AERSP 424: Advanced Computer Programming

Homework 1
Due: 1/16/19

Submission Instructions:

- Submit the file with the .cpp extension containing your C++ source code.
- If you upload an updated submission, please remove the previous submission as only the final submission will be grade

1. Write a single line of C++ code to complete each of the following tasks:
    a. Create a comment in the code stating that the program will compute the sum and the difference of two integers
    ```
    //this program will compute the sum and difference of three integers
    ```

    b. Declare variables **x,y** and **sum, difference** to be of type **int**
    ```
    int x, y, sum, difference;
    ```

    c. Prompt the user to enter two integers one at a time.
    ```
    cout<<"Enter two integers one at a time"<<endl;
    ```

    d. Read the integers that the user has entered and store them in the variables **x,y**
    ```
    cin>>x;
    cin>>y;
    ```

    e. Compute the sum and store the result in the variable **sum**. Compute the difference and store the result in the variable **difference**
    ```
    sum = x+y;
    difference = x-y;
    ```

    f. Print **"The sum is: "** followed by the value of the variable **sum**. Print **"The difference is: "** followed by the value of the variable **difference.**
    ```
    cout<<"The sum is: "<<sum << endl;
    cout<<"The difference is: "<<difference << endl;
    ```

    g. Return a value from **main** indicating that the program terminated successfully.
    ```
    return 1;
    ```

2. Test the program with as many different inputs as you can think of. Create a table of all of the test inputs and the results of the test. Indicate any real numbers that do not result in the correct output.

   Answers will vary.

3. Create a program which prints the size of types by copying the code below to create a C++ program

```
#include <iostream>
using namespace std;
int main()
{
   cout << "Size of char : " << sizeof(char) << endl;
   cout << "Size of int : " << sizeof(int) << endl;
   cout << "Size of short int : " << sizeof(short int) << endl;
   cout << "Size of long int : " << sizeof(long int) << endl;
   cout << "Size of signed int : " << sizeof(signed int) << endl;
   cout << "Size of unsigned int : " << sizeof(unsigned int) <<
endl;
  cout << "Size of float : " << sizeof(float) << endl;
  cout << "Size of double : " << sizeof(double) << endl;

}
```

   What sizes are printed out?

```
Size of char : 1
Size of int : 4
Size of short int : 2
Size of long int : 4
Size of signed int : 4
Size of unsigned int : 4
Size of float : 4
Size of double : 8
```

4. Write a function that takes two float parameters named **`start`** and **`stop`** and returns a float named **`product`** which is the product of all of the numbers from start to stop inclusive. Use a **`for`** loop to iterate from **`start`** to **`stop`**.

```
float foo( float start, float stop) {

      float product=start;
      for( int i=start+1; i<=stop;i++) {
        product = product*i;
      }
      return product;
}
```

5. Write a function that takes two **ints** named **x** and **y** as parameters and calculates **x** raised to the **y** power. The function should use a **while** loop to calculate the result. Return the result.

```
int foo2(int x, int y) {

      int result=1;
      if(y==0)
           return result;
      else {
           result=x;
           int i=1;
           while (i<y) {
             result=result*x;
             i++;
           }
           return result;
      }
}
```

6. Identify and correct the errors in each of the following statements:
   a.
   ```
   Int happy
   int happy;
   ```

   b.
   ```
   #include <iostream>
   void main(int argc, char* argv[]) {
    if (argc < 2) {
       std::cout << "We need two parameters please\n";
       return 1;
     }
     std::cout << argv[1] << '\n';
     return 0;
   }

   #include <iostream>
   int main(int argc, char* argv[]) {
    if (argc < 2) {
       std::cout << "We need two parameters please\n";
       return 1;
     }
     std::cout << argv[1] << '\n';
     return 0;
   }
   ```

c.
```
if(a = b)
  cout << "result1"<<endl;
else
  cout << "result2"<<endl;
```

```
if(a == b)
  cout << "result1"<<endl;
else
  cout << "result2"<<endl;
```

d.
```
int foo(int temp) {

 cout << temp;
 return;
}
```

```
int foo(int temp) {

 cout << temp;
 return 1;
}
```

e.
```
#include <iostream>;
int main() {

   int a,b;
   b = pow(a,b);
   cout << "b:" <<b<<endl;
   return 1;
}
```

f.
```
cout >> output;
```

```
cout << output;
```

g.
```
while (x = 4 ) {
++c;
```

```
while (x = 4 ) {
++c; }
```

h.
```
if (y>3)
sum =+ 5;
```

```
if (y>3)
sum += 5;
```

i.
```
if ( hw == 1)
   cout << "Good" << endl;
else;
   cout << "Bad" << endl;
endif;
```

```
if ( hw == 1)
   cout << "Good" << endl;
else
   cout << "Bad" << endl;
```

j.
```
for( float i=0; i!=2.75;i++) {
   printf( "i%2.5f \n" );
}
```

```
for( float i=0; i<2.75;i++) {
   printf( "%2.5f \n",i );
}
```