Lab 5: More Functions and Vectors

Lab 5 will cover the use of void functions for all subtasks. You should only have a single main function, and for each lab problem, write a function (or set of functions) to perform each task. Your lab should have a menu to select which set of functions to execute.

1. Chapter 5 problem 1
2. Chapter 5 problem 4
3. Write a function called `delete_repeats` that takes an integer vector and returns the number of non-repeat values left. The vector of non-repeat values should also be available.
4. The standard deviation S of a list of N numbers x_i is defined as

$$S = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \bar{x})^2}$$

   where $\bar{x}$ is defined as the average of the x_i. Define a function which takes a vector of doubles, and returns the standard deviation of the values. Make sure you define a second function which actually calculates the average.
5. Extra Credit: Chapter 5 problem 6 (5 points)
6. Extra Credit: Chapter 5 problem 9 (5 points)
7. Extra Credit: Chapter 7 problem 13, using vectors rather than arrays (15 points)

Also, please answer the following questions in a separate text file:

1. How can a programmer determine the number of items actually in a vector?
2. How are pass by reference parameters denoted, and what can they be used for? Give examples of different uses.
3. C++ defines a void type for functions, which denotes no return value. If this was not available, what alternatives could be used?
4. Given what we discussed in class, how would a programmer go about creating a vector which can hold a vector of integers? This is also known as a 2 dimensional integer vector.
5. Write a short program to determine what the largest positive integer value is, as well as the largest float and double values. Also, determine what the most negative value for each type is, and for floats and doubles, the smallest representable value. Hint: look at the functions defined in the `numeric_limits` header file.