BF768 Spring 2022 Homework 3

Due: Sunday March 27, 2022 at 11:59 pm EST

General Policy on Homework Collaboration: Except as otherwise noted, all problem sets/homeworks are to represent individual effort and are to be written up and turned in individually. This does not preclude talking about a problem set with other class members; in fact, working together is encouraged, since it is one of the skills of modern science. The only requirement is that if you work on a problem set with other people, please note on the write-up with whom you worked.

Description: You will be creating a Python CGI program that accesses a MYSQL database in response to a user request from a web browser and then returns results to the user.

Problem. Create a python CGI program called **yourname_doubleSearch.py**. The objective is that the program will query the miRNA database with the names of two genes, and return a list of all miRNAs that target *both* genes.

1. On first accessing the program through a web browser, the program should return an HTML form that contains:
    a. *two* text boxes, each of which takes as input a gene name,
    b. a submit button.
2. Above the form (both before and after the first submit) there should be some explanation of what the page is for and what the user should do.
3. Somewhere near the text boxes there should be sample gene names to use so that the program can be tried out.
4. When the program receives the names of the two genes, after a submit, it should query the database to produce the list of miRNAs, and then return the list to the user, displayed as an HTML table with three columns: miRNA name, targeting score for gene 1, and targeting score for gene 2. The gene names should be included in the headers for the score columns so that the user knows explicitly which score corresponds to which gene.
5. Additionally, there should be a summary statement above the table that lists the two genes entered into the text boxes and gives a count of the number of miRNAs that target both genes (essentially, the number of rows in the table). Use something like this:

    "Gene <gene_name_1> and gene <gene_name_2> are both targeted by <count> miRNAs."

6. The original (empty) form should be displayed above the table after a successful submit.
7. If either of the gene names submitted doesn't exist in the miRNA database, or if either of the gene names is left empty, the program should report that to the user and print the form, but not print any part of the table or the summary statement.

To submit this homework:

1. Put the program in your cgi-directory and give it execute status for all ("chmod ugo+x yourname_doubleSearch.py"). It should be reachable from the following URL:

   `https://bioed.bu.edu/cgi-bin/students_22/username/yourname_doubleSearch.py`

2. On blackboard, under HW4, submit your python CGI program.

Python method for executing a query with parameters

Your program will need to use the gene names, submitted through the form, in the query to the miRNA database. When there are parameter values to be used in a query, put question marks (?) in the query where the values should go and then substitute the actual values in the execute statement by putting them in a list):

```
query = "select …. where name1 = '?' and name2 = '?' …"

cursor.execute(query,[genename1,genename2])
```