

Operating Systems

CT-353

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Lab 08:

Deadlock

```
#include <stdio.h>

int main() {
    int n, r, i, j, k;

    int alloc[10][10], max[10][10], avail[10];
    int finish[10], need[10][10], dead[10];

    int flag = 0, c = 0;

    printf("Enter number of processes: ");
    scanf("%d", &n);

    printf("Enter number of resources: ");
    scanf("%d", &r);

    printf("Enter allocation matrix:\n");
    for(i = 0; i < n; i++)
        for(j = 0; j < r; j++)
            scanf("%d", &alloc[i][j]);

    printf("Enter maximum matrix:\n");
    for(i = 0; i < n; i++)
        for(j = 0; j < r; j++)
            scanf("%d", &max[i][j]);

    printf("Enter available resources:\n");
    for(i = 0; i < r; i++)
        scanf("%d", &avail[i]);

    for(i = 0; i < n; i++)
        for(j = 0; j < r; j++)
```

```

        need[i][j] = max[i][j] - alloc[i][j];
for(i = 0; i < n; i++)
    finish[i] = 0;
for(k = 0; k < n; k++) {
    for(i = 0; i < n; i++) {
        if(finish[i] == 0) {
            c = 0;
            for(j = 0; j < r; j++) {
                if(need[i][j] <= avail[j])
                    c++;
            }
            if(c == r) {
                for(j = 0; j < r; j++)
                    avail[j] += alloc[i][j];
                finish[i] = 1;
                flag = 1;
            }
        }
    }
}
flag = 0;
j = 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 Deadlocked processes are:\n");
}

```

```
    for(i = 0; i < j; i++)  
        printf("P%d\t", dead[i]);  
    printf("\n");  
} else {  
    printf("\nNo Deadlock detected. System is in safe state.\n");  
}  
return 0;  
}
```

Output:

No Deadlock:

```
C:\Users\User1\Documents\os lab 7.exe
Enter number of processes: 5
Enter number of resources: 3
Enter allocation matrix:
0 1 0
2 0 0
3 0 2
2 1 1
0 0 2
Enter maximum matrix:
7 5 3
3 2 2
9 0 2
2 2 2
4 3 3
Enter available resources:
3 3 2

No Deadlock detected. System is in safe state.

-----
Process exited after 43.58 seconds with return value 0
Press any key to continue . . .
```

Deadlock:

```
C:\Users\User1\Documents\os lab 7.exe
Enter number of processes: 5
Enter number of resources: 3
Enter allocation matrix:
0 1 0
2 0 0
3 0 2
2 1 1
0 0 2
Enter maximum matrix:
7 5 3
3 2 2
9 0 2
2 2 2
4 3 3
Enter available resources:
1 1 1

System is in Deadlock and the Deadlocked processes are:
P0      P2      P4

-----
Process exited after 44.9 seconds with return value 0
Press any key to continue . . .
```