**Lab Activity – Lists and Files**

**Objectives:**

* practice creating and filling lists
* practice reading data from a file and writing data to the file
* practice of analyzing data in the list

**In this lab, you should write three programs which we discussed in detail during the lecture**

**Part 1.**

**Write a program that**

* asks the user for the name of a file (all files you test must have one number per line with no blank lines; two examples are provided below)
* reads numbers from the file and stores them in the list
* calculates the sum of all numbers and the average value
* displays (in the shell window)
  + all numbers in the file
  + the sum of all numbers
  + the average value

1. The program should work with a text file of any length if it contains one number per line. The file should have no empty (blank) lines, including at the very end of the file.
2. The program should include error handling for working with files and lists.

Here are 2 files you can use to test your program:

[data.txt](http://facweb.northseattle.edu/voffenba/class/csc110/L/data.txt)

[otherData.txt](http://facweb.northseattle.edu/voffenba/class/csc110/L/otherData.txt)

HINT

**You do not know the exact amount of numbers in the file, so you need to create an empty list, and add to it the elements in the loop as you read the new line from the file.**

===========

***Example for testing***:

Enter the name of the file: data.txt

The sum of elements = -2909, average = -111.88

Enter the name of the file: otherdata.txt

The sum of elements = 5486, average = 107.57

**Part 2. Fibonacci Numbers**

**Write a program that**

* ask the user to enter the number of elements in the list
* create a new list and fill it with numbers of the Fibonacci sequence
* create a new file **fibonacci.txt** and write all numbers in this file (the file must have in each line index and Fibonacci number with no blank lines)
* displays (in the shell window) the indexes and Fibonacci numbers

HINT

**You know the exact amount of numbers in the list, so you need to create a new list with a given number of elements, and then append new elements to this list in the loop.**

===========

**Example for testing:**

Enter the number of elements: 10

0 1

1 1

2 2

3 3

4 5

5 8

6 13

7 21

8 34

9 55

**Part 3. Rotated Left**

**Write a program that**

* ask the user to enter the number of elements in the list
* ask the user to enter the number of rotations
* create a new list and fill it of consecutive numbers, starting at 1
* execute the cyclic shift operations for each element to the left one by one
* displays (in the shell window)
  + the original list
  + all steps inside the loop after each rotare

===========

**Example for testing:**

Enter the number of elements: 5

How many shifts: 5

1 2 3 4 5

2 3 4 5 1

3 4 5 1 2

4 5 1 2 3

5 1 2 3 4

1 2 3 4 5

Enter the number of elements: 10

How many shifts: 2

1 2 3 4 5 6 7 8 9 10

2 3 4 5 6 7 8 9 10 1

3 4 5 6 7 8 9 10 1 2