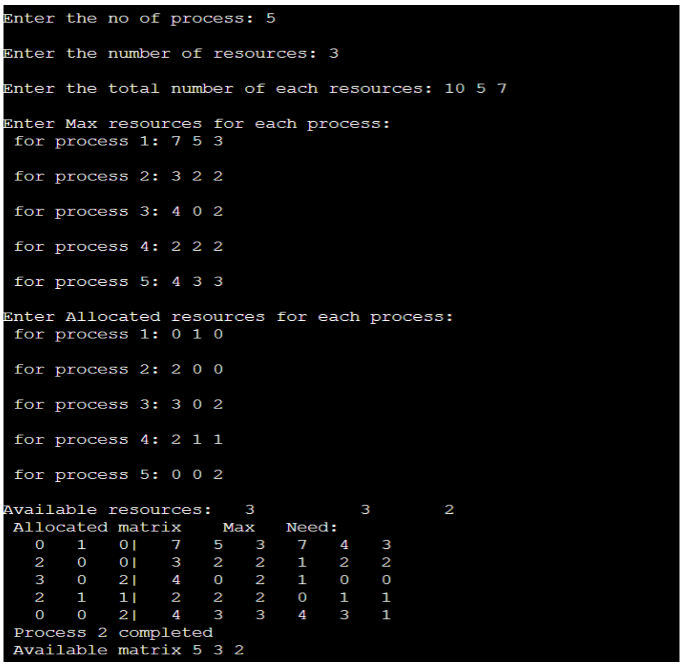
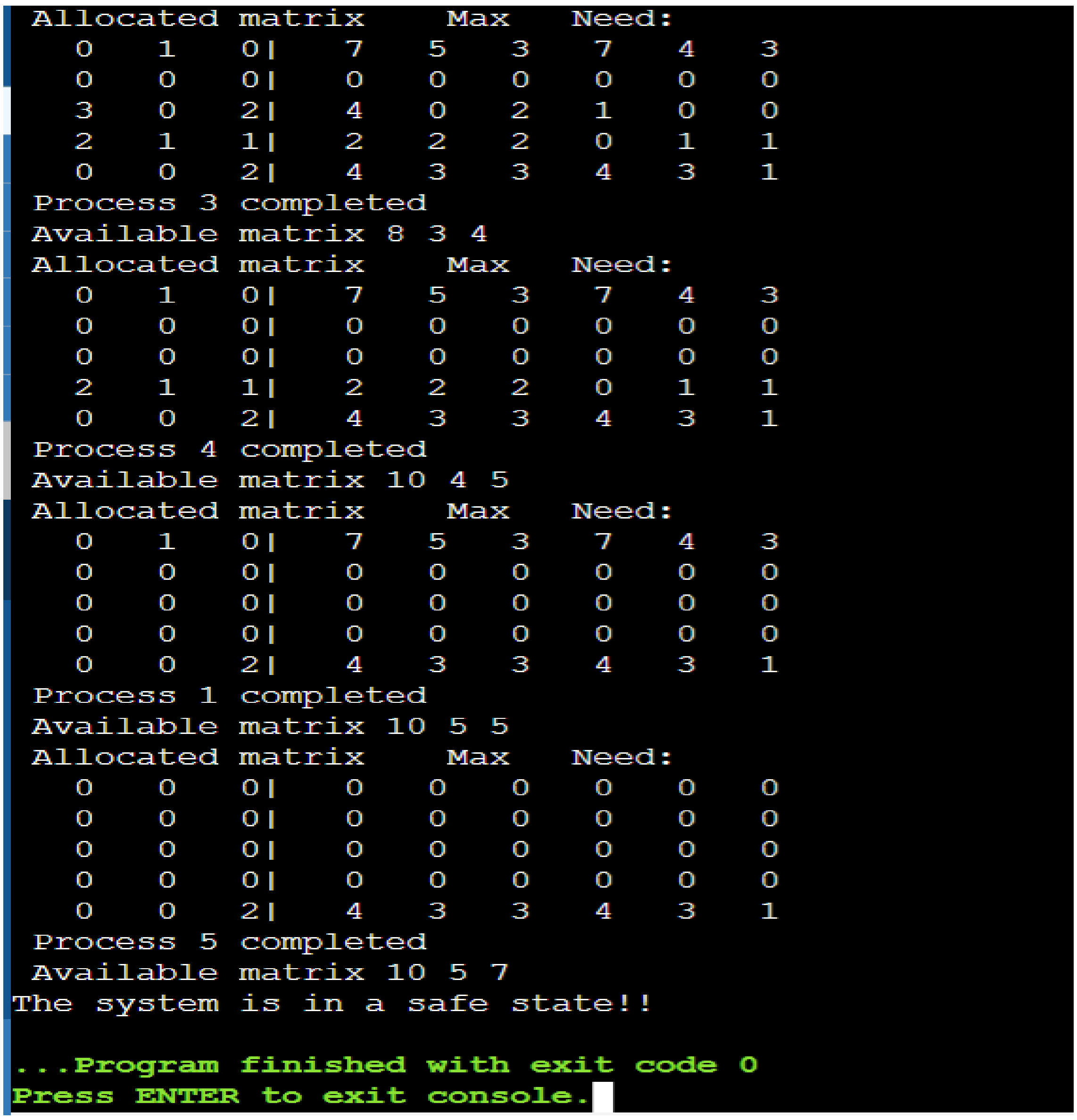
```c
#include<stdio.h>
int main()
{
  int
allocated[15][15],max[15][15],need[15][15],avail[15],tres[15],work[15],fl
ag[15];
  int pno,rno,i,j,prc,total,count=0;
  printf("\nEnter the no of process: ");
  scanf("%d",&pno);
  printf("\nEnter the number of resources: ");
  scanf("%d",&rno);
  for(i=1;i<=pno;i++)
  {
    flag[i]=0;
  }
  printf("\nEnter the total number of each resources: ");
  for(i=1;i<=rno;i++)
  {
    scanf("%d",&tres[i]);
  }
  printf("\nEnter Max resources for each process: ");
  for(i=1;i<=pno;i++)
  {
    printf("\n for process %d: ", i);
    for(j=1;j<=rno;j++)
    {
       scanf("%d",&max[i][j]);
    }
  }


   printf("\nEnter Allocated resources for each process: ");
   for(i=1;i<=pno;i++)
   {
     printf("\n for process %d: ", i);
     for(j=1;j<=rno;j++)
     {
       scanf("%d",&allocated[i][j]);
     }
   }

   printf("\nAvailable resources: ");
   for(j=1;j<=rno;j++)
   {
     avail[j]=0;
     total=0;
     for(i=1;i<=pno;i++)
     {
       total+=allocated[i][j];
     }
     avail[j] = tres[j]-total;
     work[j] = avail[j];
     printf("  %d\t",work[j]);
   }

   do
   {
     for(i=1;i<=pno;i++)
     {
       for(j=1;j<=rno;j++)
       {
         need[i][j] = max[i][j]-allocated[i][j];
       }
     }


     printf("\n Allocated matrix    Max   Need: ");
     for(i=1;i<=pno;i++)
     {
      printf("\n");
      for(j=1;j<=rno;j++)
      {
        printf("%4d",allocated[i][j]);
      }
      printf("|");
      for(j=1;j<=rno;j++)
      {
         printf("%4d",max[i][j]);
      }
      for(j=1;j<=rno;j++)
      {
        printf("%4d",need[i][j]);
      }
    }


prc=0;

for(i=1;i<=pno;i++)
{
  if(flag[i]==0)
  {
    prc=i;
    for(j=1;j<=rno;j++)
    {
     if(work[j]<need[i][j])
     {
      prc=0;
      break;
     }
   }
  }
if(prc!=0)
break;
}

if(prc!=0)
{
printf("\n Process %d completed",i);
count++;
printf("\n Available matrix ");
for(j=1;j<=rno;j++)
{
work[j]+=allocated[prc][j];
allocated[prc][j] = 0;
max[prc][j] = 0;
flag[prc] = 1;
printf ("%d ", work[j]);
}
}

}while(count != pno&&prc != 0);
if (count == pno)
printf ("\nThe system is in a safe state!!");
else
printf ("\nThe system is in an unsafe state!!");
return 0;

}
```



```
Enter the no of process: 5

Enter the number of resources: 3

Enter the total number of each resources: 10 5 7

Enter Max resources for each process:
 for process 1: 7 5 3

 for process 2: 3 2 2

 for process 3: 4 0 2

 for process 4: 2 2 2

 for process 5: 4 3 3

Enter Allocated resources 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

Available resources:    3           3        2
 Allocated matrix     Max    Need:
   0    1    0|    7    5    3    7    4    3
   2    0    0|    3    2    2    1    2    2
   3    0    2|    4    0    2    1    0    0
   2    1    1|    2    2    2    0    1    1
   0    0    2|    4    3    3    4    3    1
 Process 2 completed
 Available matrix 5 3 2
```



```
 Allocated matrix     Max    Need:
   0    1    0|    7    5    3    7    4    3
   0    0    0|    0    0    0    0    0    0
   3    0    2|    4    0    2    1    0    0
   2    1    1|    2    2    2    0    1    1
   0    0    2|    4    3    3    4    3    1
 Process 3 completed
 Available matrix 8 3 4
 Allocated matrix     Max    Need:
   0    1    0|    7    5    3    7    4    3
   0    0    0|    0    0    0    0    0    0
   0    0    0|    0    0    0    0    0    0
   2    1    1|    2    2    2    0    1    1
   0    0    2|    4    3    3    4    3    1
 Process 4 completed
 Available matrix 10 4 5
 Allocated matrix     Max    Need:
   0    1    0|    7    5    3    7    4    3
   0    0    0|    0    0    0    0    0    0
   0    0    0|    0    0    0    0    0    0
   0    0    0|    0    0    0    0    0    0
   0    0    2|    4    3    3    4    3    1
 Process 1 completed
 Available matrix 10 5 5
 Allocated matrix     Max    Need:
   0    0    0|    0    0    0    0    0    0
   0    0    0|    0    0    0    0    0    0
   0    0    0|    0    0    0    0    0    0
   0    0    0|    0    0    0    0    0    0
   0    0    2|    4    3    3    4    3    1
 Process 5 completed
 Available matrix 10 5 7
The system is in a safe state!!

...Program finished with exit code 0
Press ENTER to exit console.
```