Alexandria University
Faculty of Engineering
Specialized Scientific Programs
Computer & Communications Program
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Data Structures (1)
Course Code: CSE127
Lecturer: Prof. Dr. Nagia M. Ghanem
Dr. Samia Hafez

Lab 02
Stacks

1. Given the following struct which represents a stack using array.

```
#define SIZE 100
typedef struct
{
    int items[SIZE];
    int top;
}Stack;
```

Write a C function for each the following stack operation.

- Stack* initialize ()
- void push (Stack* s, int x)
- int pop (Stack* s)
- int isEmpty (Stack*s)
- int isFull (Stack*s)
- int peek (Stack*s)

2. Using the previous question function to implement a function that displays the elements in the stack without destroying it.

`void display (Stack*s)`

3. Using the previous questions function to implement a function that displays how many even numbers are in the stack.

`int countEven (Stack*s)`

HOMEWORK PROBLEMS

1- Write a C function to reverse a string using stack operations.

2- Write a C function to check whether the given stack is sorted (minimum on top).

Note: You need to handle special cases, such as an empty stack or a stack with a single element; in both scenarios, the stack is considered sorted.

3- Write a C function that deletes prime numbers in the stack of integers.

4- Write a C function that will merge two given sorted stacks of integers (min on top) and return one sorted stack (min on top).

Note: Don't use any other data structures you are only allowed to use stacks.

5- Write a C function to check if a given string has balanced parentheses.

- Example of balanced: "(a + b) * (c + d)"
- Example of unbalanced: "(a + b))"

6- Write a main function that displays a menu, allowing the user to select which function to test. Prompt the user for the corresponding input based on the chosen function. Include an additional option to exit the program.

Notes:

- You are only allowed to use the stack functions that are discussed in the labs.
- You must **upload one file** that contains all the stack operations, and the 5 functions required and the main function.