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3). Write a C program to simulate deadlock detection.

```
#include <stdio.h>
void main()
{
    int n, m, i, j;
    printf("Enter the number of process and number
        of type of resource:\n");
    scanf("%d%d", &n, &m);
    int max[n][m], need[n][m], all[n][m],
    ava[m], finish[n], dead[n];
    int flag = 1, c;
    for (i=0; i<n; i++){
        finish[i] = 0;
    }
    printf("Enter the maximum number of each type of
        resource needed by each process:\n");
    for(i=0; i<n; i++){
        for(j=0; j<m; j++){
            scanf("%d", &max[i][j]);
        }
    }
    printf("Enter the allocated number of each type of
        resource for each process:\n");
    for (i=0; i<n; i++){
        for(j=0; j<m; j++){
            scanf("%d", &all[i][j]);
        }
    }
    printf("Enter the available number of each
        type of resource:\n");
    for(j=0; j<m; j++){
        scanf("%d", &ava[j]);
    }
```

```
for(i=0;i<n;i++){
    for(j=0;j<m;j++){
        need[i][j]=max[i][j]-all[i][j];
    }
}
while(flag){
        flag=0;
        for(i=0;i<n;i++){
            if(finish[i]==0){
                c=0;
                for(j=0;j<m;j++){
                    if(need[i][j]<=ava[j]){
                        c++;
                    }
                }
                if(c==m){
                    for(j=0;j<m;j++){
                        ava[j]+=all[i][j];
                    }
                    finish[i]=1;
                    flag=1;
                }
            }
        }
}
int deadlock=0;
for(i=0;i<n;i++){
        if(finish[i]==0){
            dead[deadlock]=i;
            deadlock++;
        }
}
if(deadlock>0){
```

```
        printf("Deadlock hat occured:\n");
        printf("The deadlocked proaues are:\n");
        for(i=0; i<deadlock; i++){
                printf("P%d", dead[i]);
        }
        printf("\n");
    } else{
        printf("No deadlock hat occured!\n");
    }
}
```

Output:

Enter the number of proaues and number of types of resources:
5 4
Enter the maximum number of each type of resource needed by each process:
5 1 1 7
3 2 1 1
3 3 2 1
4 6 1 2
6 3 2 5
Enter the allocated number of each type of resource for each proau:
3 0 1 4
2 2 1 0
3 1 2 1
0 5 1 0
4 2 1 2
Enter the available number of each type of resource:
0 3 0 1
Deadlock hat occured:
The deadlocked proaues are:
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