**2110 Spring 2017 Program 1 Description**

We’ve talked about this program a great deal in class, but there **HAVE** been a couple of changes recently. What has not changed is that there are several parts to this program assignment. So, please read this document carefully and ask questions 1) of me in email, 2) in class, 3) of the peer mentors and/or 4) of the Program Grader, Mr. Venkata.

The goals of this assignment are for each student to:

* Write an implementation of sets using lists
* Design and complete an experiment to test the speed of your list implementation of sets with my characteristic vector implementation of sets
* Write a short (by my standards, anyway) “professional paper” about your experiment(s), results and conclusions.

Some details

* I’ll supply you with my characteristic vector implementation of sets. I’m satisfied that it works, BUT, if/when you are the first to notice a BUG in the code, contact me via email with the details of the bug(s) and IFF I agree it is a bug rather than a feature, you’ll be awarded “extra credit” for this assignment.
* You will write a list implementation of sets that includes the following methods.
  + Intersection -- using overloading of the bitwise AND operator (&)
  + Union – using overloading of the bitwise OR operator (|)
  + Xor – using overloading of the bitwise XOR operator (^)
  + Difference – using overloading of the ‘-‘ operator. Not that this one is NOT a bitwise operator
  + Add an element to a Set
  + Remove an element from a Set
  + Print a set in the { item1, item2, …, itemN } notation
* In all of the methods listed above you must use the same name and parameters as the characteristic vector implementation or your program won’t compile.
* You will submit your .h and .cpp (or C, I don’t care) files through Blackboard.
* We will add our main.C and, by default, compile your program using the command g++ \*.cpp \*.C so that OUR main.C and your code will compile. We will assume that you program includes a file called Set.h that provides the declarations for your list implementation of Set. So it better be there or your program will fail to compile and you’ll receive a maximum of 25 points for the programming assignment.
* We will provide
  + A “complete” implementation of a characteristic vector representation of Sets. This is **NOW** available in the ~phs0004/public/2110/Sets/myImplementation directory. This directory includes my Set.h, Set.C, main.C and even a README file that are readable by you. You should be able to copy all of those files to your own area to work with them.
  + Different main.C files that we’ll test your submission with, to make sure that your program meets our expectations. These won’t be available to you until after you program is submitted
  + A much LARGER main.c file that you’ll use for your experimental study. This will be large enough that both my Characteristic Vector and your List implementation of sets will require significant (actually measurable by crude methods provided by Linux) run time. This will be available in a couple of weeks.
  + An “outline” of what an experimental paper should look like. I’ll make this available in a couple of weeks as well – assuming that I find my copy of the example.
* Submissions
  + Submit your List implementation of sets to THIS BB page
  + I’ll provide a separate page for the experimental paper in a couple of weeks.
  + Both your program and your experimental paper will be due at or before 11:59pm on Wednesday, March 1, 2017, four weeks and roughly 2 hours from when this assignment is posted.