

PIC 10A 1C Week 4b Problems. TA: Eric Kim

1. What Would C++ Do?

For each of the code snippets, write down the output of the program. If the code has an error, explain why, and whether it is a compile-time error or a runtime error.

C++ Code	What is the output?
<pre>string s1 = "yesterday"; cout << s1.substr(0,3);</pre>	
<pre>string s2 = "revolution"; cout << s2.substr(0);</pre>	
<pre>string s3 = "sgt"; cout << s3 + "peppers";</pre>	
<pre>cout << "sgt" + "peppers";</pre>	
<pre>string s4 = "ForNoOne"; cout << s4.substr(3,2) + s4.substr(0,3);</pre>	
<pre>string s5 = "Walrus"; s5[1] = "o"; cout << s5;</pre>	
<pre>const string s6 = "aow"; s6[0] = 'p'; cout << s6;</pre>	

References

<pre>int a = 42; int &ra = a; a += 3; ra += 1; cout << "a: " << a << " ra: " << ra;</pre>	
<pre>int a = 1; int &ra = 1; ra += 1; cout << "a: " << a << " ra: " << ra;</pre>	
<pre>int x = 3; int y = x; x = 42; cout << "x: " << x << " y: " << y;</pre>	
<pre>int x = 1; const int& y = x; cout<<"x: " << x << " y: " << y <<endl; x = 42; cout << "x: " << x << " y: " << y;</pre>	
<pre>int x = 1; const int& y = x; y = 2; cout << "x: " << x << " y: " << y;</pre>	
<pre>const int x = 1; int& y = x; y = 42; cout << x << " " << y;</pre>	

2. IO Manipulation for Fun and Profit

Louis Reasoner would like to write a program that pseudo-illustrates addition. Given two numbers, each with fewer than 4 digits, the output of the program is:

You entered: 42, 1. The sum is:

```
  00042
+ 00001
-----
  00043
```

Louis writes the following program. Is the program correct? If not, describe what the program would instead output, and try to fix it.

```
int main() {
    cout << "Give me two numbers to add:" << endl;
    int x1, x2;
    cin >> x1 >> x2;
    cout << "You entered: " << x1 << ", " << x2 << ".";
    cout << " The sum is:" << endl;
    cout << setw(5) << setfill('0') << " " << x1 << endl;
    cout << "+ " << x2 << endl;
    cout << "-----" << endl;
    cout << " " << x1+x2 << endl;
    return 0;
}
```

3. My Little Barplot

Suppose we would like to visualize some data as a barplot, ie:

Title: My Week

```
Hours of Sleep      | *****  
Cups of Coffee     | *****  
Existential Crises | *
```

Write a complete C++ program that asks the user for: (a) Title, (b) 3 category title+values. Note that your program should assume that there are exactly 3 categories. For instance, to generate the above barplot, the user would have typed:

```
Enter Plot Title: My Week  
[1/3] Enter category title: Hours of Sleep  
Enter data: 15  
[2/3] Enter category title: Cups of Coffee  
Enter data: 20  
[3/3] Enter category title: Existential Crises  
Enter data: 1
```

4. Long Division? More like, Wrong Division!

Write a program that illustrates long division. Suppose we want to illustrate $42 / 2$. The output of your program should be:

Let's divide 42 by 2:

```
      00021
00002 | 00042
```

You may assume that the user will only input integers with at most 5 digits, and that the numbers are evenly divisible. For instance, we disallow dividing 16 by 3 ($16 / 3$).

Hint: To make the vertical bar "|", use the pipe character on your keyboard (SHIFT+backslash). To make the horizontal line "_", use the underscore character (SHIFT+hyphen).