

# Math 1062, Spring 2012, Homework 2

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**Due: Friday, Feb 3, 2012**

- You may work with other people (cite them explicitly in your write up) and you can find the L<sup>A</sup>T<sub>E</sub>X of this file at <http://wstein.org/edu/2012/1062/hw/>.
- I will have office hours 11am–2pm in Padelford C423 on Thursdays.
- For this assignment, it is easiest for me if you email your solutions as a Sage worksheet (an `.sws` file) to [wstein@uw.edu](mailto:wstein@uw.edu), which you get by clicking “File... Save worksheet to a file...” in the Sage notebook. It is very useful if you put “1062 homework 2” in the subject line, which I’ll use as a double check that I don’t miss any assignments.

## 1 Homework

1. For each of the following, your code should define a Python function called `f[letter]` (i.e., `fa`, `fb`, `fc`, `fd`, `fe`, `ff`, `fg`, `fh`) that has the given behavior for the given input. You do not have to handle input that is not of the given type, unless explicitly asked to do so. I will grade this by writing a program that evaluates your solution in Sage, which better define a function `f[letter]`, then calls `f[letter]` with some random input and verifies that the output is correct. By “output” I mean what `f[letter]` returns. My grader program will ignore anything printed when `f[letter]` runs.
  - (a) **Input:** an integer  $n$   
**Output:** the cube of  $n$
  - (b) **Input:** a positive integer  $n$   
**Output:** the sum of the cubes of the positive integers up to and including  $n$
  - (c) **Input:** a list  $v$   
**Output:** the new list got from  $v$  by reversing the order of the elements; your function should *not* change  $v$
  - (d) **Input:** a positive integer  $k$   
**Output:** list of the Fibonacci numbers  $F_0 = 0, F_1 = 1, \dots, F_k = F_{k-1} + F_{k-2}$
  - (e) **Input:** a list  $v$  of integers  
**Output:** the number of distinct integers in  $v$
  - (f) **Input:** an integer  $n$  and an optional list  $v$  that defaults to `[]` if not given  
**Output:** appends  $n$  copies of  $n$  to  $v$
  - (g) **Input:** a string  $s$   
**Output:** an instance of a Python class with an attribute `foo` that equals  $s$  and a method `bar` that returns  $s$

- (h) **Input:** two numbers  $a$  and  $b$   
**Output:** returns  $a+b$  if the addition works without raising an error; otherwise raise a `NotImplementedError` exception.

2. Get started on your final project:

- (a) Write a paragraph describing a *topic* that you would like to do a final project about.
- (b) What are the *deliverables* of your project? (E.g., Code? A paper? A Sage worksheet? A patch? A bugfix?)
- (c) List other students in class you might work with on your project.
- (d) What key aspects of Sage do you need to learn in order to succeed at your project? (E.g., linear algebra, symbolic calculus, 2d or 3d plotting, Cython?)
- (e) Estimate how many hours it will take you to complete (then double the number you get).