

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:

cout << endl;	<u>Nothing</u>
cout << "Hello World" << endl;	<u>it prints Hello world</u>
cout << "Hello\tWorld" << endl;	<u>It adds space between (Hello World)</u>
cout << "Hello\nWorld" << endl;	<u>Hello on the first line and world on the second</u>
cout << 123 << endl;	<u>It prints 123 as an integer</u>
cout << "123" << endl;	<u>It prints 123 as a string</u>
cout << "5 + 3" << endl;	<u>Nothing because it's a string and prints 5 + 3</u>
cout << 5 + 3 << endl;	<u>It solves the arithamic equation and prints 8</u>
cout << 5 + '3' << endl;	<u>An error because it two different data types</u>
cout << (0.3 == 0.3L) << endl;	<u>It would be divided into itself so the answer would be 1</u>
cout << sizeof(double) << endl;	<u>4</u>
cout << sizeof(int) << endl;	<u>4</u>

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.

Nothing because nothing was inputted	prints 5 + 3 as a string not solve.	<code>cout << sizeof(int) << endl;</code> prints
it prints Hello world	It solves the arithmetic equation and prints 8	in bits the size of a double 8 bytes
<code>\t</code> puts space in between the Hello World string	This an error because it is two different data types	<code>cout << sizeof(int) << endl;</code> prints
<code>\n</code> puts World on a different line.	A zero because 0.3 - 0.3 is 0.	in bits the size of an integer. 4
it prints 123 as an integer		bytes
It prints 123 as a string		

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;
```

Bob is 32 years old.

Bob Smith

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.

The cout used variables to input then name and the age into the statement .

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.

prints a string on the screen using a "format string" that includes the instructions to mix several strings and produce the final string to be printed on the screen.

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.

