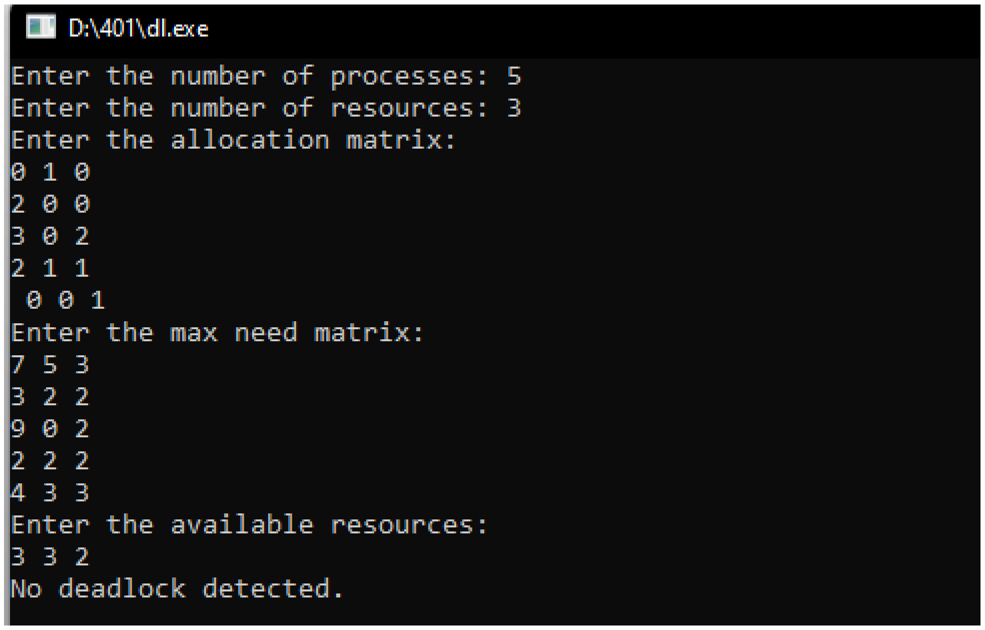
WEEK 7
Write a C program to simulate deadlock detection

```
#include <stdio.h>

#define MAX_PROCESSES 10
#define MAX_RESOURCES 10

int processes, resources;
int allocation[MAX_PROCESSES][MAX_RESOURCES];
int max_need[MAX_PROCESSES][MAX_RESOURCES];
int available[MAX_RESOURCES];
int marked[MAX_PROCESSES];
int finished[MAX_PROCESSES];

void initialize() {
  printf("Enter the number of processes: ");
  scanf("%d", &processes);
  printf("Enter the number of resources: ");
  scanf("%d", &resources);

  printf("Enter the allocation matrix:\n");
  for (int i = 0; i < processes; i++) {
    for (int j = 0; j < resources; j++) {
      scanf("%d", &allocation[i][j]);
    }
  }

  printf("Enter the max need matrix:\n");
  for (int i = 0; i < processes; i++) {
    for (int j = 0; j < resources; j++) {
      scanf("%d", &max_need[i][j]);
    }
  }

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

void detectDeadlock() {
  for (int i = 0; i < processes; i++) {
    marked[i] = 0;
```

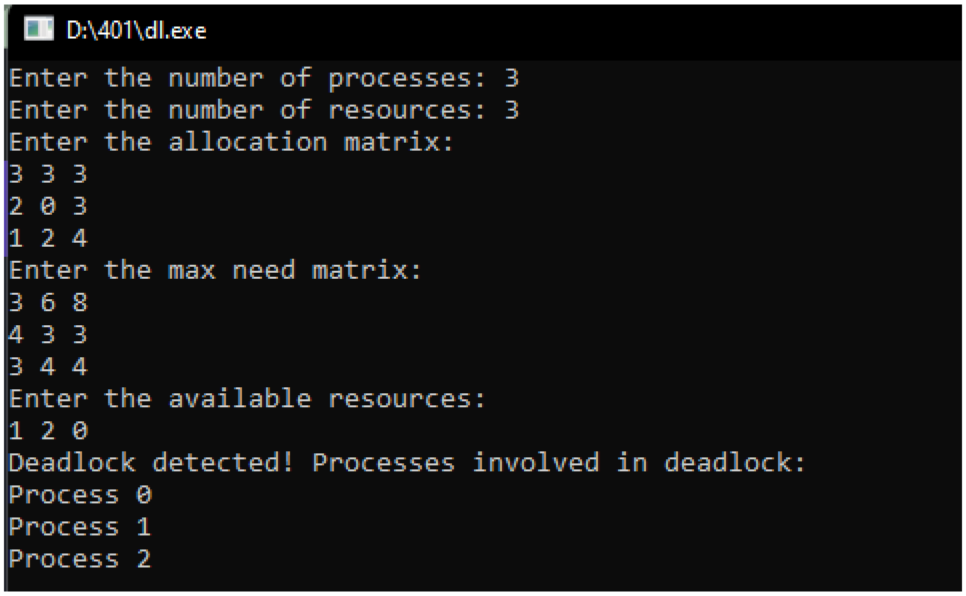
```
        finished[i] = 0;
    }

    int marked_count = 0;
    while (marked_count < processes) {
        int found = 0;
        for (int i = 0; i < processes; i++) {
            if (!finished[i] && !marked[i]) {
                int can_allocate = 1;
                for (int j = 0; j < resources; j++) {
                    if (max_need[i][j] - allocation[i][j] > available[j]) {
                        can_allocate = 0;
                        break;
                    }
                }
                if (can_allocate) {
                    marked[i] = 1;
                    marked_count++;
                    found = 1;
                    for (int j = 0; j < resources; j++) {
                        available[j] += allocation[i][j];
                    }
                    break;
                }
            }
        }
        if (!found) {
            printf("Deadlock detected! Processes involved in deadlock:\n");
            for (int i = 0; i < processes; i++) {
                if (!finished[i] && !marked[i]) {
                    printf("Process %d\n", i);
                }
            }
            return;
        }
    }

    printf("No deadlock detected.\n");
}

int main() {
    initialize();
    detectDeadlock();
    return 0;
```

}

OUTPUT:



```
D:\401\dl.exe
Enter the number of processes: 5
Enter the number of resources: 3
Enter the allocation matrix:
0 1 0
2 0 0
3 0 2
2 1 1
 0 0 1
Enter the max need matrix:
7 5 3
3 2 2
9 0 2
2 2 2
4 3 3
Enter the available resources:
3 3 2
No deadlock detected.
```



```
D:\401\dl.exe
Enter the number of processes: 3
Enter the number of resources: 3
Enter the allocation matrix:
3 3 3
2 0 3
1 2 4
Enter the max need matrix:
3 6 8
4 3 3
3 4 4
Enter the available resources:
1 2 0
Deadlock detected! Processes involved in deadlock:
Process 0
Process 1
Process 2
```