COMS 3101-3 Programming Languages – Python
Assignment 2 (20 points)
Due: 2PM, Sept 13th 2013

1. (5 pt.) (a) Write a recursive function that computes the n-th Fibonacci number. The Fibonacci numbers are defined as follows: Fib(0) = 1, Fib(1) = 1, Fib(n) = Fib(n – 1) + Fib(n – 2). (b) Write another Python function that runs iteratively but performs the same task.

2. (5 pt.) A tuple is a sequence of comma-separated values inside of parentheses. For instance (5,6) is a two-tuple.
   a. Write a function called zip that is given two lists of the same length and creates a new list of two-tuples where each two-tuple is the tuple of the corresponding elements from the two lists. For example, `zip([1,2,3],[4,5,6])` would re- `turn [(1, 4), (2, 5), (3, 6)].` Use the function in a program and test your code on several different values.
   b. Write a function called unzip that returns a tuple of two lists that result from unzip- ping a zipped list (see the previous exercise). So `unzip([(1,4),(2,5),(3,6)])` would return `([1, 2, 3], [4, 5, 6]).` Use the function in a program and test your code on several different values.

3. (10 pt.) The file markets.csv contains geographic information for over 8000 farmers markets in the US. The file is in a tabular form, where each line/row lists data for a farmers market and fields are separated by a comma (comma-separated-value format). The fields are (in this order): farmer's market identifier, name, website, street address, city, county, state, zip code, longitude, and latitude.

   Your task is to write a tool that allows users to search for farmers markets in their town or zip code.

   (a) Write a function that, given a filename, opens the file in the format described and reads in the data. Each farmers market should be represented as a tuple of strings. The function should return two objects: A dictionary mapping zip codes to lists of such tuples and a dictionary mapping cities to sets of zip codes. Note that you can use return a, b to return two values and `result_a, result_b = function(args)` to capture the return values when you call the function.
   (b) Using Python string formatting, write a function that, given the parameters `state, name, address, city, zip`, returns a formatted string. For example:

Columbia University Greenmarket
E. Side of Broadway between 114th & 115th Streets New York, New York 10027

Do not simply use '+' to concatenate strings, but string formatting as described in class

(c) Write a program that first reads in the data file once (using the function from part (a)), and then asks the user repeatedly to enter a zip code or a city name (in a while loop until the user types "quit"). For each request, the program prints all farmers markets for this town or zip code (using the function from part (b) and writing to `sys.stdout`). If town names are ambiguous between states, all entries should be printed.