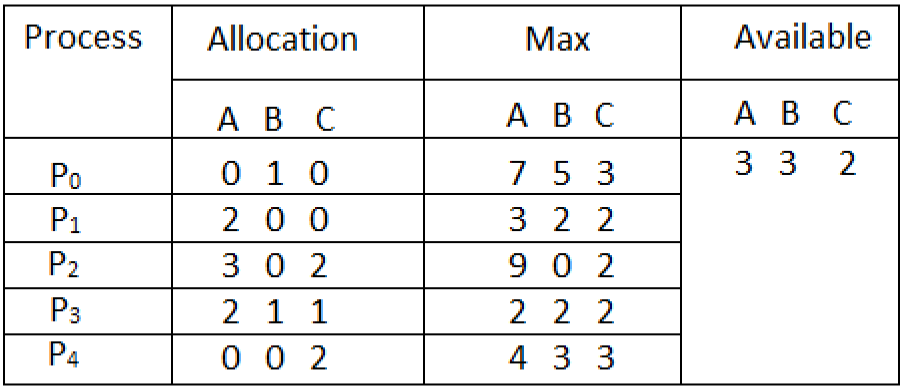
OS LAB-Shivani Sathyanarayanan

1BM21CS203

Use bankers algo given here to check if the following state is safe/unsafe:



Process	Allocation	Max	Available
	A B C	A B C	A B C
P_0	0 1 0	7 5 3	3 3 2
P_1	2 0 0	3 2 2	
P_2	3 0 2	9 0 2	
P_3	2 1 1	2 2 2	
P_4	0 0 2	4 3 3	

Is the system in a safe state? If Yes, then what is the safe sequence? What will happen if process P1 requests one additional instance of resource type A and two instances of resource type C?

CODE:

```
#include<stdio.h>
struct file
{
int all[10];
int max[10];
int need[10];
int flag;
};
void main()
{
struct file f[10];
int fl;
int i, j, k, p, b, n, r, g, cnt=0, id, newr;
int avail[10],seq[10];

printf("Enter number of processes: ");
scanf("%d",&n);
```

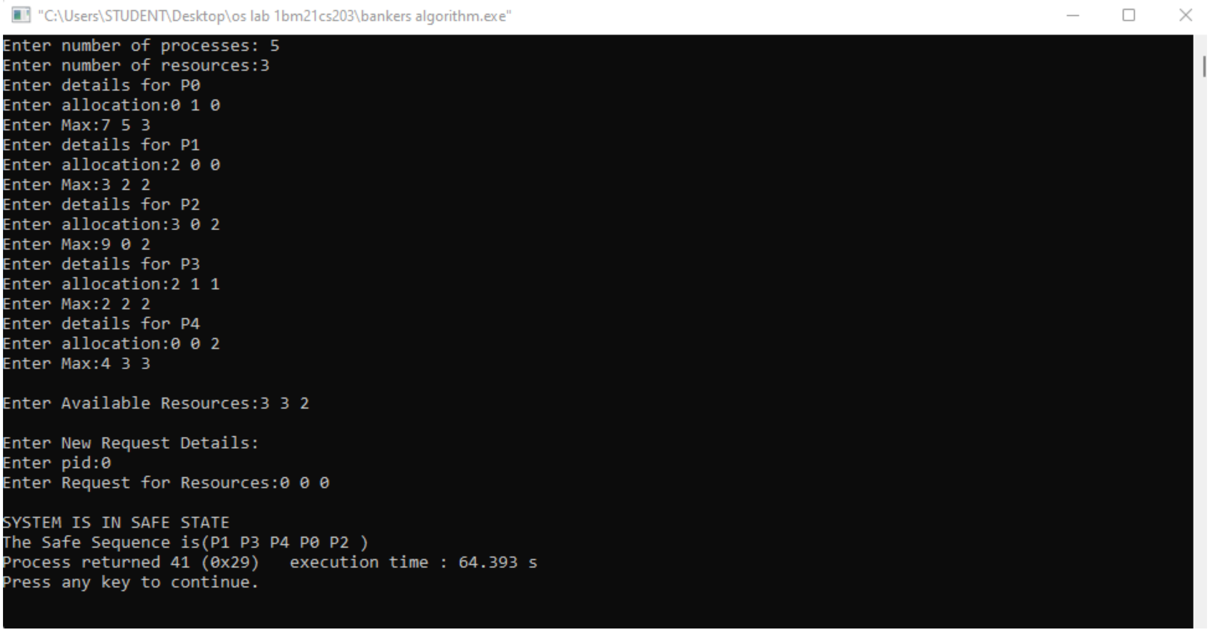
```
printf("Enter number of resources:");
scanf("%d",&r);
for(i=0;i<n;i++)
{
printf("Enter details for P%d",i);
printf("\nEnter allocation:");
for(j=0;j<r;j++)
scanf("%d",&f[i].all[j]);
printf("Enter Max:");
for(j=0;j<r;j++)
scanf("%d",&f[i].max[j]);
f[i].flag=0;
 }
 printf("\nEnter Available Resources:");
 for(i=0;i<r;i++)
 scanf("%d",&avail[i]);
 printf("\nEnter New Request Details:");
 printf("\nEnter pid:");
 scanf("%d",&id);
 printf("Enter Request for Resources:");
 for(i=0;i<r;i++)
 {
scanf("%d",&newr);
f[id].all[i] += newr;
avail[i]=avail[i] - newr;
 }
 for(i=0;i<n;i++)
 {
 for(j=0;j<r;j++)
 {
```

```
f[i].need[j]=f[i].max[j]-f[i].all[j];
if(f[i].need[j]<0)
f[i].need[j]=0;
}
}
cnt=0;
fl=0;
while(cnt!=n)
{
g=0;
for(j=0;j<n;j++)
{
if(f[j].flag==0)
{
b=0;
for(p=0;p<r;p++)
{
if(avail[p]>=f[j].need[p])
b=b+1;
else
b=b-1;
}
if(b==r)
{

seq[fl++]=j;
f[j].flag=1;
for(k=0;k<r;k++)
avail[k]=avail[k]+f[j].all[k];
cnt=cnt+1;
```

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


 g=1;
 }
 }
 }
 if(g==0)
 {
 printf("\n SYSTEM IS IN UNSAFE STATE");
 }
 }
 printf("\nSYSTEM IS IN SAFE STATE");
 printf("\nThe Safe Sequence is(");
 for(i=0;i<fl;i++)
 printf("P%d ",seq[i]);
 printf(")");
}
```

OUTPUT:

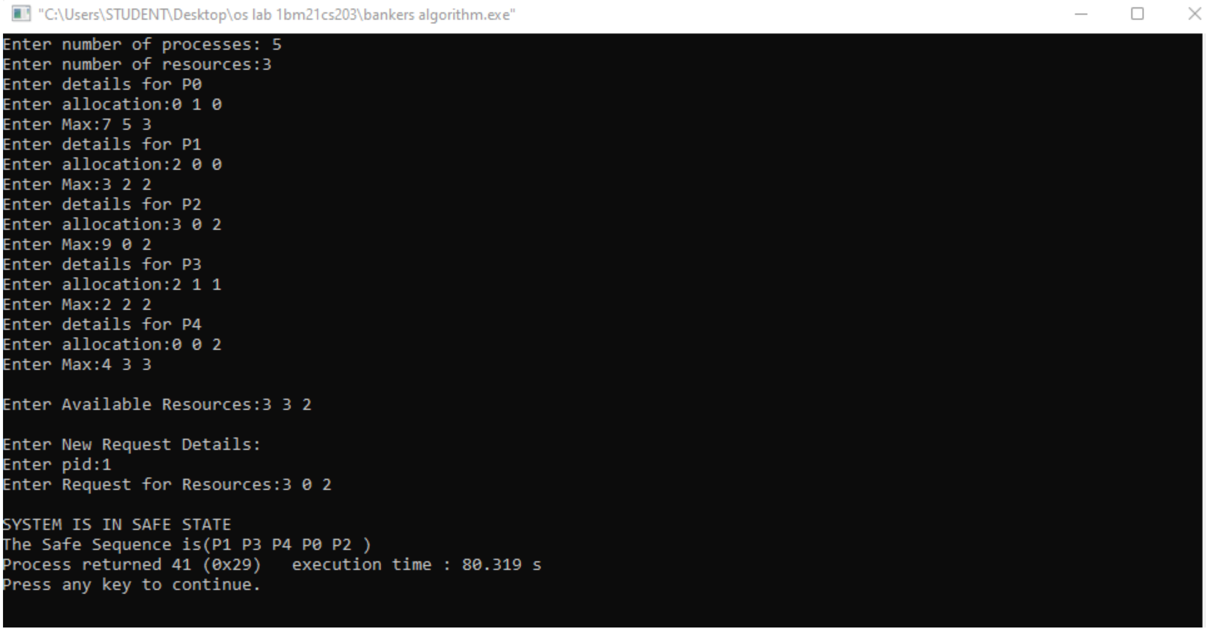
With no additional request:



"C:\Users\STUDENT\Desktop\os lab 1bm21cs203\bankers algorithm.exe"

```
Enter number of processes: 5
Enter number of resources:3
Enter details for P0
Enter allocation:0 1 0
Enter Max:7 5 3
Enter details for P1
Enter allocation:2 0 0
Enter Max:3 2 2
Enter details for P2
Enter allocation:3 0 2
Enter Max:9 0 2
Enter details for P3
Enter allocation:2 1 1
Enter Max:2 2 2
Enter details for P4
Enter allocation:0 0 2
Enter Max:4 3 3

Enter Available Resources:3 3 2

Enter New Request Details:
Enter pid:0
Enter Request for Resources:0 0 0

SYSTEM IS IN SAFE STATE
The Safe Sequence is(P1 P3 P4 P0 P2 )
Process returned 41 (0x29)   execution time : 64.393 s
Press any key to continue.
```

After P1 requests one additional instance of resource type A and two instances of resource type C:



"C:\Users\STUDENT\Desktop\os lab 1bm21cs203\bankers algorithm.exe"

```
Enter number of processes: 5
Enter number of resources:3
Enter details for P0
Enter allocation:0 1 0
Enter Max:7 5 3
Enter details for P1
Enter allocation:2 0 0
Enter Max:3 2 2
Enter details for P2
Enter allocation:3 0 2
Enter Max:9 0 2
Enter details for P3
Enter allocation:2 1 1
Enter Max:2 2 2
Enter details for P4
Enter allocation:0 0 2
Enter Max:4 3 3

Enter Available Resources:3 3 2

Enter New Request Details:
Enter pid:1
Enter Request for Resources:3 0 2

SYSTEM IS IN SAFE STATE
The Safe Sequence is(P1 P3 P4 P0 P2 )
Process returned 41 (0x29)   execution time : 80.319 s
Press any key to continue.
```