

EUROPEAN UNIVERSITY OF LEFKE
Faculty of Engineering
Department of Software Engineering



COMP 217
DATA STRUCTURES
Lab Work No. 3

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Code :

```
#include <stdio.h>
#include <string.h>
#define SIZE 10
typedef struct {
    char items[SIZE];
    int top;
} stack;

void init_stack(stack * s){
    s->top = -1;
}

int is_empty(stack *s){
    return s->top == -1;
}

int is_full(stack *s)
{
    return s->top == SIZE-1;
}

char top_of_stack(stack *s){
    return is_empty(s) ? '\0' : s->items[s->top];
}

void push(stack *s, char c){
    if(is_full(s)) {
        printf("Overflow: stack is full!\n");
        return;
    }
    s->top++;
    s->items[s->top] = c;
}

char pop(stack *s){
    if(is_empty(s)) {
        printf("Underflow: stack is empty!\n");
        return '\0';
    }
    char temp = s->items[s->top];
    s->top--;
    return temp;
}

int is_balanced(char * exp, stack * s){
```

```

    for(size_t i = 0; exp[i] != '\0'; i++){
        if(exp[i] == '(')
            push(s,exp[i]);
        if(exp[i] == ')')
            pop(s);
    }
    return is_empty(s);
}

void str_rev(char * str){
    stack s;
    init_stack(&s);
    int len=strlen(str);
    for (int i = 0; i < len; i++)
        push(&s, str[i]);
    while (!is_empty(&s))
        printf("%c",pop(&s));
}

int main(){
    stack s, min, max;
    init_stack(&s);
    init_stack(&min);
    init_stack(&max);
    char exp[SIZE], str[SIZE];
    printf("Enter the expression to check if its brackets are
balanced : ");
    scanf("%s",exp);
    if(is_balanced(&exp,&s))
        printf("Your expression is balanced\n");
    else printf("Your expression isn't balanced\n");
    printf("Enter a string to reverse : ");
    scanf("%s", str);
    str_rev(&str);
    printf("\n");
    int i = 0, x, arr[SIZE];
    printf("Enter numbers to get the max and mininum or enter 0 to
stop and get the results.\n");
    do{
        printf("Enter a number : ");
        scanf("%d", &x);

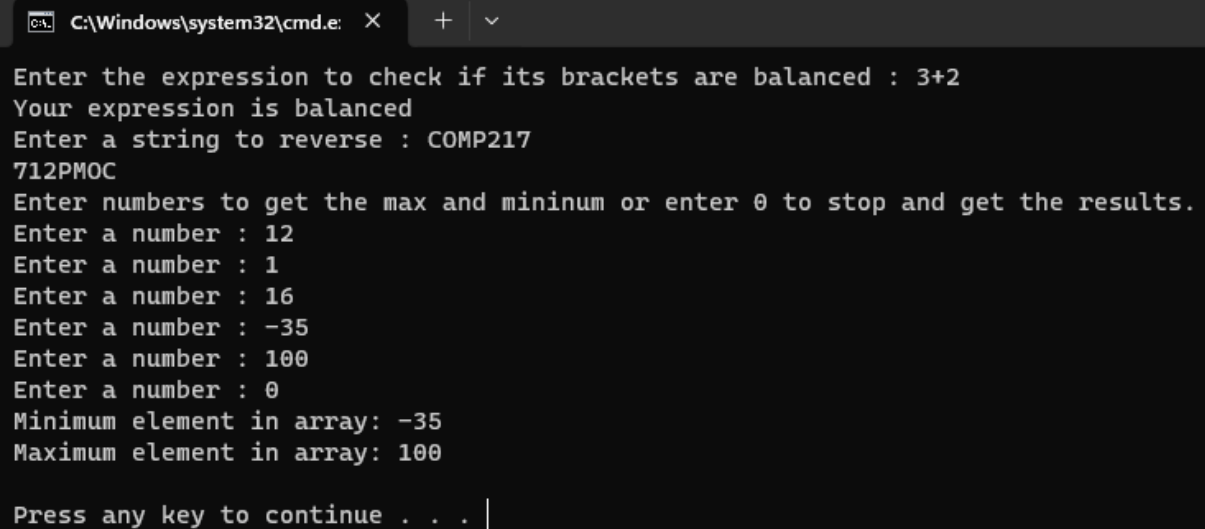
```

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    arr[i] = x;
    if(is_empty(&min)) push(&min, arr[i]);
    else if(arr[i] < top_of_stack(&min)) push(&min, arr[i]);
    if(is_empty(&max)) push(&max, arr[i]);
    else if(arr[i] > top_of_stack(&max)) push(&max, arr[i]);
    i++;
} while (x != 0);
printf("Minimum element in array: %d\nMaximum element in array: %d\n", top_of_stack(&min), top_of_stack(&max));
return 0;
}

```

Result :



```

C:\Windows\system32\cmd.exe
Enter the expression to check if its brackets are balanced : 3+2
Your expression is balanced
Enter a string to reverse : COMP217
712PMOC
Enter numbers to get the max and mininum or enter 0 to stop and get the results.
Enter a number : 12
Enter a number : 1
Enter a number : 16
Enter a number : -35
Enter a number : 100
Enter a number : 0
Minimum element in array: -35
Maximum element in array: 100
Press any key to continue . . . |

```