Homework #1

Basic Input and Arithmetic

Due: Sep. 20 by 11:59:59 PM **Assigned:** Sep 13, 2018

Write a C++ program which prompts the user to enter two numbers and a choice of operation and then displays the result of applying the operation to the numbers.

Requirements:

- Name the source file for your program `program1.cpp`
- The program is only required to work if the numbers entered by the user are integers. All calculation done in the program should be using integer values.
- The program should accept numbers that are positive, negative, or zero.
  - If the second number is zero and the selected operation is division, then the program must not attempt the division, but instead display a message as shown in the sample run below.
  - If the second number is negative and the selected operation is raising the first to the power of the second, an error message will be shown to the user
  - **IMPORTANT:** All error messages must be printed to the error stream using `cerr`
- Valid choices for the operation are 1, 2, 3, 4, or 5 – if the user enters an invalid choice, the program will display an error message and re-prompt the user **until** a valid choice is made
  - **IMPORTANT:** All error messages must be placed in the error stream using `cerr`
  - Assume that a number is always given. We will not concern ourselves with involved input validation as it's actually quite complicated
- The prompts and output displayed by the program must be formated as shown in the sample runs below (e.g. blank lines, spacing, case of text).
- A sample run of your program should look like:

```
This program will prompt for two integers and an operation and then
display the result of applying the operation to the numbers.

Enter the first integer: 2
Enter the second integer: 8

The available operations are:
    1. addition
    2. subtraction
```

```
    3. multiplication
    4. division
    5. raise first integer to the second integer
Enter the number for your choice of operation: 2

2 - 8 = -6
```

(The numbers 2*,* 8*, and* 2 *are entered by the user.)*

- A sample run that quits due to invalid menu selection should look like:

```
This program will prompt for two integers and an operation and then
display the result of applying the operation to the numbers.

Enter the first integer: 31
Enter the second integer: 4

The available operations are:
    1. addition
    2. subtraction
    3. multiplication
    4. division
    5. raise first integer to the second integer
Enter the number for your choice of operation: 9

9 is an invalid operation. Valid choices were 1, 2, 3, 4, or 5.
Enter the number for your choice of operation: 3

31 * 4 = 124
```

(The numbers 31*,* 4*,* 9*, and* 3 *are entered by the user.)*

- A sample run that avoids a divide-by-zero error should look like:

```
This program will prompt for two integers and an operation and then
display the result of applying the operation to the numbers.

Enter the first integer: 77
Enter the second integer: 0

The available operations are:
    1. addition
    2. subtraction
    3. multiplication
    4. division
    5. raise first integer to the second integer
Enter the number for your choice of operation: 4
```

```
77 / 0 can not be found because can't divide by zero.
```

(The numbers `77`*,* `0`*, and* `4` *are entered by the user.)*

- A sample run that avoids raising a value to a negative number should look like:

```
This program will prompt for two integers and an operation and then
display the result of applying the operation to the numbers.

Enter the first integer: 49
Enter the second integer: -2

The available operations are:
    1. addition
    2. subtraction
    3. multiplication
    4. division
    5. raise first integer to the second integer
Enter the number for your choice of operation: 5

49^(-2) will not be calculated by this program.
```

(The numbers `49`*,* `-2`*, and* `5` *are entered by the user.)*

- Compile your program using `g++ -Wall program1.cpp`
  - I won't stop you from naming your output if you want, it's just not necessary

Hints:

- Before you start writing the program, think about these questions:
  - How many variables will you need to use?
  - Do the variables need to be initialized?
  - What data type should each variable have?
- Option 5 can be executed using a pre-defined function. Remember to:
  - Include the appropriate library
  - Use the function correctly

Reminders:

- Be sure that your program includes your name, ID, description, etc. as listed in the document posted on the Information section in Blackboard.

- Use good style including indentation, comments, etc. Part of the grade will be for style.
- Carefully test your program.
- You are welcome to write your program at home. If you do, be sure to compile and test it in the lab before submitting it.

How to submit your program:

- Submit the file program1.cpp electronically using the following terminal command:
  For the 12:30 lecture section:
  `~cs211a/bin/handin 1 program1.cpp`

  For the 5:35 lecture section:
  `~cs211b/bin/handin 1 program1.cpp`