CS 31 Worksheet Week 4

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This worksheet is entirely **optional**, and meant for extra practice. Some problems will be more challenging than others and are designed to have you apply your knowledge beyond the examples presented in lecture, discussion or projects. All exams will be done on paper, so it is in your best interest to practice these problems by hand and not rely on a compiler.

Concepts: While Loops, Do While Loops, String Traversal, Functions (Only pass-by-value)

Reading Problems

1) What does the following code snippet output, AND what does each call to `mystery` return?

```
#include <iostream>
using namespace std;

int mystery(int a, int b) {
      int count = 0;
      while (count < 2) {
            a = a + b/2;
            b = a + 5;
            cout << "a: " << a << " b: " << b << endl;
            count++;
      }
      return count;
}
int main() {
      int a = 5, b = 10;
      cout << "a: " << a << " b: " << b << endl;
      mystery(a, b);
      cout << "a: " << a << " b: " << b << endl;
      if (a % b == 0) {
            return 1;
      }
}
```

Time: <10 min

2) What does the following code snippet output?

```
#include <iostream>
using namespace std;

void mystery (char code, int j) {
    if (j % 3 == 0)
        cout << "I found " << code << " at index " << j;
    else
        cout << "meh too lazy rn" << endl;
    if (j % 1 == 0)
            cout << "!" << endl;
}

int main() {
    string message = "2319!:(";
    int i = 0;
    do {
        mystery(message[i], i);
        i++;
    } while(i < message.size());
}
```

Time: <10 min

Programming Problems

Note: Now that you have had some more in-class practice with functions and strings, it might be a good idea to revisit the problems from last week if you haven't figured them out already! :)

1) Write a function called `reverse(int n)` that reverses the digits in the parameter and returns its result. For example, if `n` is 927, it should return 729. You do not need to handle negative numbers or non-digit characters. Leading zeroes should be ignored as well (see examples #2, 4). Then, in a `main()` function, take a number from user input, and call the function `reverse` using that number you just received.

Example test cases:

Enter number: 123

321

Enter number: 001

1

Enter number: 0

0

Enter number: 100

1

Time: ~20 min

2) Write a function `max3` which uses 3 integer parameters and returns the value of the largest. Test the function in a program that determines the largest of 3 quiz scores. If the largest score is more than 100, print a congratulatory message!

Example test cases:

Enter student 1's score: 105

Enter student 2's score: 44

Enter student 3's score: 56

The highest score out of these was 105! Congratulations on your hard work!

Time: ~10 min

3. Given a string, write a function that can reverse the order of characters in each word within a sentence while still preserving whitespace and initial word order. You can make it any kind of return value and have whatever parameters you need. However, explain your reasoning for your choices by using comments (remember, comments are denoted with `//`).

Example:

Input: "Let's take LeetCode contest"

Output: "s'teL ekat edoCteeL tsetnoc"

Note: In the string, each word is separated by single space and there will not be any extra space in the string.

Time: ~20 min

4. Implement a function `ToLowerCase` that has a string parameter `str`, and returns the same string in lowercase.

Example 1:
Input: "Hello"
Output: "hello"

Example 2:
Input: "here"
Output: "here"

Example 3:
Input: "LOVELY"
Output: "lovely"

Example 4:
Input: "ABC123”
Output: “abc123”

Time: ~10 min

Hint:
The tolower() function in C++ converts an uppercase character to its lowercase equivalent. If the character is already lowercase or is not an alphabet, it returns the original character. 0

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