

A Minor Character Can Still Drink Heavily

Programming Project 2 (minor – 30 points)

So, aside from the snide commentary and blatant attempts at sabotage, you’ve been relatively helpful to the Big Dumb Quest Of The One Ring. For example, a few times, you have been the unfortunate innocent stabbed during a tense struggle on the battlefield instead of one of the main characters. That’s almost like taking a bullet for someone, except that you didn’t mean to do it, and furthermore, you had no intention of trying to save anyone’s life but your own. It’s this kind of unintended selfless behavior that really makes you think you could be a good person if anyone ever gave you a reward for doing it.

It briefly occurred to you that perhaps this attitude was why you might have been overlooked for the Big Dumb Quest, but you quickly dismissed that possibility as ridiculous.

Aaaanyway, the story picks up at the point where you were drinking heavily to drown out the intense pain of having been stabbed in your spleen multiple times. The “heroes” were exchanging witty and poignant dialogues with one another that would later be chronicled and change the course of history. You, on the other hand, were trying to stand up without peeing blood. (Hey, everyone has their own challenges in life.) It occurred to you that perhaps one way to involve yourself in the BDQ might be to *merge* into the existing story instead of trying to usurp it from that idiot Frodo. You’d have to do a bit of terrible prep work, like *sort* out your life and be at peace. Eh, what the hell. Let’s give it a shot.

Job Details. Your task is to write a C++ program that implements the zen-like alcoholic daze that you need to join the BDQ. You will be writing a recursive function for the *mergesort* algorithm. For this algorithm, you must write your code using the following function calls:

```
void mergesort (int * a, int first, int last);  
void merge(int * a, int * b, int lasta, int lastb, int * output = NULL);
```

The parameter `a` will be an array defined dynamically in the main program based on a user-inputted size. You’ll need to fill that array with random numbers using the techniques from the last project. I would recommend making sure that the numbers in the array are fairly small, say between 0 and 1000000.

Your `mergesort` function must be recursive, and take less than 10 lines of code. The merging of two sorted arrays will take place in the function called `merge`.

For `merge`, the pointers `a` and `b` will likely be references to the place where they conceptually begin in the overall big array. The `lasta` and `lastb` variables will indicate their last positions, and the `output` is a place where you can put the final result if you need to do so. (But obviously, you will need to create it first before calling the function.)

Your project, in total, is worth 30 project points. Although you may work in groups of 2 on this project, I recommend working alone, mostly so that you familiarize yourself with how this works. This code will serve as a foundation for the next project, so you will want to make sure that not only can you write it well, but that you can modify it somewhat significantly to do the next project (which is the first “big” one).

I’m around if you have any questions.