OPERATING SYSTEM - CS23431

EXP 9

DEADLOCK AVOIDANCE

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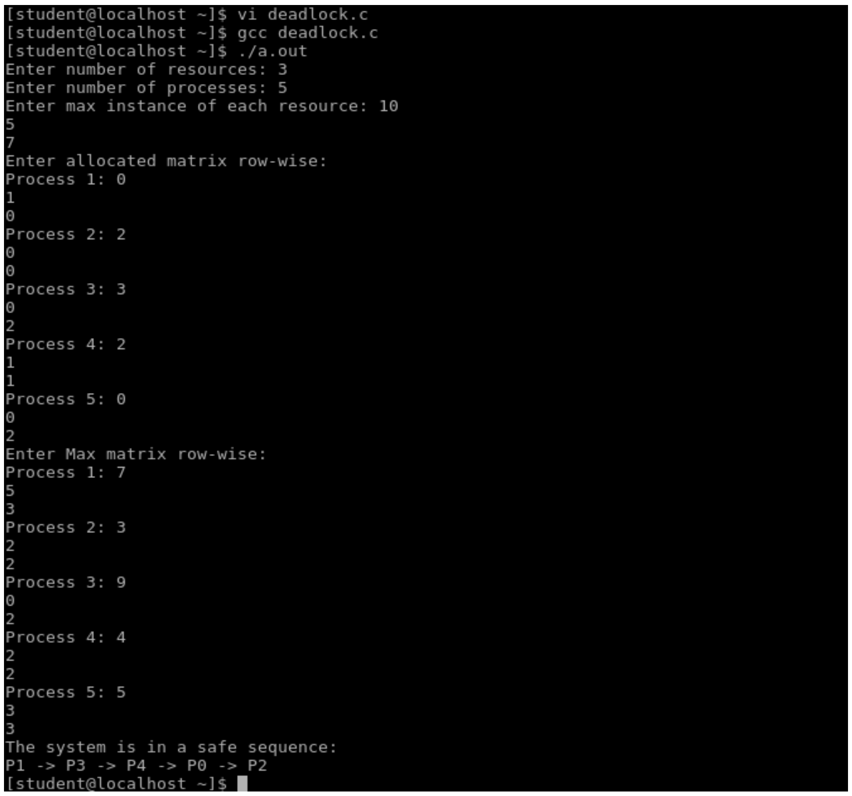
PROGRAM:

```
#include <stdio.h>

int main() {
    int resource, process;
    printf("Enter number of resources: ");
    scanf("%d", &resource);
    printf("Enter number of processes: ");
    scanf("%d", &process);

    int inst[resource];
    printf("Enter max instance of each resource: ");
    for (int i = 0; i < resource; i++) {
        scanf("%d", &inst[i]);
    }

    int allocated[process][resource], max[process][resource], need[process][resource];
    int available[resource];

    printf("Enter allocated matrix row-wise:\n");
    for (int i = 0; i < process; i++) {
        printf("Process %d: ", i + 1);
        for (int j = 0; j < resource; j++) {
            scanf("%d", &allocated[i][j]);
        }
    }

    printf("Enter Max matrix row-wise:\n");
    for (int i = 0; i < process; i++) {
        printf("Process %d: ", i + 1);
        for (int j = 0; j < resource; j++) {
            scanf("%d", &max[i][j]);
        }
```

```
}

for (int i = 0; i < process; i++) {
    for (int j = 0; j < resource; j++) {
        need[i][j] = max[i][j] - allocated[i][j];
    }
}

for (int j = 0; j < resource; j++) {
    int sum = 0;
    for (int i = 0; i < process; i++) {
        sum += allocated[i][j];
    }
    available[j] = inst[j] - sum;
}

int finish[process];
for (int i = 0; i < process; i++) {
    finish[i] = 0;
}

int safeseq[process];
int count = 0, canrun, notsafe = 0;

while (count < process) {
    int found = 0;
    for (int i = 0; i < process; i++) {
        if (!finish[i]) {
            canrun = 1;
            for (int j = 0; j < resource; j++) {
                if (need[i][j] > available[j]) {
                    canrun = 0;
                    break;
                }
            }
            if (canrun) {
                for (int j = 0; j < resource; j++) {
                    available[j] += allocated[i][j];
                }
                safeseq[count++] = i;
```

```
                    finish[i] = 1;
                    found = 1;
                }
            }
        }
        if (!found) {
            printf("System is not in safe sequence\n");
            notsafe = 1;
            break;
        }
    }

    if (!notsafe) {
        printf("The system is in a safe sequence:\n");
        for (int i = 0; i < process; i++) {
            printf("P%d", safeseq[i]);
            if (i != process - 1) {
                printf(" -> ");
            }
        }
        printf("\n");
    }

    return 0;
}
```

OUTPUT:



```
[student@localhost ~]$ vi deadlock.c
[student@localhost ~]$ gcc deadlock.c
[student@localhost ~]$ ./a.out
Enter number of resources: 3
Enter number of processes: 5
Enter max instance of each resource: 10
5
7
Enter allocated matrix row-wise:
Process 1: 0
1
0
Process 2: 2
0
0
Process 3: 3
0
2
Process 4: 2
1
1
Process 5: 0
0
2
Enter Max matrix row-wise:
Process 1: 7
5
3
Process 2: 3
2
2
Process 3: 9
0
2
Process 4: 4
2
2
Process 5: 5
3
3
The system is in a safe sequence:
P1 -> P3 -> P4 -> P0 -> P2
[student@localhost ~]$
```