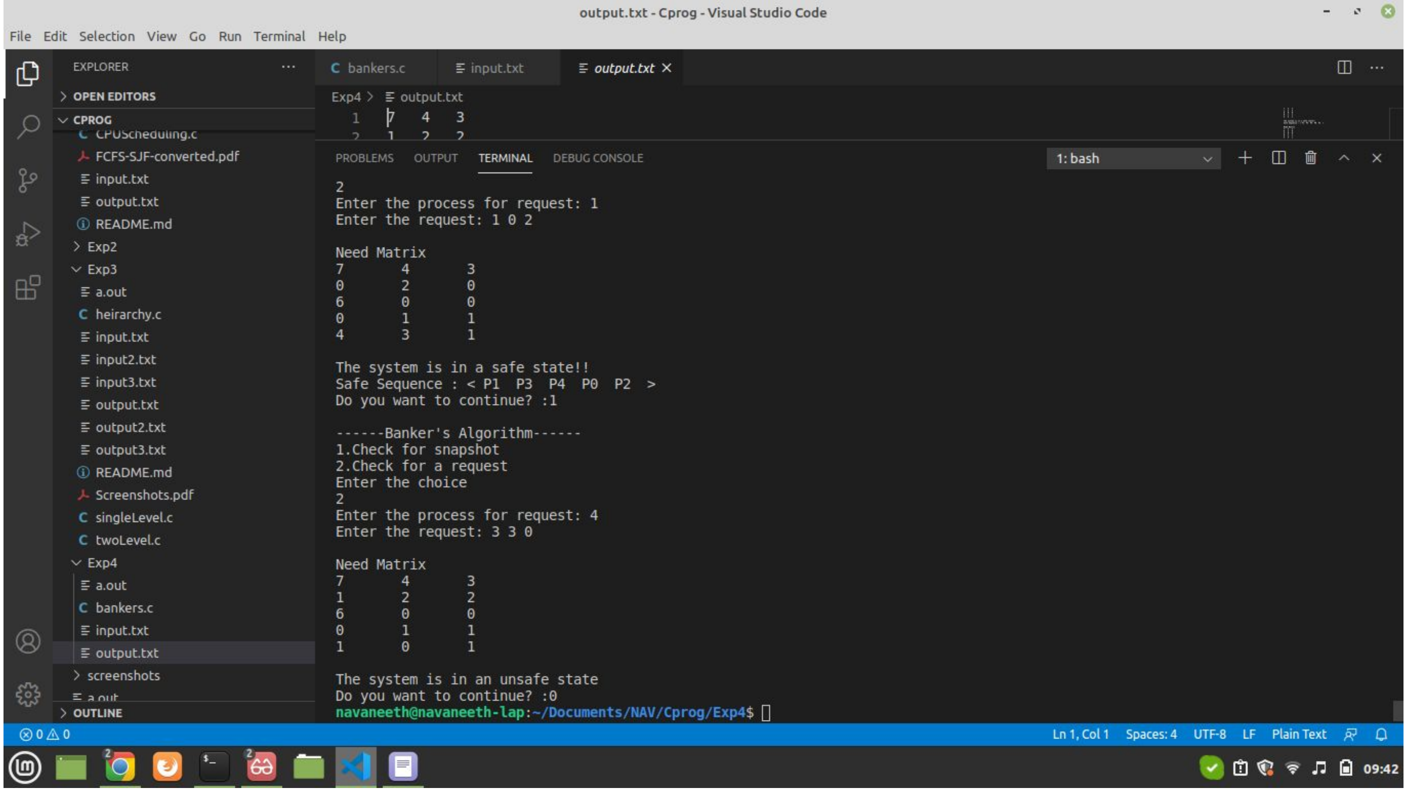
```
7   4   3
1   2   2
```

```
Enter the no of processes : 5

Enter the no of resources : 3

Enter the Max Matrix for each process :
For process 1 : 7 5 3

For process 2 : 3 2 2

For process 3 : 9 0 2

For process 4 : 2 2 2

For process 5 : 4 3 3


Enter the allocation for each process :
For process 1 : 0 1 0

For process 2 : 2 0 0

For process 3 : 3 0 2

For process 4 : 2 1 1

For process 5 : 0 0 2

Enter the Available Resources : 3 3 2

------Banker's Algorithm------
1.Check for snapshot
2.Check for a request
Enter the choice
```



```
7   4   3
```

```
------Banker's Algorithm------
1.Check for snapshot
2.Check for a request
Enter the choice
1

Need Matrix
7       4       3
1       2       2
6       0       0
0       1       1
4       3       1

The system is in a safe state!!
Safe Sequence : < P1  P3  P4  P0  P2  >
Do you want to continue? :1

------Banker's Algorithm------
1.Check for snapshot
2.Check for a request
Enter the choice
2
Enter the process for request: 1
Enter the request: 1 0 2

Need Matrix
7       4       3
0       2       0
6       0       0
0       1       1
4       3       1

The system is in a safe state!!
```



```
7   4   3
```

```
2
Enter the process for request: 1
Enter the request: 1 0 2

Need Matrix
7       4       3
0       2       0
6       0       0
0       1       1
4       3       1

The system is in a safe state!!
Safe Sequence : < P1  P3  P4  P0  P2  >
Do you want to continue? :1

------Banker's Algorithm------
1.Check for snapshot
2.Check for a request
Enter the choice
2
Enter the process for request: 4
Enter the request: 3 3 0

Need Matrix
7       4       3
1       2       2
6       0       0
0       1       1
1       0       1

The system is in an unsafe state
Do you want to continue? :0
navaneeth@navaneeth-lap:~/Documents/NAV/Cprog/Exp4$
```