

(60-140) Lab Exercises #10

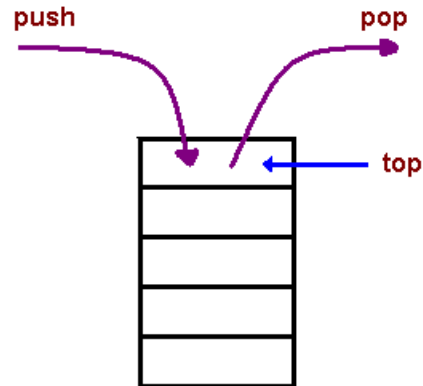
(Due at the end of the lab period)

Nov. 29- Dec.2, 2016.

Objective: Working with global and local variables

Stack Implementation: A stack, like an array, can store multiple data items of the same type. However, the operations on a stack are limited: we can either push an item onto the stack (add it to one end—the "stack top") or pop it from the stack (remove it from the same end). Examining or modifying an item that's not at the top of the contents is forbidden.

One way to implement a stack in C is to store its items in an array, which we'll call `contents`. A separate integer variable named `top` marks the position of the stack top. To push an item on the stack, we simply store the item in `contents` at the position indicated by `top`, then increment `top`. Popping an item requires decrementing `top`, then using it as an index into `contents` to fetch the item that's being popped*.



Based on this outline, the attached "globalContents.c" is a program that declares the `contents` and `top` variables for a stack and provides a set of functions that represent operations on the stack. All four functions need access to the `top` variable, and two functions need access to `contents`, so `contents` and `top` are declared **globally**.

Modify the "globalContents.c" program by moving the `contents` array and `top` into `main` (declare local variables), which will pass them as arguments to `push`, `pop`, `isEmpty` and `isFull` functions as follows:

```
- int isEmpty(int top);  
- int isFull(int top);  
- int pop(int contents[], int top);  
- int push(int data , int contents[], int top);
```

Save the program in a file named as "localContents.c", in the working directory on the PC you are using and demonstrate it to GA/TAs.

Hint: The value of `top` should be updated in the `main` function.

EVALUATION: You need to show your GA/TA the complete program at the end of this lab to receive **15 marks**.

IMPORTANT: DO YOUR OWN CODE. ANY CODE SUSPECTED TO BE SIMILAR TO ANOTHER SUBMISSION WILL CAUSE BOTH SUBMISSIONS TO RECEIVE A ZERO MARK ON ALL LABS AND BE REPORTED FOR PLAGIARISM.

* K. N. King, C Programming: A Modern Approach, 2nd ed., W. W. Norton, 2008.