/*banker’s algo*/

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#include<stdio.h>
int max[100][100];
int alloc[100][100];
int need[100][100];
int avail[100];
int n,r;
void input();
void show();
void cal();
int main()
{
int i,j;
printf("**** Banker's Algo ****\n");
input();
show();
cal();
return 0;
}
void input()
{
int i,j;
printf("Enter the no of Processes: ");
scanf("%d",&n);
printf("\nEnter the no of resources instances: ");
scanf("%d",&r);
printf("\nEnter the Max Matrix\n");
for(i=0;i<n;i++)
{
for(j=0;j<r;j++)
{
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scanf("%d",&max[i][j]);
}
}
printf("Enter the Allocation Matrix\n");
for(i=0;i<n;i++)
{
for(j=0;j<r;j++)
{
scanf("%d",&alloc[i][j]);
}
}
printf("Enter the available Resources\n");
for(j=0;j<r;j++)
{
scanf("%d",&avail[j]);
}
}
void show()
{
int i,j;
printf("Process\tAllocation\tMax\tAvailable\tNeed\t");
for(i=0;i<n;i++)
{
printf("\nP%d\t ",i+1);
for(j=0;j<r;j++)
{
printf("%d ",alloc[i][j]);
}
printf("\t\t");
for(j=0;j<r;j++)
{
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printf("%d ",max[i][j]);
}
printf("\t");
if(i==0)
{
for(j=0;j<r;j++)
printf("%d ",avail[j]);
}
printf("\t\t");
for(j=0;j<r;j++)
{
printf("%d ",max[i][j]-alloc[i][j]);
}
}
}
void cal()
{
int finish[100],temp,need[100][100],flag=1,k,c1=0;
int safe[100];     //if the system wasn't at safe state then how much states were in safe state
int i,j;
for(i=0;i<n;i++)   //This array is initialized to keep track of whether each process has finished (1 if finished, 0 otherwise),it is set to all 0s, indicating that no process has finished at the start
{
finish[i]=0;
}
//find need matrix
for(i=0;i<n;i++)
{
for(j=0;j<r;j++)
{
need[i][j]=max[i][j]-alloc[i][j];
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}

}

printf("\n");

while(flag)   //while loop that runs until flag becomes 0(i.e the condition become false)(for each process this while loop will execute)

{

flag=0;

for(i=0;i<n;i++)

{

int c=0;

for(j=0;j<r;j++)

{

if((finish[i]==0)&&(need[i][j]<=avail[j]))  //(finish[i] == 0)=process is not finished

{

c++;  //if loop cond. is satisfied, it increments a counter c. This counter keeps track of how many resource types a process can be allocated.

if(c==r)        //If c becomes equal to the total number of resource types r, it means that all the resources a process needs are available, and it can be allocated all of them.

{

for(k=0;k<r;k++)

{

avail[k]+=alloc[i][j];    //it proceeds to allocate the resources, update the available resources, mark the process as finished, and set the flag to 1 to continue checking other processes

finish[i]=1;

flag=1;

}

printf("P%d->",i);  //the process number (P%d) to indicate that the process has been allocated resources.

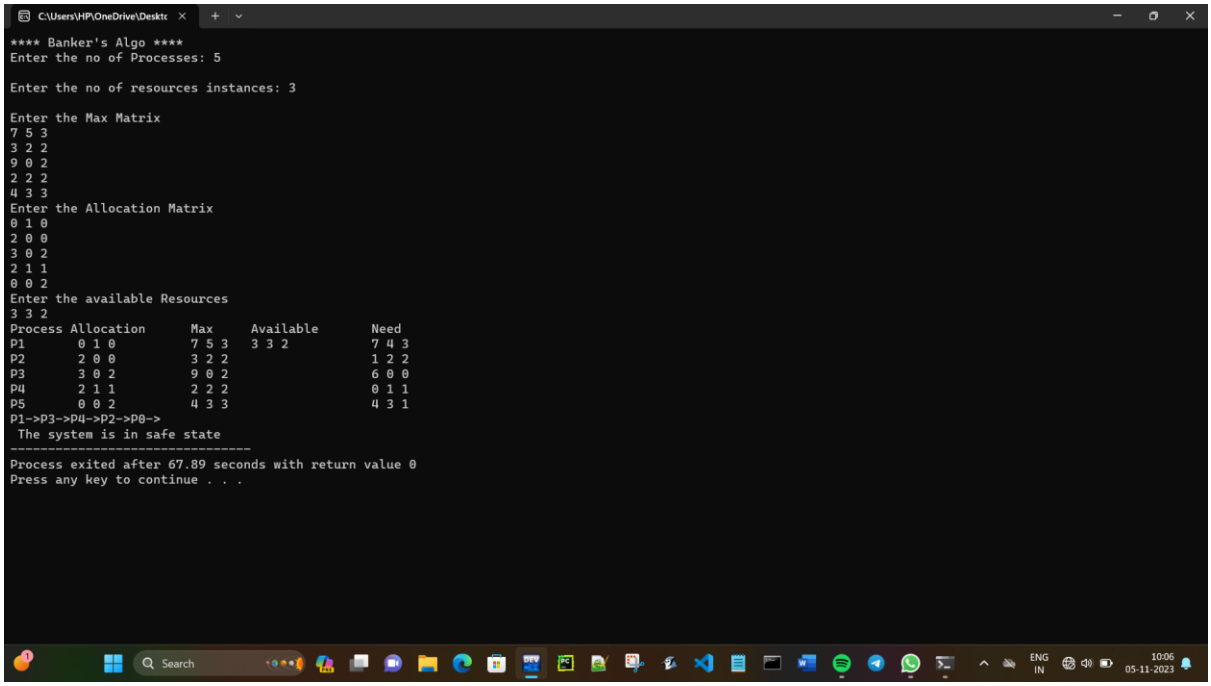
if(finish[i]==1)

{

i=n;      //effectively breaking out of the outer loop, because there's no need to continue checking other resources for this process.(the while loop exit cond.)

}
```

```
}
}
}
}
}
for(i=0;i<n;i++)
{
if(finish[i]==1)
{
c1++;     //A counter to keep track of the number of processes that have finished.
}
else
{printf("P%d->",i);  // the finish array and checks which processes have finished (finish[i] == 1) and increments c1 accordingly.
}
}
if(c1==n)
{printf("\n The system is in safe state");
}
else     //If c1 is less than n, it indicates that not all processes have finished, and the system is in an unsafe state with processes potentially deadlocked. It prints messages indicating a deadlock and an unsafe state.
{
printf("\n Process are in dead lock");
printf("\n System is in unsafe state");
}
}
```


C:\Users\HP\OneDrive\Desktc
**** Banker's Algo ****
Enter the no of Processes: 5
Enter the no of resources instances: 3
Enter the Max Matrix
7 5 3
3 2 2
9 0 2
2 2 2
4 3 3
Enter the Allocation Matrix
0 1 0
2 0 0
3 0 2
2 1 1
0 0 2
Enter the available Resources
3 3 2
Process Allocation Max Available Need
P1 0 1 0 7 5 3 3 3 2 7 4 3
P2 2 0 0 3 2 2 1 2 2
P3 3 0 2 9 0 2 6 0 0
P4 2 1 1 2 2 2 0 1 1
P5 0 0 2 4 3 3 4 3 1
P1->P3->P4->P2->P0->
The system is in safe state
Process exited after 67.89 seconds with return value 0
Press any key to continue . . .
Search
ENG
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