

PIC10A 1C. Week 6b Problems. TA: Eric Kim

1. Vowel Counter

Write a program that, given a user-inputted string, counts the number of vowels. Assume that the user only inputs text in **lowercase**. For instance, here is an example expected output:

```
Please enter a word: apple
The word "apple" has 2 vowels.
```

2. Loopy

Rewrite the following while loop as an equivalent do-while loop and for loop:

```
int i = 0; int n = 20; int acc = 0;
while (i < n) {
    acc = acc + (2*i);
    if (acc > 10) {
        break;
    }
    i += 1;
}
// As a do-while loop: INSERT CODE BELOW
```

```
// As a for loop: INSERT CODE BELOW
```

Part 2: Louis Reasoner suggests the following answers:

```
do {
    acc = acc + (2*i);
    i += 1;
} while ((i < n) && (acc <= 10));
```

```
for (int i = 0; i < n; i += 1) {
    acc = acc + (2*i);
    if (acc > 10)
        break;
}
```

```
for (int i = 0; (i < n) && (acc <= 10); i += 1) {
    acc = acc + (2*i);
}
```

Are these equivalent to the original while loop? If so, explain why. If not, describe why not.

Hint: consider the values of acc and i at the end of the original while loop.

3. Forward Back

Write a program that, given a user-inputted string, repeats the string in the following pattern:

Please enter a word: Apple

A

 p

 p

 l

 e

 l

 p

 p

A

Hint: Recall the `<iomanip>` library, ie: `setw()`, `setfill()`.

4. Debugging

Louis Reasoner wants to write a program that, given a user-inputted string, outputs it in reverse order. He thinks to himself, "A-ha! I'll just write a for-loop that traverses the string in reverse order!". He writes the following program:

```
int main() {
    cout << "Enter a word: ";
    string wd;    cin >> wd;
    for (size_t i = (wd.size()-1); i >= 0; --i) {
        cout << wd[i];
    }
    return 0;
}
```

When he runs the program, the program correctly outputs the string in reverse order, but then quickly crashes. The error message complains about a string index out of bounds error. What could be the problem? Can you fix the code?