ECE106 - Homework Assignment 3

The questions are based on the code in the file a3.cc, which is also posted online. Please assume that the "new" statements allocate memory at locations 0x8000, 0x8010, 0x8020, 0x8030, etc. Also, the number of marks for each question is in square brackets.

Please use the following stack and heap as a basis for how answer question 1. Please note that you will need to have different addresses for the elements on the stack. Note that you can use r instead of real and i instead of imaginary.

```
Stack at Point 0
ret                  0x01bb
a.r,ref.r     1.0    0x01bf
a.i,ref.i     2.0    0x01c3
p0          0x8000   0x01c7
END
Heap at Point 0
              0.0    0x8000
              0.1    0x8004
END
```

1. [2] Please write the address of the start of the stack for you (just like before, c1+26*c2, in hex), and the value of the address modulo 3.

What do the stack and heap look like at Point 1 and Point 2 of the program?

2. [2] How many default constructors are called? How many copy constructors? How many of the other constructors? How many destructors? What does the program print?

3. [1] The bad_multiply() function does not always work correctly; hence the name. What are two integers, i1 and i2, such that bad_multiply(i1,i2) returns a result that is not correct (hint: use large integers)? What is the corrected version of the function?

4. [2] Write a single line (in the main function()) that makes p4 point to the result of adding a, b, c, and d together without using any other variables in the main() function. How many Complex objects cannot be deleted as a result of executing this line?

5. [1] If you add the following lines to the main() function, where X is c1+c2*26 mod 3, what do the lines print?

```
Complex f(X,X);
Complex g(1.0,2.0*X);
Complex* p6=f.mul(&g);
```

```
p6->print();
delete p6;
p6=NULL;
```

6. [1] Pointers can be used to point to functions as well as data values. The pointers can then be used to call the function being pointed to. The process2() function uses function pointers to avoid the if statement, and therefore be shorter.

How many lines is the process() function? How many lines is the process2() function? What is at least one disadvantage of function pointers?

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

`http://education.calumet.purdue.edu/vockell/edpsybook/Edpsy2/edpsy2_intro.htm`

This is part of the second 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.