

ECE106 - Homework Assignment 4

Fill in the file `a4.cc` with the answers to the following questions and submit the file on ecf using the command

```
submitece106s 8 a4.cc
```

Please make sure that the file can be compiled on ecf. The number of marks for each question is in square brackets.

- [2] Implement the `add()` method for the binary search tree. If a value is not in the tree then the method needs to add a new node to the tree. If a value already exists in the tree, the method does nothing.
- [2] What is printed when function `q2()` is called in `main()`? As a result of calling `q2()`, for each class, how many objects are created, how many copy constructors are called, how many non-copy constructors are called, and how many destructors are called?
- [2] What is printed when function `q3()` is called in `main()`? As a result of calling `q3()`, for each class, how many objects are created, how many copy constructors are called, how many non-copy constructors are called, and how many destructors are called?
- [1] Add the code that will causes the expression `"c2=r1*c2"` to be computed correctly in `main()`. Hint: you will need to declare and create an `operator*` method or function. Please indicate your code by adding `"// Q4"` to where you declare and start the body of your method or function.
- [1] In question 3, when `q3()` was called, one or more errors occurred and were handled by exceptions. Think about how the errors could be handled without the use of exceptions. Now, examine the `q5()` function and fill in the bodies of the `add5()`, `sub5()`, `mul5()`, and `div5()` functions. If the global variable `err` is not `NULL` these functions must return 0. Otherwise the `add5()`, `sub5()`, and `mul5()` functions add, subtract, and multiply integers. The `div5()` function will execute the statement `err="Division by 0"` and return 0 if `c2` is 0. Otherwise the `div5()` function returns `c1/c2`. What should be printed when `q5()` is called?
- [1] Regular expressions are a powerful programming tool. You can read more about them online (e.g. wikipedia). A good introduction of regular expressions is

<http://immike.net/blog/2007/04/06/the-absolute-bare-minimum-every-programmer-should-know-about-regular-expressions/>

Write a regular expression that matches all declarations of operator methods in a file. Assume that the regular expression, RE, is used in the following way

```
egrep 'RE' a4.cc
```

Note that you will have to change the RE to the actual regular expression. Assume that you do not have to worry about whether the expression is commented out or not. Also assume that all variable, method, function, structure, type, and class names only contain lower or upper case letters, digits, and the underscore (`_`), and that none of these characters can be part of an operator.

The result of running the above command with the correct regular expression should be twelve lines that correspond to the four operators being declared in the Computable, Real, and Complex classes. Note that the regular expression may be tested on different files.

7. [1] Please read the document at the following url:

```
http://education.calumet.purdue.edu/vockell/edpsybook/Edpsy3/edpsy3\_instruction.htm
```

This is part of the third chapter of an online book that I've found to be an interesting read. The book's url is

```
http://education.calumet.purdue.edu/vockell/edpsybook/
```

What did you find to be one of the most interesting ideas in that part of the chapter and why? Please limit your answer to at most 75 words.