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First year - EECG142

Stacks And Queues

void fun(stack<stackElementType> & S, int T)

(1) Let S be an empty stack of integers and X be an array of N integers. Write an **external function** to store the elements of X in the stack such that X[0] is stored in the bottom of the stack and X[N-1] is stored in the top of the stack.

(2) Determine the output resulting from executing this code.

```
int I;
Stack <int> S; // empty
for(I=0; I < 10; I++){
        if (I % 2)
                S.push(I);
        else
                if (! S.isEmpty())
                        cout  << I << ":" << S.top() << '\n';
}
while(! S.isEmpty())
        cout << S.pop() << '\n';
```

```
0 1 2 3 4 5 6 7 8 9

2 : 1
4 : 3
6 : 5
8 : 7
1 3 5 7 9    False

9    true   LIFO
7
5
3
1
```

(3) Write a program that reads an input C/C++ file and checks for balanced bracket pairs in the file. The possible types of brackets are { }, [ ], < >, ( )

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(4) Suppose you have a stack S, containing various items, and an empty stack T. Show how each of the following tasks can be performed using the stack operations:
   a. Print out the contents of S in reverse order.   *push in another stack*
   b. Count the number of items in S, returning S to its original state.
   c. Delete every occurrence of a specified item from S, leaving the order of the remaining items unchanged.

(5) Using a stack, trace the evaluation of the following **RPN** expressions:
   12 10 5 / 12 3 - * +   *30*
   6 4 + 5 * 2 3 + *

(6) Let Q be an empty queue of integers and X be an array of N integers. Write an external function to store the elements of X in the queue such that X [N-1] is the front of the queue and X [0] is the rear of the queue.

(7) Let Q be a non-empty queue of integers. Write an external function ReverseQueue to reverse the queue using an empty stack of integers.

(8) Write an application that reads text from an input ASCII file, buffers it in a queue until the end of a sentence is reached (indicated by a word ending with '.') and then writes out the complete sentence to the standard output. The program should continue to read sentences and writes them out until the end of file of the input is reached.

(9) Write an external function bool DelElement (Queue &Q, int n) that deletes the nth element of a queue, leaving other elements in the same order. It returns a value indicating whether the operation succeeded or failed. Use an auxiliary array, stack, or queue as needed.