OPERATING SYSTEM - CS23431

EXP 9

DEADLOCK AVOIDANCE

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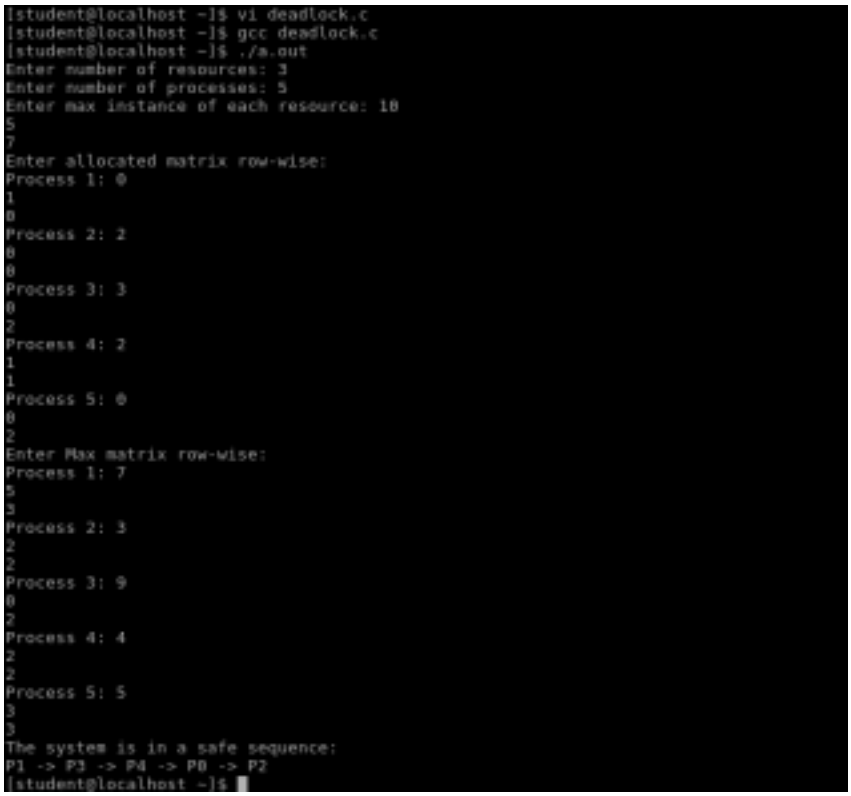
PROGRAM:

```
#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 ~]$