CS 150 Lab 10

Arrays and Files

Date: Tuesday, October 30, 2007

The purpose of today's lab is for you to get some hands-on experience with reading data from files, and placing them into arrays.

- **Be sure to answer the given questions before you start**
- Be sure your output looks exactly like the specified output
- Be sure to submit your solution to CS150-01 Lab when you are done (By Friday, Nov 2, 6pm)
- Show the instructor or TA your solution before submitting it

Lab 10.1

For this lab, you will need to create a new Visual Studio project that will contain your source code. Name this project "10_1CharacterCounterXXXXXXXX", replacing the XXXXXXXX with your PUNetID.

Write a program that will keep track of the number of times each character appears in a file. Your program should output:

1. The ASCII value for each character.
2. The character itself.
3. The number of times each character appears in the file.
4. A histogram of the number of times each character appears in the file.

The easiest way to tackle this problem is to keep an integer array of counters that have all been initialized to zero. Since there are 256 possible ASCII characters, then your array should have 256 cells.

You should then have a loop to read in the characters from the file, one at a time, and increment the appropriate cell in the array. For example, if you read in the character 'a', then you should increment the value in the cell 97 by one.

Now you should have an array of 256 integers, where each integer represents the number of times that a character appears. The next step is to loop through this array and output the values the four values listed above.

For example, if the input file contains:
`the rain in spain falls mainly on the plain`

Your program should output:

```
********************************
*      Character Counter        *
********************************

 ASCII   CHARACTER   FREQUENCY   HISTOGRAM
    97           a           5   *****
   101           e           2   **
   102           f           1   *
   104           h           2   **
   105           i           5   *****
   108           l           4   ****
   109           m           1   *
   110           n           6   ******
   111           o           1   *
   112           p           2   **
   114           r           1   *
   115           s           2   **
   116           t           2   **
   121           y           1   *
```

What data will you need to track in your program? What data types will you need to use?

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What elements of the output need to be produced by a loop? What data will control when these loops will terminate?

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For this lab, you will need to create a new Visual Studio project that will contain your source code. Name this project “10_2BankXXXXXXXX”, replacing the XXXXXXXX with your PUNetID.

You are to write a program that will process a collection of checking account transactions for one customer only.

The input will consist of a series of lines of data, the first line containing the account number and the previous balance. Each subsequent line will contain: (a) a date in the form 041019 to be read into an integer, (b) one of two characters (D - deposit, orW - withdrawal) to be read into a char and (c) an amount of money to be deposited or withdrawn to be read into a float. A deposit transaction is identified by the character D followed by the amount of the deposit. A withdrawal transaction is identified by the character W followed by the amount of the withdrawal. Each transaction is preceded by a date. The last line of the data contains a date of 000000 which stands for end

A simple data file might contain:

```
1234 500.00
051001 W 25.00
051015 W 99.25
051030 D 100.00
000000
```

Your program will print the summary statistics for all transactions. The summary statistics will consist of:

1. number of withdrawals
2. total sum of all the withdrawals
3. number of deposits
4. total sum of all the deposits

```
           ********************************
           *      Bank Transactions        *
           ********************************
                  Account: ####
         Previous Balance: $####.##

Date    Withdrawals($)     Deposits($)     Balance($)
######       ######.##                      ######.##
######                       ######.##      ######.##
######                       ######.##      ######.##
######       ######.##                      ######.##

         (##) Withdrawals Totalled $######.##
         (##) Deposits    Totalled $######.##
```