CS16, UCSB
Pre-lab #5: Worth 50% of Lab 5 score (50 total points)

Print this form, staple loose pages together, and write
your answers on it.

Accepted: On paper, in lab Wednesday, August 1.

Name (2 pts): _____

Email (2 pts): _____

Lab section (2 pts) Circle one: 2:00   3:30

If you have the book, read sections 4.1, 4.2, 4.4 and 4.8.
Then answer the following items.

1. Summarize the meaning of each of the following terms, in
   your own words. If you do not have the book, please
   consult the provided URLs for each term.
   a. (5 pts) Modularity (http://en.wikipedia.org/wiki/
      Modular_programming)

   b. (5 pts) Abstraction, in the context of modularity
      (http://en.wikipedia.org/wiki/Abstraction_
      %28computer_science%29)

   c. (5 pts) Reusability (http://en.wikipedia.org/wiki/
      Reusability)

2. (4 pts) What is the purpose of a function prototype?

3. (3 pts) Write a prototype for a function named `process` that takes one int argument and returns a double value.

4. (5 pts) Write an **expression** that will set the double variable `x` to a random value between -2.0 and +2.0, inclusive. If you don't have the book, you may wish to consult http://stackoverflow.com/questions/2704521/ generate-random-double-numbers-in-c.

5. Answer the following questions about file I/O. You may need to consult the class slides and extra materials.
   a. (2 pts) Write an expression that will open a file named "file.txt" for reading. The expression should return a file pointer to the file.

   b. (1 pt) What does `fopen` return if it could not open the specified file?

c. (14 pts) Consider the following function prototype:

```
int firstInteger( char* filename );
```

The `firstInteger` function is given the name of a file in the string parameter `filename`. The file specified by `filename` contains a sequence of positive integers separated by newlines. The `firstInteger` function will:
1. Open the file specified by `filename`.
2. Read in the first integer from the file.
3. Close the file.
4. Return the integer read in.

For full credit, you may assume that the file can be opened and that it contains at least one positive integer. There are also a series of bonuses below, which can all be done if you choose. Write your function definition in the space below the bonuses.

- For two points of BONUS, you may not assume that the file can be opened. If the file cannot be opened, return -1.
- For two points of BONUS, you may not assume that the file contains integers. If you failed to read in an integer, return -2.
- For three points of BONUS, you may not assume that the file contains <u>positive</u> integers. If you read in a negative integer OR zero, return -3.

Pre-lab End. Adapted from Michael Costanzo by Kyle Dewey.