Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Technology

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Operating System Lab

Assignment No. - 4

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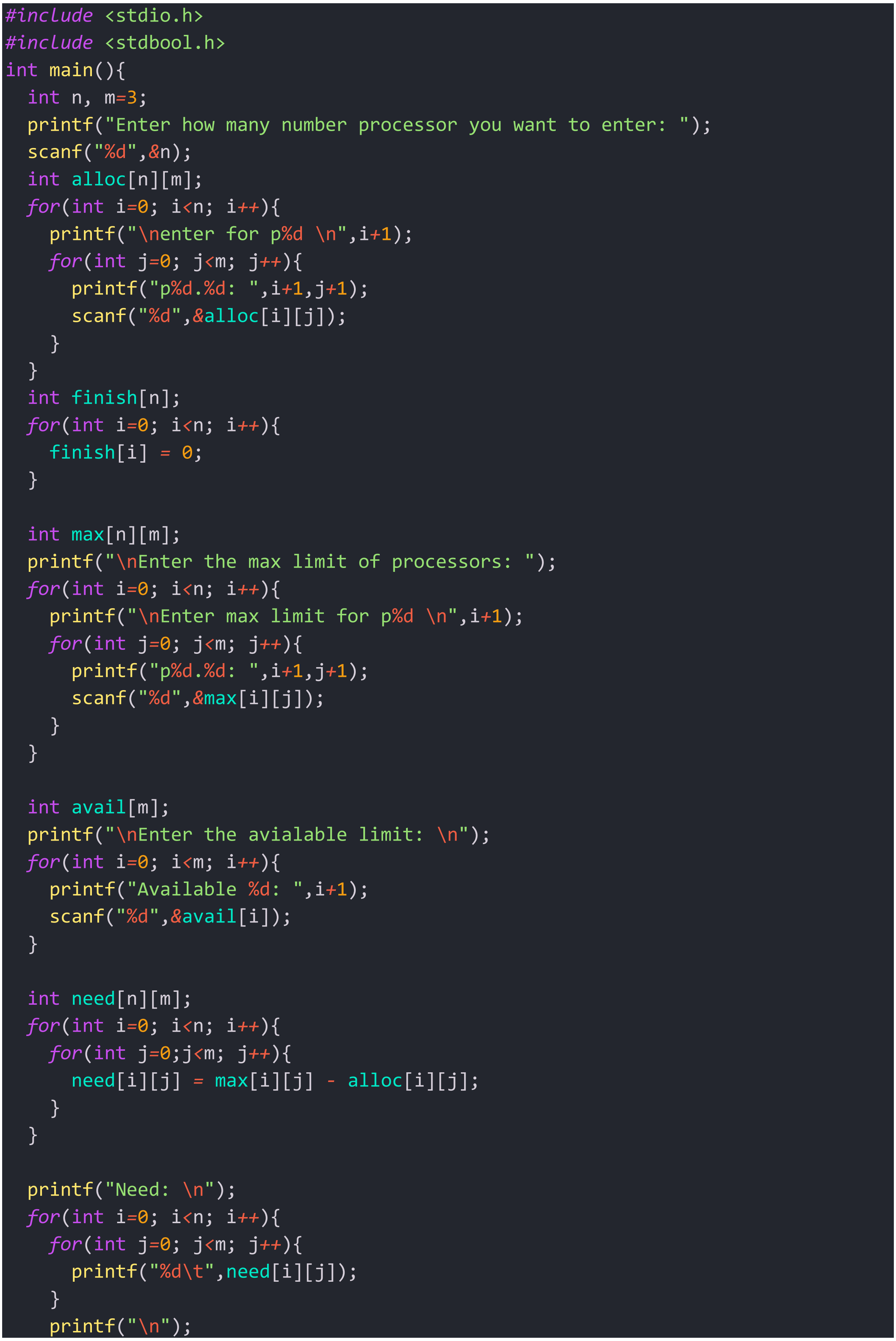
Roll No : 21

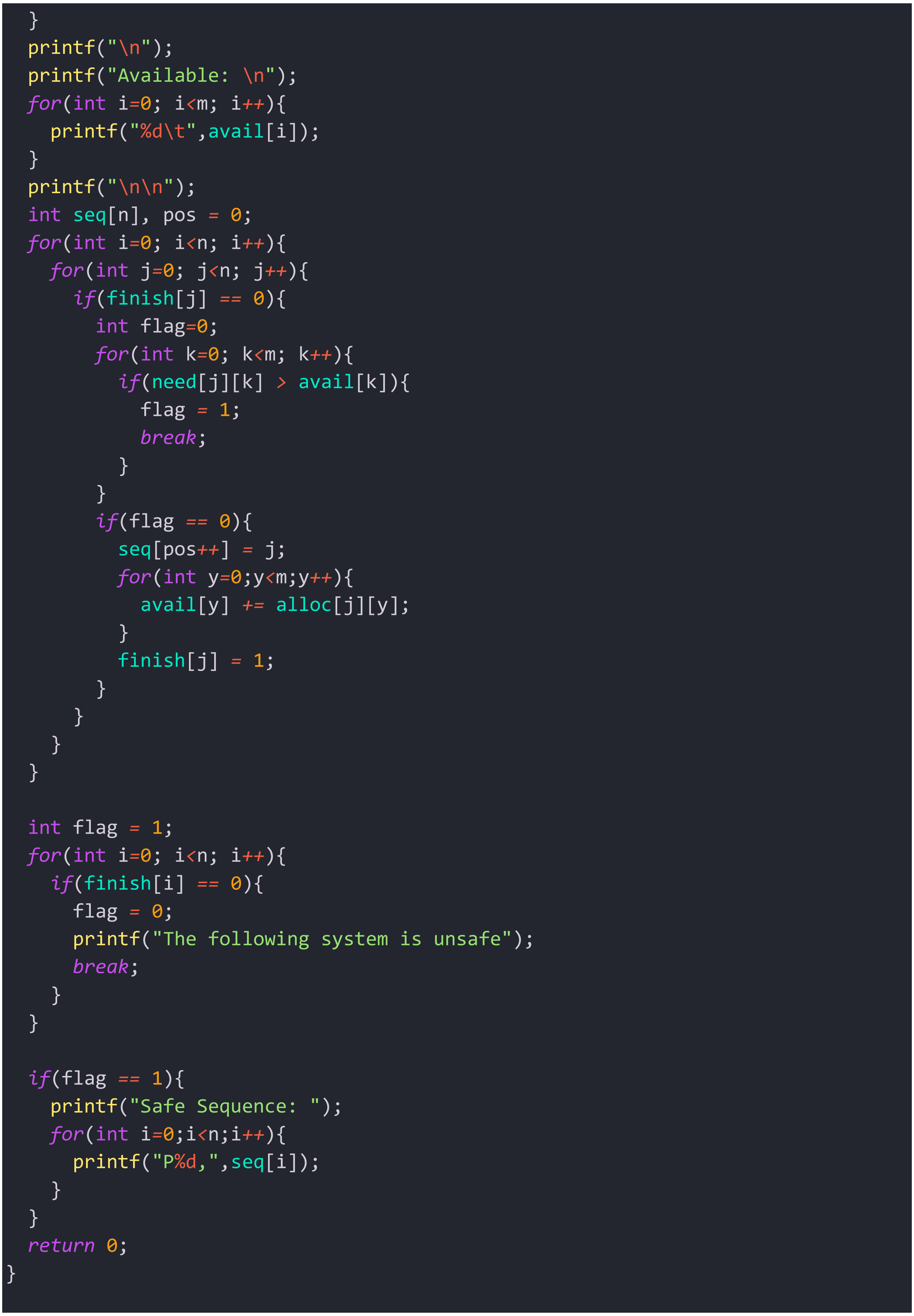
Problem Statement :

Banker’s Algorithm

Program :

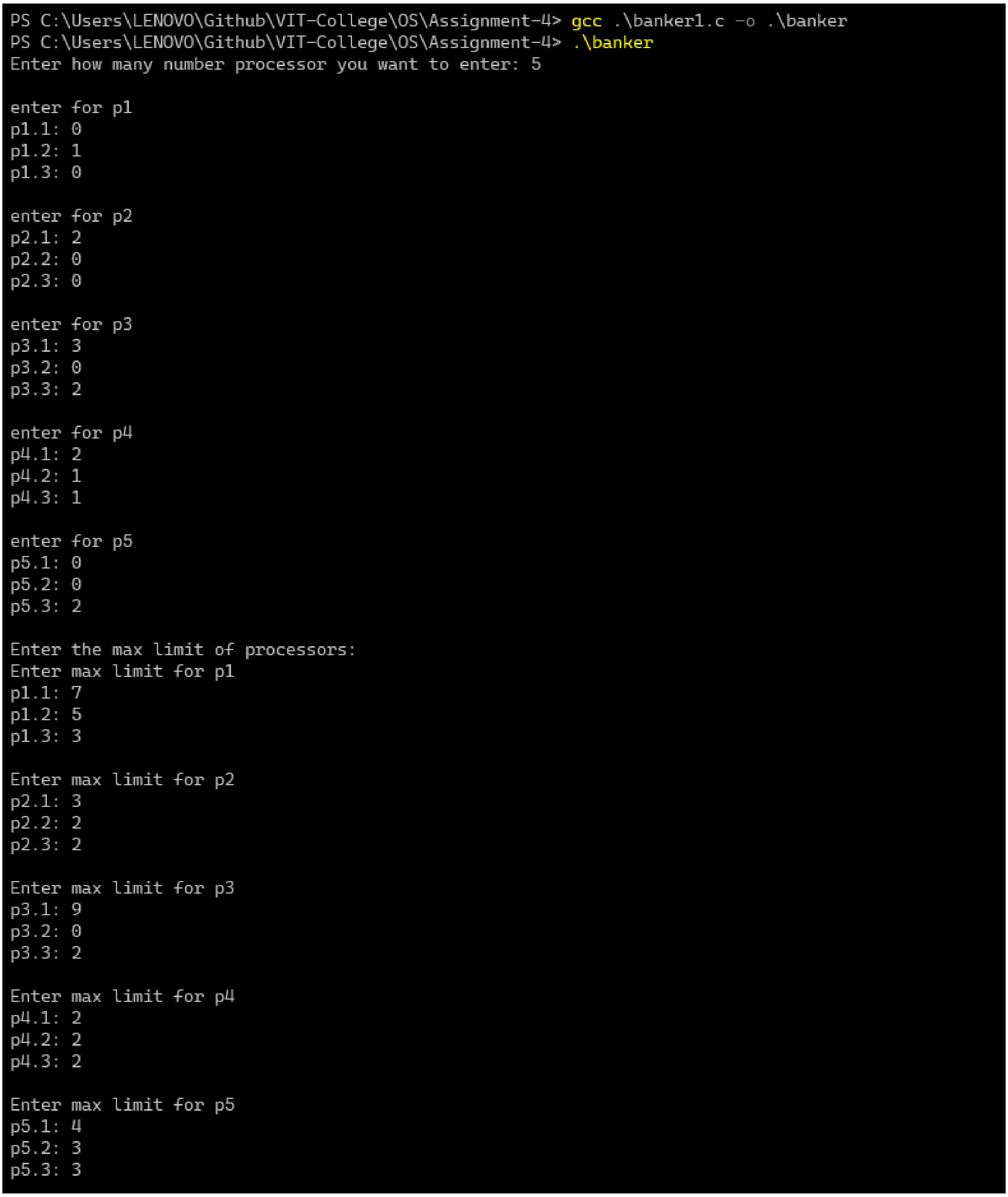


```
#include <stdio.h>
#include <stdbool.h>
int main(){
  int n, m=3;
  printf("Enter how many number processor you want to enter: ");
  scanf("%d",&n);
  int alloc[n][m];
  for(int i=0; i<n; i++){
    printf("\nenter for p%d \n",i+1);
    for(int j=0; j<m; j++){
      printf("p%d.%d: ",i+1,j+1);
      scanf("%d",&alloc[i][j]);
    }
  }
  int finish[n];
  for(int i=0; i<n; i++){
    finish[i] = 0;
  }

  int max[n][m];
  printf("\nEnter the max limit of processors: ");
  for(int i=0; i<n; i++){
    printf("\nEnter max limit for p%d \n",i+1);
    for(int j=0; j<m; j++){
      printf("p%d.%d: ",i+1,j+1);
      scanf("%d",&max[i][j]);
    }
  }

  int avail[m];
  printf("\nEnter the avialable limit: \n");
  for(int i=0; i<m; i++){
    printf("Available %d: ",i+1);
    scanf("%d",&avail[i]);
  }

  int need[n][m];
  for(int i=0; i<n; i++){
    for(int j=0;j<m; j++){
      need[i][j] = max[i][j] - alloc[i][j];
    }
  }

  printf("Need: \n");
  for(int i=0; i<n; i++){
    for(int j=0; j<m; j++){
      printf("%d\t",need[i][j]);
    }
    printf("\n");
```

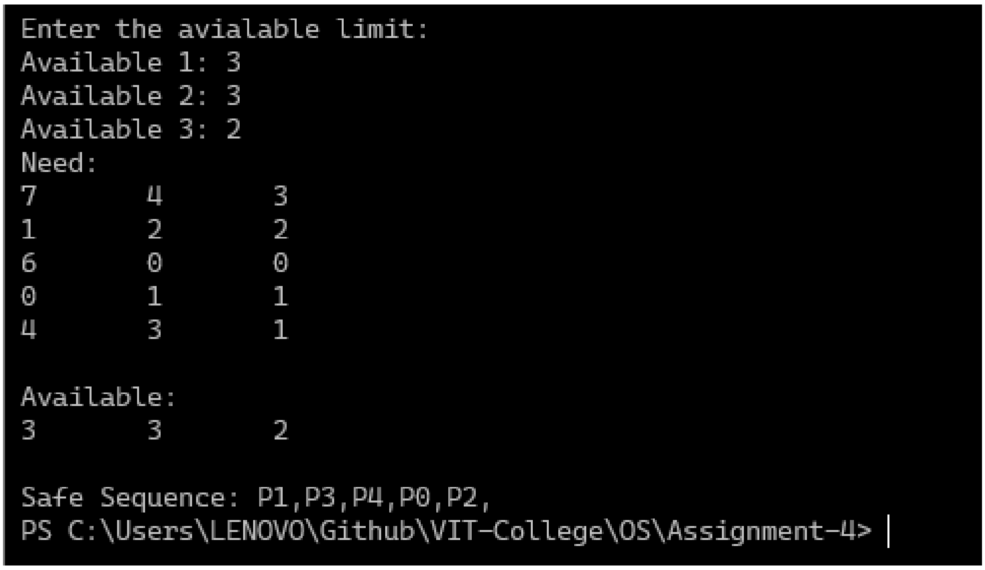


```
  }
  printf("\n");
  printf("Available: \n");
  for(int i=0; i<m; i++){
    printf("%d\t",avail[i]);
  }
  printf("\n\n");
  int seq[n], pos = 0;
  for(int i=0; i<n; i++){
    for(int j=0; j<n; j++){
      if(finish[j] == 0){
        int flag=0;
        for(int k=0; k<m; k++){
          if(need[j][k] > avail[k]){
            flag = 1;
            break;
          }
        }
        if(flag == 0){
          seq[pos++] = j;
          for(int y=0;y<m;y++){
            avail[y] += alloc[j][y];
          }
          finish[j] = 1;
        }
      }
    }
  }

  int flag = 1;
  for(int i=0; i<n; i++){
    if(finish[i] == 0){
      flag = 0;
      printf("The following system is unsafe");
      break;
    }
  }

  if(flag == 1){
    printf("Safe Sequence: ");
    for(int i=0;i<n;i++){
      printf("P%d,",seq[i]);
    }
  }
  return 0;
}
```

Output-1:

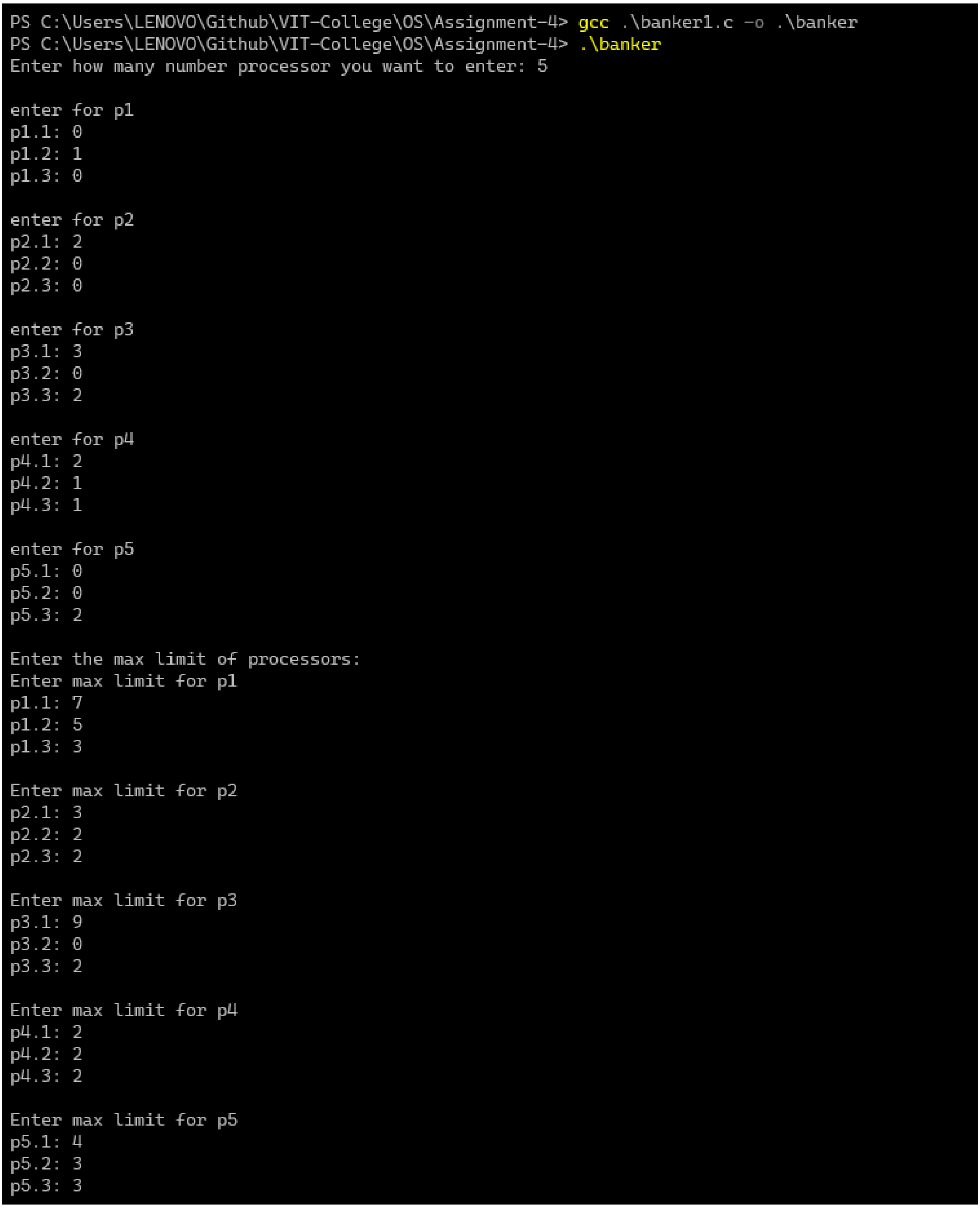


```
PS C:\Users\LENOVO\Github\VIT-College\OS\Assignment-4> gcc .\banker1.c -o .\banker
PS C:\Users\LENOVO\Github\VIT-College\OS\Assignment-4> .\banker
Enter how many number processor you want to enter: 5

enter for p1
p1.1: 0
p1.2: 1
p1.3: 0

enter for p2
p2.1: 2
p2.2: 0
p2.3: 0

enter for p3
p3.1: 3
p3.2: 0
p3.3: 2

enter for p4
p4.1: 2
p4.2: 1
p4.3: 1

enter for p5
p5.1: 0
p5.2: 0
p5.3: 2

Enter the max limit of processors:
Enter max limit for p1
p1.1: 7
p1.2: 5
p1.3: 3

Enter max limit for p2
p2.1: 3
p2.2: 2
p2.3: 2

Enter max limit for p3
p3.1: 9
p3.2: 0
p3.3: 2

Enter max limit for p4
p4.1: 2
p4.2: 2
p4.3: 2

Enter max limit for p5
p5.1: 4
p5.2: 3
p5.3: 3
```

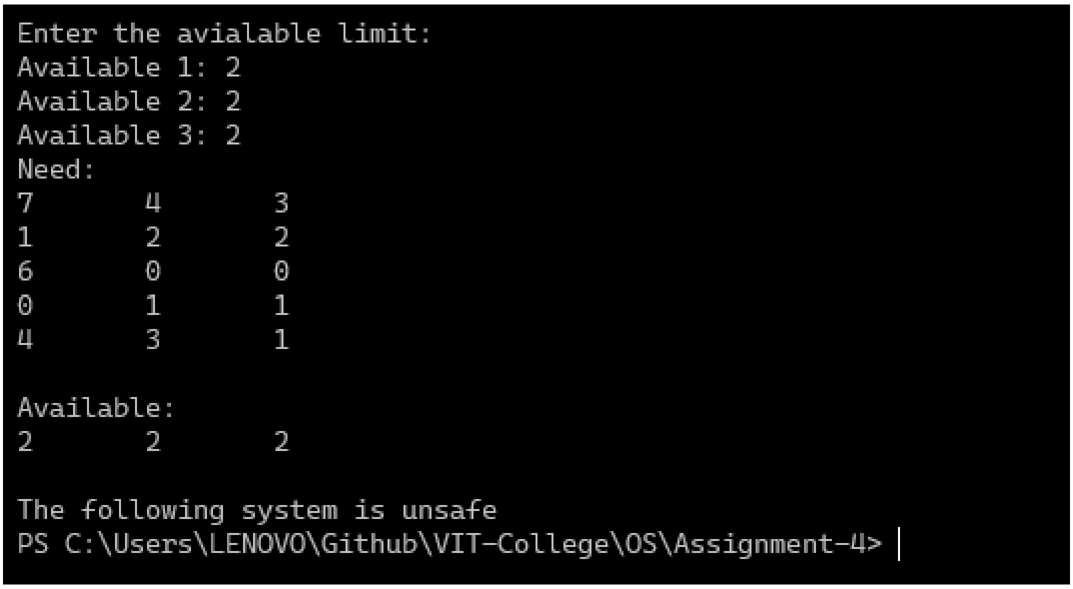


```
Enter the avialable limit:
Available 1: 3
Available 2: 3
Available 3: 2
Need:
7       4       3
1       2       2
6       0       0
0       1       1
4       3       1

Available:
3       3       2

Safe Sequence: P1,P3,P4,P0,P2,
PS C:\Users\LENOVO\Github\VIT-College\OS\Assignment-4>
```

Output-2 :



```
PS C:\Users\LENOVO\Github\VIT-College\OS\Assignment-4> gcc .\banker1.c -o .\banker
PS C:\Users\LENOVO\Github\VIT-College\OS\Assignment-4> .\banker
Enter how many number processor you want to enter: 5

enter for p1
p1.1: 0
p1.2: 1
p1.3: 0

enter for p2
p2.1: 2
p2.2: 0
p2.3: 0

enter for p3
p3.1: 3
p3.2: 0
p3.3: 2

enter for p4
p4.1: 2
p4.2: 1
p4.3: 1

enter for p5
p5.1: 0
p5.2: 0
p5.3: 2

Enter the max limit of processors:
Enter max limit for p1
p1.1: 7
p1.2: 5
p1.3: 3

Enter max limit for p2
p2.1: 3
p2.2: 2
p2.3: 2

Enter max limit for p3
p3.1: 9
p3.2: 0
p3.3: 2

Enter max limit for p4
p4.1: 2
p4.2: 2
p4.3: 2

Enter max limit for p5
p5.1: 4
p5.2: 3
p5.3: 3
```



```
Enter the avialable limit:
Available 1: 2
Available 2: 2
Available 3: 2
Need:
7       4       3
1       2       2
6       0       0
0       1       1
4       3       1

Available:
2       2       2

The following system is unsafe
PS C:\Users\LENOVO\Github\VIT-College\OS\Assignment-4> 
```