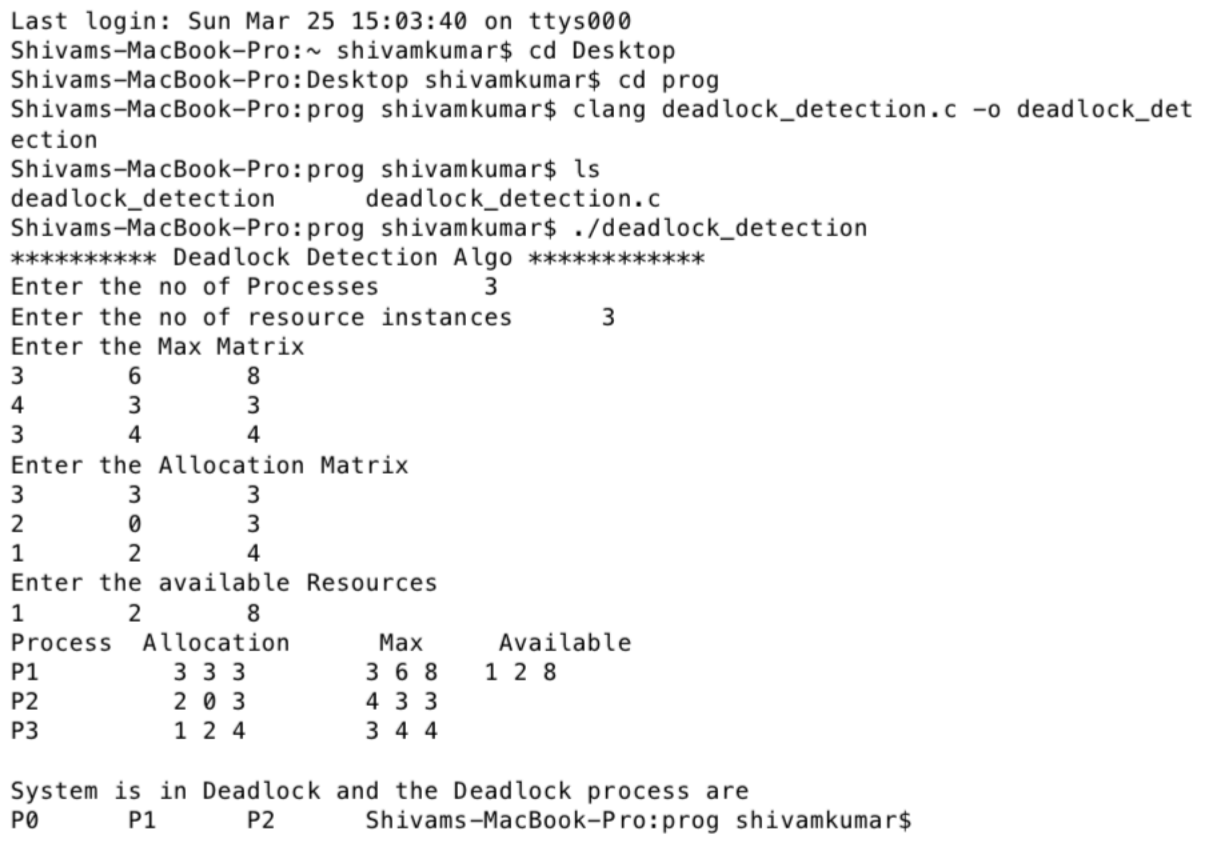
```
#include<stdio.h>
int max[100][100];
int alloc[100][100];
int need[100][100];
int avail[100];
int n,r;
void input();
void show();
void cal();

int main()
{
	int i,j;
	printf("********** Deadlock Detection Algo ************\n");
	input();
	show();
	cal();

	return 0;
}

void input()
{
	int i,j;
	printf("Enter the no of Processes\t");
	scanf("%d",&n);
	printf("Enter the no of resource instances\t");
	scanf("%d",&r);
	printf("Enter the Max Matrix\n");
	for(i=0;i<n;i++)
	{
		for(j=0;j<r;j++)
		{
			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\t Allocation\t Max\t Available\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");
		for(j=0;j<r;j++)
		{
			printf("%d ",max[i][j]);
		}
		printf("\t");
		if(i==0)
		{
			for(j=0;j<r;j++)
			printf("%d ",avail[j]);
		}
	}
}

void cal()
{
	int finish[100],temp,need[100][100],flag=1,k,c1=0;
	int dead[100];
	int safe[100];
	int i,j;
	for(i=0;i<n;i++)
	{
		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];
		}
	}
	while(flag)
	{
		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]))
				{
					c++;
					if(c==r)
					{
						for(k=0;k<r;k++)
```

```
                                                                        {
                                                                                avail[k]+=alloc[i][j];
                                                                                finish[i]=1;
                                                                                flag=1;
                                                                        }
                                                                        //printf("\nP%d",i);
                                                                        if(finish[i]==1)
                                                                        {
                                                                                i=n;
                                                                }
                                                        }
                                                }
                                        }
                                }
                        }
                j=0;
                flag=0;
                for(i=0;i<n;i++)
                {
                        if(finish[i]==0)
                        {
                                dead[j]=i;
                                j++;
                                flag=1;
                        }
                }
                if(flag==1)
                {
                        printf("\n\nSystem is in Deadlock and the Deadlock process are\n");
                        for(i=0;i<n;i++)
                        {
                                printf("P%d\t",dead[i]);
                        }
                }
                else
                {
                        printf("\nNo Deadlock Occur");
                }
}
```

Output:



```
Last login: Sun Mar 25 15:03:40 on ttys000
Shivams-MacBook-Pro:~ shivamkumar$ cd Desktop
Shivams-MacBook-Pro:Desktop shivamkumar$ cd prog
Shivams-MacBook-Pro:prog shivamkumar$ clang deadlock_detection.c -o deadlock_det
ection
Shivams-MacBook-Pro:prog shivamkumar$ ls
deadlock_detection      deadlock_detection.c
Shivams-MacBook-Pro:prog shivamkumar$ ./deadlock_detection
********** Deadlock Detection Algo ************
Enter the no of Processes       3
Enter the no of resource instances      3
Enter the Max Matrix
3       6       8
4       3       3
3       4       4
Enter the Allocation Matrix
3       3       3
2       0       3
1       2       4
Enter the available Resources
1       2       8
Process  Allocation      Max     Available
P1         3 3 3        3 6 8   1 2 8
P2         2 0 3        4 3 3
P3         1 2 4        3 4 4

System is in Deadlock and the Deadlock process are
P0      P1      P2      Shivams-MacBook-Pro:prog shivamkumar$
```