

# C++ Programming

## Lab 1

- Read the submit.pdf file to see how to prepare and submit your homework.
- (1 pt) Enter (in a file called hello.cpp), compile, and execute the following C++ program.

```
#include <iostream>
using namespace std;
int main( int argc, char *argv[] )
{
    cout << "Hello World!\n";
    return 0;
}
```
- (2 pts) Write a function (in a file called convert.cpp) that converts knots into miles per minute. The function needs to take in an int (knot) as the argument and return a double value (miles per minute). Write a main function (at the bottom of convert.cpp) that reads an integer from the terminal, and prints out the number converted to miles per minute (as a double floating point) by calling your function.  
Use:  
1 knot = 1 nautical mile per hour = 6076 feet per hour  
1 mph = 1 mile per hour = 5280 feet per hour
- (3 pts) Write a class, called *Stack*, in a file called Stack.h, that implements a stack of up to 1000 characters (use an array of 1000 char to implement your stack. You should include the following member functions in your class. (Replace the semicolons with the body of each of these methods. So the class declaration given below, you will convert to a class definition.)

```
#define STACK_CAPACITY 1000
class Stack
{
public:
    Stack(); // constructor for a stack
    void push(char c); // adds c to the top of the stack
    char pop(); // removes top element
    char top(); // returns the top element
    bool isEmpty(); // returns true iff the stack is empty
    bool isFull(); // returns true iff the stack is full
    ~Stack(); // destructor for a stack
};
```
- (3 points) Write a main procedure (in a file called test\_stack.cpp which includes stack.h) that repeatedly reads a line (using getline()) into a character string from *cin* into a std::string variable and outputs the reverse of that line by pushing the characters onto an instance of your stack class, then printing them as they are removed from the stack. Do this for each line in the input.

- (1 points) Modify your program above to exit on end of file (when the user types a ^D, on Linux, that is pressing a D while holding down the control key). This should cause `getline(cin, str)` to return false.
- Notes about submission: Create a zip file (called `<studentID>.hw1.zip`) containing your three programs above (`hello.cpp`, `convert.cpp`, `stack.h`, and `test_stack.cpp`, Create one write-up (report) showing screen shots of your three program compiling and running called `<studentID>.report.zip`. Submit the two files (zip and report) under homework 1 in Dropbox in EEE for ICS 45C. If you don't yet have Dropbox access, zip your solution and email to the TA or before the deadline. Your report may be in any standard format like pdf, doc, or html.