Assignment #3
Call-By-Name

Part 1 (to think about, and discuss with your classmates or instructor if you wish)

(a) The Sum function shown on page 131 of your text is a fully general summation utility that can add the values of any real-valued series or function which is parameterized by a single integer. Show how Sum could be used to find the sum of the first 100 terms of the sequence

\[ x_n = n^3 - 5n - 3 \]

(b) Using C, write a general summation function that works like Sum in that it can sum terms of any real-valued function. Pass the function to be used as an unevaluated function parameter:

```c
double Sum (int lower, int upper, double (*f)(int));
```

Then show how this version of Sum could be called to find the sum of the first 100 terms of the sequence defined above.

Part 2 (to turn in; due Thursday April 7)

As the above example shows, a pass-by-name capability and the ability to pass unevaluated functions as parameters are at least somewhat interchangeable features for a programming language to have.

Write a short paper describing why this is the case, based on the typical implementation of pass-by-name parameters as thunks. Then go on to contrast the two language mechanisms from a linguistic standpoint (e.g. consider issues like clarity of expression, ease of use, regularity, etc.).