Lab Assignment 6

Due (2 Weeks)

(100 points)

Objectives

- Gain more experience with file I/O;
- Work with the ArrayList class;
- Learn to use the String `split()` method;
- Gain experience with creating classes;
- Using aggregation to create classes.

PROJECT OVERVIEW

In this assignment you are to create 5 classes. Four of these are Name, Address, Phone, and Person. The fifth class is a class containing main that will utilize the four classes to accomplish a task.

- Each Name object will have instance variables representing a first name, middle initial, and last name. All of these are Strings.

- Each Address object will have instance variables representing the first line of a street address, the second line of a street address (often empty), a city, a state postal abbreviation, and a zip code. Again all of these are Strings.

- Each Phone object will have a String of length 3 representing the area code, a String of length 3 representing the exchange, and a String representing the last four digits of the local phone number. All of these are Strings.

Each Person object will have instance variables representing a name, an address, and a phone. (Here is where aggregation is occurring – using references to other classes within a given class.) In other words, the instance variables for Person will consist of a Name object, an Address object, and a Phone object.

Each of the four classes must contain:

1. An overridden toString() method that will return a String that when printed on the standard output will result in well-formatted output. Examples:

- Name toString():
- Address toString():

```
Charles L Lamb
1515 North 8th Street
Apartment C printed only if this part isn't an empty string
Nowhereville MA 78567
```

- Phone toString():   `(800) 555 – 5555`

- The Person class would print out the above information as it appears, lined up on the left.
- A method to return the information as a String in a comma separated format. The above examples would be:
  - `Charles,L,Lamb`
  - `1515 North 8th Street,Apartment`
    `C,Nowhereville,MA,78567 o 800,555,5555`

- The person class would return:

`Charles,L,Lamb,1515 North 8th Street,Apartment`
`C,Nowhereville,MA,78567`

The Name and Person classes must each have a `compareTo()` method (similar to that for Strings). For example if n1 and n2 are Name objects, then `n1.compareTo(n2)` would return a negative integer if n1 is less than n2, zero if they are equal, and a positive integer if n1 is greater than n2. The comparison is based on the last names if they are different; the first names if the last names are equal but the first names are different; and on the middle initial if all others are equal. The Person `compareTo` will merely return a value based solely on the Name.

NOTE: When reading a string of fields separated by commas, it's a good idea in this assignment to get rid of leading and trailing white space. This will help you keep things aligned in case there exist extra blanks prior to or following the beginning of a name, address, or phone number. If `str` is a String, then `str.trim()` returns a string with leading and trailing white space removed.

Of course, all of these will need constructors. The design and development of constructors is left to the student.

Finally, `main` should do the following:

- Print a message describing that a file with comma separated values will be read and stored in an ArrayList of Person objects.

- Ask the user for the name of the txt file and then open it.

- While there are more lines:

  - read a line;

  - use the String `split()` method to create an array of strings holding the parts separated by commas.

  - Create Name, Address, and Phone objects.

o   Using the objects in part c. create a Person object;

o   Add the person object to the ArrayList.

- Report that the file has been read, and report how many objects were placed in the ArrayList.

- Provide a menu driven program that will allow the user to manipulate the ArrayList. The options are:

   o   Print the list in well-formatted output (this will utilize `toString()` methods;

   o   Add a person to the list;

   o   Remove a person from the list. The person is to be identified only by Name.

   o   Sort the list using InsertionSort. This is well suited for an ArrayList.

Write the Array list to a new file as a comma separated file. Allow the user to input the new name and warn if the user is giving the same name as the original file. Let the program exit after this is done.

SAMPLE PROGRAM RUN

A sample run for the following txt file is provided below:

Fudd,Elmer,J,2000 North 8th St,,Kalamazoo,MI,49008,555,355,9999

Pig, Porky, M, 11th Avenue,Apartment C, Crystal Falls,IL,65432,218,777,6666

Bunny,Bugs,L,1503 Carrot Street,, Big Hill, MN, 98765, 333,222,9678

Cat,Sylvester,C,3111 Cage Avenue,Cage 3,Honolulu,HI,33333,789,213,4444

Snerd,Mortimer,K,888 Seventeenth Street,,Paducah,TX,48848,333,333,1234

Bunny,Bugs,K,1503 Carrot Street,,Big Hill,MN,98765,333,222,9678

This program will open a file in txt format representing a directory.

Enter the name of the directory file: Assign6Input.txt

Assign6Input.txt has been read and Person objects have been placed in an ArrayList of size 6. What action do you wish to take?

Print the list: Enter 1:

Print the list: Enter 1:

Add a person to the list: Enter 2:

Remove a person: Enter 3:

Sort the interal ArrayList: Enter 4:

Save the list to a new file and quit: Enter 5:

Enter 1, 2, 3, 4, or 5: 1

Elmer J Fudd

2000 North 8th St Kalamazoo MI 49008

(555) 355-999

Porky M Pig

11th Avenue

Apartment C

Crystal Falls IL 65432

(218) 777-6666

Bugs L Bunny

1503 Carrot Street

Big Hill MN 98765

(333) 222-9678

Sylvester C Cat

3111 Cage Avenue Cage 3

Honolulu HI 33333

(789) 213-4444

Mortimer K Snerd

888 Seventeenth Street Paducah TX 48848

(333) 333-1234

Bugs K Bunny

1503 Carrot Street

Big Hill MN 98765

(333) 222-9678

What action do you wish to take?

Print the list: Enter 1:

Add a person to the list: Enter 2:

Remove a person: Enter 3:

Sort the interal ArrayList: Enter 4:

Save the list to a new file and quit: Enter 5:

Enter 1, 2, 3, 4, or 5: 2

Enter first Name: Albert

Enter Middle Name: A

Enter Last Name: Anderson

Enter Address 1: 1111 South 11th Street

Enter Address 2:

Enter City: Irontown

Enter State Abbreviation : NH

Enter Zip Code: 39876

Enter Phone Area Code: 222

Enter Phone Exchange: 222

Enter Last Four Digits: 2222

What action do you wish to take?

Print the list: Enter 1:

Add a person to the list: Enter 2:

Remove a person: Enter 3:

Sort the interal ArrayList: Enter 4:

Save the list to a new file and quit: Enter 5:

Enter 1, 2, 3, 4, or 5: 1

Elmer J Fudd

2000 North 8th St Kalamazoo MI 49008

(555) 355-999

Porky M Pig

11th Avenue

Apartment C

Crystal Falls IL 65432

(218) 777-6666

Bugs L Bunny

1503 Carrot Street

Big Hill MN 98765

(333) 222-9678

Sylvester C Cat

3111 Cage Avenue Cage 3

Honolulu HI 33333

(789) 213-4444

Mortimer K Snerd

888 Seventeenth Street Paducah TX 48848

(333) 333-1234

Bugs K Bunny

1503 Carrot Street

Big Hill MN 98765

(333) 222-9678

Albert A Anderson

1111 South 11th Street

Irontown NH 39876

(222) 222-2222

What action do you wish to take?

Print the list: Enter 1:

Add a person to the list: Enter 2:

Remove a person: Enter 3:

Sort the interal ArrayList: Enter 4:

Save the list to a new file and quit: Enter 5:

Enter 1, 2, 3, 4, or 5: 3

Enter the last name of the person to remove: Pig

Enter the first name of the person to remove: Porky

Enter the middle initial of the person to remove: M

Removing

Porky M Pig

11th Avenue

Apartment C

Crystal Falls IL 65432

(218) 777-6666

at position 1.

What action do you wish to take?

 Print the list: Enter 1:

Add a person to the list: Enter 2:

Remove a person: Enter 3:

Sort the interal ArrayList: Enter 4:

Save the list to a new file and quit: Enter 5:

Enter 1, 2, 3, 4, or 5: 1

Elmer J Fudd

2000 North 8th St Kalamazoo MI 49008

(555) 355-999

Bugs L Bunny

1503 Carrot Street

Big Hill MN 98765

(333) 222-9678

Sylvester C Cat

3111 Cage Avenue Cage 3

Honolulu HI 33333

(789) 213-4444

Mortimer K Snerd

888 Seventeenth Street Paducah TX 48848

(333) 333-1234

Bugs K Bunny

1503 Carrot Street

Big Hill MN 98765

(333) 222-9678

Albert A Anderson

1111 South 11th Street Irontown NH 39876

(222) 222-2222

What action do you wish to take?

Print the list: Enter 1:

Add a person to the list: Enter 2:

Remove a person: Enter 3:

Sort the interal ArrayList: Enter 4:

Save the list to a new file and quit: Enter 5:

Enter 1, 2, 3, 4, or 5: 4

What action do you wish to take?

Print the list: Enter 1:

Add a person to the list: Enter 2:

Remove a person: Enter 3:

Sort the interal ArrayList: Enter 4:

Save the list to a new file and quit: Enter 5:

Enter 1, 2, 3, 4, or 5: 1

Albert A Anderson

1111 South 11th Street Irontown NH 39876

(222) 222-2222

Bugs K Bunny

1503 Carrot Street

Big Hill MN 98765

(333) 222-9678

Bugs L Bunny

1503 Carrot Street

Big Hill MN 98765

(333) 222-9678

Sylvester C Cat

3111 Cage Avenue Cage 3

Honolulu HI 33333

(789) 213-4444

Elmer J Fudd

2000 North 8th St Kalamazoo MI 49008

(555) 355-999

Mortimer K Snerd

888 Seventeenth Street Paducah TX 48848

(333) 333-1234

What action do you wish to take?

Print the list: Enter 1:

Add a person to the list: Enter 2:

Remove a person: Enter 3:

Sort the interal ArrayList: Enter 4:

Save the list to a new file and quit: Enter 5:

Enter 1, 2, 3, 4, or 5: 5

Enter the new file name: Assign5Output.csv

BUILD SUCCESSFUL (total time: 3 minutes 31 seconds)

Here is a copy of the file Assign6Output.txt.

Anderson,Albert,A,1111 South 11th Street,,Irontown,NH,39876,222,222,2222
Bunny,Bugs,K,1503 Carrot Street,,Big Hill,MN,98765,333,222,9678 Bunny,Bugs,L,1503 Carrot
Street,,Big Hill,MN,98765,333,222,9678 Cat,Sylvester,C,3111 Cage Avenue,Cage
3,Honolulu,HI,33333,789,213,4444 Fudd,Elmer,J,2000 North 8th
St,,Kalamazoo,MI,49008,555,355,999 Snerd,Mortimer,K,888 Seventeenth
Street,,Paducah,TX,48848,333,333,1234