Name: Nikhil Gupta
Roll No.: 20051523

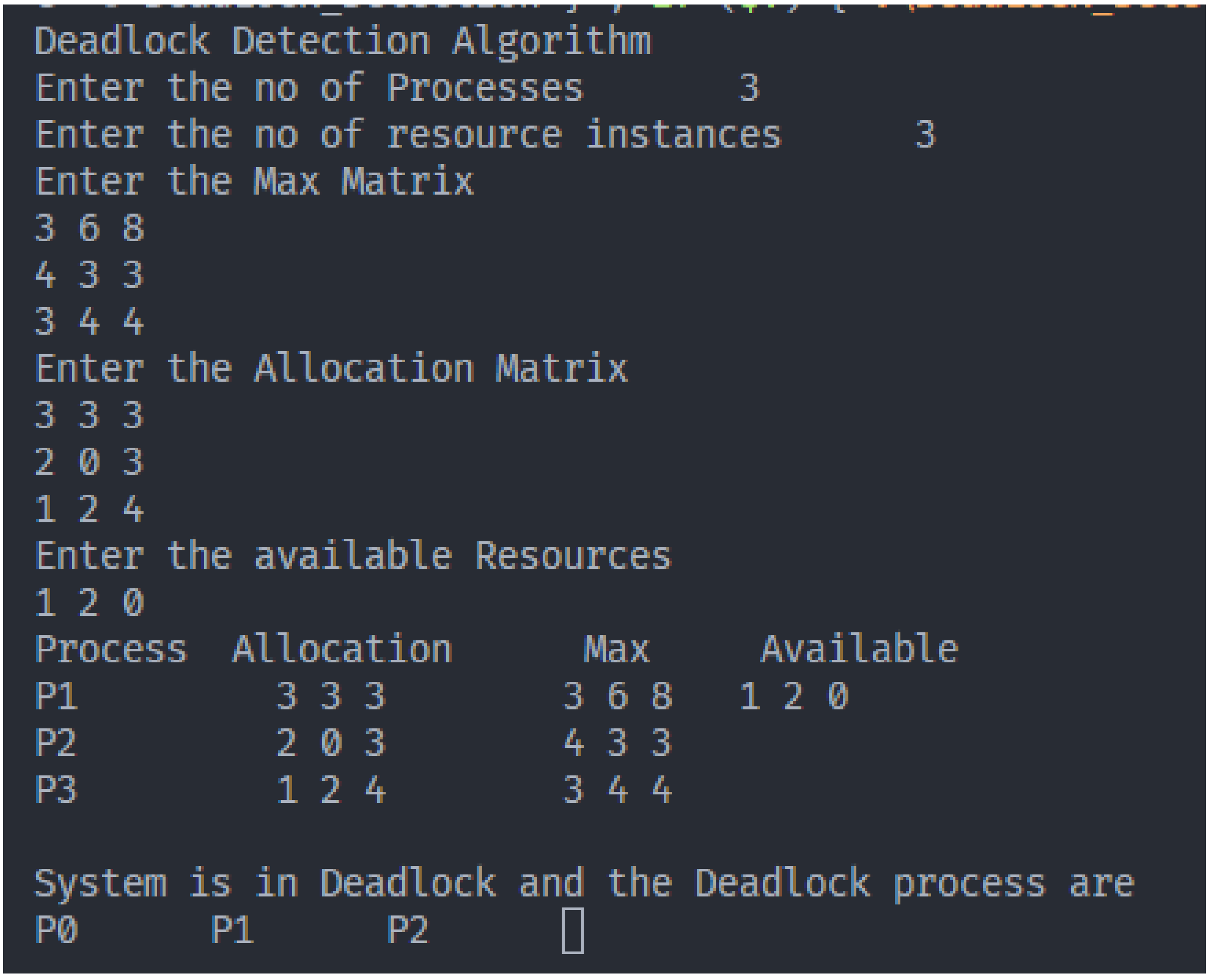
ASSIGNMENT 14

Deadlock Detection Algorithm

```c
#include <stdio.h>
#include <conio.h>
int max[50][50];
int alloc[50][50];
int need[50][50];
int avail[50];
int n, r;
void input();
void show();
void cal();

int main()
{
    int i, j;
    printf("Deadlock Detection Algorithm \n");
    input();
    show();
    cal();
    getch();
    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;
    }

    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;
                        }
                        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



```
Deadlock Detection Algorithm
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 0
Process  Allocation      Max     Available
P1         3 3 3        3 6 8   1 2 0
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
```