1.main.c

```
#include <stdio.h>
#include <stdlib.h>
#include "header.h"

int main(){
   twoStacks ts;
   init(&ts, 5);
   push1(&ts, 5);
   push2(&ts, 10);
   push1(&ts, 15);
   push2(&ts, 20);
   push1(&ts, 25);
   push2(&ts, 25);
   display1(&ts);
   display2(&ts);
   printf("Popped element from stack 1: %d\n", pop1(&ts));
   printf("Popped element from stack 2: %d\n", pop2(&ts));
   display1(&ts);
   display2(&ts);
   return 0;
}
```

2.header.h

```
typedef struct twoStacks {
   int* arr;
   int size;
   int top1;
   int top2;
}twoStacks;

void init(twoStacks *ts, int size);

void push1(twoStacks *ts, int x);
void push2(twoStacks *ts, int x);

int pop1(twoStacks *ts);
int pop2(twoStacks *ts);

void display1(twoStacks *ts);
void display2(twoStacks *ts);
```

3.logic.c

```
#include <stdio.h>
#include <stdlib.h>
#include "header.h"

void init(twoStacks *ts, int size){
   ts ->  size = size;
   ts -> arr = (int *)malloc(sizeof(int) * size);
   ts -> top1 = -1;
   ts -> top2 = size;
   return;
}

void push1(twoStacks *ts, int x){
   if(ts -> top1 < ts -> top2 - 1){
      ts -> top1++;
      ts -> arr[ts -> top1] = x;
   }else{
      printf("Stack Overflow\n");
   }
   return;
}
void push2(twoStacks *ts, int x){
   if(ts -> top1 < ts -> top2 - 1){
      ts -> top2--;
      ts -> arr[ts -> top2] = x;
   }else{
      printf("Stack Overflow\n");
   }
   return;
}
```

```
int pop1(twoStacks *ts){
    if(ts -> top1 >= 0){
        int x = ts -> arr[ts -> top1];
        ts -> top1--;
        return x;
    }else{
        printf("Stack Underflow\n");
        return -1;
    }
}
int pop2(twoStacks *ts){
    if(ts -> top2 < ts -> size){
        int x = ts -> arr[ts -> top2];
        ts -> top2++;
        return x;
    }else{
        printf("Stack Underflow\n");
        return -1;
    }
}
void display1(twoStacks *ts){
    if (ts->top1 == -1) {
        printf("Stack 1 is empty\n");
    }else{
        printf("Elements in Stack 1 are: ");
         for (int i = 0; i <= ts->top1; i++) {
            printf("%d ", ts->arr[i]);
        }
        printf("\n");
    }
}
```

```
void display2(twoStacks* ts) {
    if (ts->top2 == ts->size) {
        printf("Stack 2 is empty\n");
    } else {
        printf("Elements in Stack 2 are: ");
        for (int i = ts -> size - 1; i >= ts -> top2 ; i--) {
            printf("%d ", ts->arr[i]);
        }
        printf("\n");
    }
}
```

Output:

```
tanis@Tanishq MINGW64 /d/COEP/DSA/Serious/Assignment3/twoStacks
$ gcc -Wall main.c logic.c

tanis@Tanishq MINGW64 /d/COEP/DSA/Serious/Assignment3/twoStacks
$ ./a
Stack Overflow
Elements in Stack 1 are: 5 15 25
Elements in Stack 2 are: 10 20
Popped element from stack 1: 25
Popped element from stack 2: 20
Elements in Stack 1 are: 5 15
Elements in Stack 2 are: 10
```