This lab investigates integer arithmetic (addition, subtraction, multiplication, division, and mod) on a digital computer.

1. Make a copy of the sample program addition.cpp and compile it with debugging info (-g) and changing the name of the executable to the basename addition with the -o option
   
g++ -g addition.cpp -o addition < cr >
and run it (by typing)
   
addition < cr >
several times using both positive and negative integers.

2. Try running the program and when it asks for the first integer type both the integers on the same line separated by white space (i.e. spaces or tabs). What happens? The console input cin actually queues everything you enter from the keyboard, even if you enter more than the program statement asks for. When cin is called again it first sees if there is anything in the queue which has not been used, and if there is, it takes that (before you have time to type anything). You could actually run the program as a pipeline, e.g.
   
   echo "45 -33" | addition < cr >
although the prompts still appear (we can fix this later).

3. Make a copy of the same program and modify it to compute the product and quotient of the two integers, i.e. when you enter two integers a and b have it compute ab and a/b. Run the program with two non-zero integers such as 45 and 8. What happens if the second integer doesn’t divide the first one evenly (i.e. there is a remainder on division)? You can use the % operator in C/C++ to find the remainder. For example, you might want to declare an integer variable rem and add the following statements to your program:
   
   rem = num1 % num2; // find remainder on division by num2
   cout << " with remainder " << rem ;

4. What happens with your program in (3.) if you try to divide by zero, i.e. enter two numbers but make the second one zero? This actually causes what is called a CPU exception. The hardware processor will never divide a number by zero and the exception created causes the operating system to kill your program (with a core dump). Later we will use a debugging program (gdb) to look at this dump and try to help us find which line caused the problem.

Assignment Write a program as described below and email me the pathname of your program in plain text; do not send an attachment. For example, you might say
   
   My lab1 program is /usr/stu/demo/cs221/homewk1.cpp

Write a program which will accept three integers input from the keyboard and which will compute the average as a fraction. For example, if the user inputs
   
   20 -5 2
the program prints out
   
   the average of 20 -5 and 2 is 5 and 2/3