[Ravi Patel]

[CPSC 230]   Instructor: Dr. Thamira Hindo

Chapter 2- Lab assignment- part1 (15 points)

Due date: End of the class time

Note: Submit your assignment in the dropbox (chapter 2 assignment). Write the code and the output for Q1 and Q3. Answer Q2 as required

Q1 (3 pts)

What is the difference between fixed and showpoint, use the example in slide 13 to explain the difference. Change the precision value to two. Show the output and Comment.

By using setf(ios::fixed) you are able to show a set number of digits after a decimal point.

By using setf(ios::showpoint) you are able to show a set number of digits in scientific notation.

Note: setf(ios:noshowpoint) is able to show scientific notation without a point at the end.

Change the precision value to two:

```
#include <iostream>

using namespace std;
int main(int argc, char *argv[]) {

    double a = 30; double b = 10000.0;
             double pi = 3.1416; cout.precision (2); //we set the precision
of cout.setf() to 2
cout << showpoint << a << '\t' << b << '\t' << pi << '\n';
cout << noshowpoint << a << '\t' << b << '\t' << pi << '\n';
cout << fixed << a << '\t' << b << '\t' << pi << '\n';

    return 0;
}

//OUTPUT:
//30.    1.0e+04   3.1 //using showpoint with precision of 2 (use of scientific
                    notation)
//30 1e+04     3.1      //using noshowpoint with precision of 2 (use of scientific
                    notation)
//30.00   10000.00  3.14      //using fixed with precision of 2
```

Q2 (7 pts)

1- What is the output of the following program lines ?

        number = (1/3) * 3;
        cout << "(1/3) * 3 is equal to " << number;

An error is the output of the above program lines due to using identifier 'number' without declaration of the identifier.

In order to make the program work we would need to declare 'number' as an int, double, float, etc. first, by placing a declaration keyword in front of the identifier, and then we can use the declared identifier in the cout line above. (Which would output as: (1/3) * 3 is equal to 0)

2-(3 pts) What is the output of the following program lines? Use include <string>

```
string date, month,year, day; // declare strings
char y, x;                      //declare characters
 x='f';                         // initialize a character
month = "03"; day = "04";   year = "06"; //initialize strings
date = month + day + year;     //string 'date' (month+day+year) concatenated
cout << date << "\t"<< x << endl;
y = x++; cout << y << "\t" << x<< endl; // y=x++ sets y=x (y='f') and x to
                                        x=x+1 (x='g')
 y = x += 2; cout << y << endl; //increasing y by 2, y = y+2 = 'f' + 2 = 'h'

//OUTPUT:
//030406  f     //cout date (which is 030406) + a tab + char x (which is 'f')
//f       g     //cout y=x++ (y=x='f') and x++ changes value of x to 'g' (x=x+1)
//h             //cout y = y+2 = 'f' + 2 = 'h' (changes value of y from 'f' > 'h')
```

3- Convert each of the following mathematical formulas to a C++ expression:

Q3- (5 pts.)

Sound travels through air as a result of collisions between the molecules in the air. The temperature of the air affects the speed of the molecules, which in turn affects the speed of sound. The velocity of sound in dry air can be approximated by the formula:

$$Velocity = 331.3 + 0.61 * Tc$$

Where Tc is the temperature of the air in degrees Celsius and the velocity is in meters/second.

Write a program to find the velocity when the temperature equal 1 and 40 degree in the following format:

        At 1 degrees Celsius the velocity of sound is ---------- m/s
        At 10 degrees Celsius the velocity of sound is ----------- m/s

```cpp
#include <iostream>

using namespace std;
int main(int argc, char *argv[]) {

    double startingtemp;     //declare startingtemp as a double
    double startingtemp2;    //declare startingtemp2 as a double
    double velocity;    //declare velocity as a double
    double velocity2;   //declare velocity2 as a double


    cout << "Starting temperature? (Celsius): ";//prompt user for input
    cin >> startingtemp;     //assign input to double startingtemp
    cout <<"\n";   //create a space, new line
    cout << "Another starting temperature? (Celsius): ";  //prompt user for input
    cin >> startingtemp2;    //assign input to double startingtemp2
    cout <<"\n";   //create a space, new line


    velocity = 331.3 + 0.61 * startingtemp;//calculate velocity at startingtemp
    velocity2 = 331.3 + 0.61 * startingtemp2;   //calculate velocity2 at
                                         startingtemp2


        cout << "At " << startingtemp
            << " degrees Celsius the velocity of sound is "
            << velocity << " m/s" << endl;    //display the calculated output

        cout << "At " << startingtemp2
            << " degrees Celsius the velocity of sound is "
            << velocity2 << " m/s" << endl;    //display the calculated output
    }

//OUTPUT:
//Starting temperature? (Celsius): 1
//
//Another starting temperature? (Celsius): 40
//
//At 1 degrees Celsius the velocity of sound is 331.91 m/s
//At 40 degrees Celsius the velocity of sound is 355.7 m/s
```