

# Shri Swaminarayan College of Computer Science

SY BCA : Data Structure

Lab Assignment :4

Date:

Submission:

Topic : **Stack (LIFO list)**

**Using array implement the STACK and the following stack operations:**

- 1) **void init ( )**; that initializes the stack.
- 2) **bool empty ( )**; that checks whether the stack is empty or not.
- 3) **bool full ( )**; that checks whether the stack is full or not.
- 4) **void push ( )**; that adds item **x** in the stack .
- 5) **int pop ( )**; that removes and returns an item from the stack ..
- 6) **int top ( )**; that returns (without removing) the top item in the stack .
- 7) **void move ( )**; that moves the contents of one stack to other stack .  
For example if **s** contains 1, 2, and 3; after move **d** should contain 3, 2, and 1.
- 8) **void copy ( )**; that copies one stack to other stack .  
For example if **s** contains 1, 2, and 3; after copy **d** should also contain 1, 2, and 3.
- 9) **void print ( )**; that prints the contains of the stack.
- 10) **bool search ( int key)**; that returns **true** if the stack pointed by **p** contains **key**, returns **false** otherwise.
- 11) **void invert ( )**; that inverts the content of the stack pointed by **p**.  
For example if the stack contains 1, 2, and 3; after invert it will contain 3, 2, and 1.

**Write programs:**

- 12) Accept a mathematical expression that includes several sets of nested parenthesis and check that the parentheses are nested correctly. For example  
$$A - ( B + C / ( D * E / ( E - F ) ) - G ) + H$$
is a valid expression.
- 13) Change the above problem slightly and assume that three different types of scope delimiters exist. These types are indicated by parentheses ( ( and ) ), braces ( { and } ) and brackets ( [ and ] ). Now to validate the expression you have to check that the scope ender is of the same type as its scope opener.  
For example,  
( A + B ] is invalid whereas { A + B } is valid.  
[ A + { B / ( C - D ) } ] is invalid whereas [ A + { B / ( C - D ) } ] is valid.
- 14) Accept an infix expression and convert it into postfix. Accept and evaluate a postfix expression.