

Name: \_\_\_\_\_

### Lab Three

Date: \_\_\_\_\_

#### Objectives:

- Create an informative banner for a program.
- Investigate variables and basic mathematical operations.
- Basic Output
- Introduction to Strings.

#### Procedures:

##### 1. Program Banner

Write a series of print statements to create a banner that can be used as a heading for all your laboratory exercises. The banner should contain your name, the date, the class, and the assignment number, along with a short description of the exercise and any relevant information about your solution (algorithms, etc.). For example, your banner might have a form similar to:

```
*****
*                                                                 *
* Bob Jones                January 22, 2021                      *
* CSC 101                                                           *
*                                                                 *
*      Laboratory Assignment # 3                                    *
*                                                                 *
*                                                                 *
* A short description of the laboratory assignment, and any algorithms *
* used would go here!                                             *
*                                                                 *
*                                                                 *
*****
```

Write a short program that prints such a banner. Compile and run the program. Hand a printed copy of this program along with this lab sheet.

##### 2. Variables, Strings, and the Scientific Method

Examine the *cout* statements listed below. Write out what you think each statement would print to the console:

<code>cout &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; "Hello World" &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; "Hello\tWorld" &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; "Hello\nWorld" &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; 123 &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; "123" &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; "5 + 3" &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; 5 + 3 &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; 5 + '3' &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; (0.3 == 0.3L) &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; sizeof(double) &lt;&lt; endl;</code>	_____
<code>cout &lt;&lt; sizeof(int) &lt;&lt; endl;</code>	_____

Write a program that utilizes these print statements. Run it and check the answers against the estimates you provided. Try to explain the output of each print statement.

3. Add the following five statements to the program you wrote above:

```
string name = "Bob";  
int age = 32;  
cout << name << " is " << age << " years old" << endl;  
string last = "Smith";  
cout << name+last << endl;
```

---

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Estimate the output for each of the *cout* lines. Then run the program with the additional lines and compare your estimate with the actual output. Explain the operation of each of the *cout* lines.

4. Add the following two statements to the program you wrote above:

```
printf("There are %d in a dozen and %d in a score\n", 12, 20);
```

Compile and run the program (NOTE: you will need to also need to add the following preprocessor directive:

```
#include<stdio.h>
```

to compile the program), examining its output. Explain the operation of the `printf` statement. What do the `%d` symbols do? Do a brief Google search on C++ or C `printf` statement.

4. You have been asked to write an invoice application that calculates the total sales amount (including sales tax) for a sales transaction, and then prints the result. Declare variables (of an appropriate type and using meaningful variable names) to represent:

- The name of the purchased Item.
- The cost for each unit.
- The number of units purchased.
- The tax rate

Assign sample data to the variables, and use this information to calculate the total sales amount. The program should output an invoice with all the appropriate information for the sale.

For example, if your sample data consisted of purchasing 6 Bananas at \$0.50 each with a tax rate of 10%, the output of your program might be the following invoice:

SUNY Orange Fruit Co. Sales Invoice					
Item	Quantity	Unit Price	Subtotal	Tax	Total
Bananas	6	0.50	3.00	0.30	3.30
Thank you for shopping with the SUNY Orange Fruit Co.					

Make sure that you:

- Create a Flow chart to outline your algorithm.
- Write a complete C++ program.
- Add a banner to your program, with appropriate information.
- Document your code with appropriate comments.