

Lab 2: Sorting and GDB

Due: Friday 1/28 at 11:59 PM

For this lab I have provided a little class that stores numbers and keeps them in order. The way it does this is with a “reverse bubble sort,” one that starts at the end of the array and works its way to the beginning. The advantage of this is that the new numbers are added to the back end of the array. (The spot always represented by the variable *used*.) When a new number is added the bubble sort can make one pass through the array and the new number will drop in place.

The problem is that the bubble sort is crashing, and I need you to diagnose why that is happening and to fix it. I want you to do this using *gdb*. I will also need you to write the `load_from_file` and `write_to_file` member functions, as well as a main that drives the program.

Start by downloading the files I have provided on Blackboard.

You will find a little class that stores numbers in an array. Some of these functions have been written for you, and some are left for you to write yourself.

Your jobs are to:

- Write the implementations for the `load_from_file` and `save_to_file` functions.
- Write a main that asks the user for the name of their file. Remember you can read the filename into a string and then use the `.c_str()` function to use that string in an open command:
 - o `ifs.open(filename.c_str());`

The main then:

- loads the array from the file into a NumList object
- Calls the `b_sort` function on the NumList
- Writes the sorted numbers out to the screen, using the `see_all` function.

Here there is a problem. Something goes into an infinite loop. To find this you are going to use gdb. (I have provided a data file called smaller.dat, so that you will not have to walk through so much code.) Here are the steps:

- Compile with the `-g` option (`g++ -g *.cc`)
- Type `gdb ./a.out`
- Type `break main`
- Type `run`
- Start hitting `n` to walk through the code
- When you get to the call of a member function you want to “step into” hit `s`
- Continue hitting `n`

Using this method, try to find the error in the code that I gave you, and then correct it. When you do, recompile everything and test it. You should see a sorted list of numbers on the screen for either the larger.dat or the smaller.dat file.

Open your main again, and have it ask the user to type in three of their own numbers, which will be inserted into the list. Using the string member function `find` (which returns the location of a substr within the string) and the `insert` function (which will insert a substring at the position sent as its first argument), modify the filename, so that the characters “sorted” are inserted before the dot. (This means that “larger.dat” becomes “largersorted.dat” and “ebenezer.txt” becomes “ebenezersorted.txt”). Then have the main write the number array out to that file.

After you have successfully compiled all of this run it on the larger.dat file and insert the numbers 106, 237 and 45,701.

Submit to your source code and sorted data file on Blackboard.