CPE 102:Spring 2023

Homework 3

Due date: May 3, 2023.

You should submit your program by May 3 (any time up to midnight) through Teams. This time, please upload each file separately without zipping. Remember that your code should be fully documented. I once again remind you to read the academic honesty policy stated in the syllabus. If you submit code without comments or without proper indentation, you will lose 10 % of your grade.

In this assignment, you will write a Java program that reads input from a file storing popular male and female baby names for a particular year in the US, and will output statistics (rank, number and percentage) of a given name in that year.

1 Input File Format

The input files contain lines in the following format:

```
rank,male-name,male-number,female-name,female-number
```

where the comma-separated fields have the following meanings:

`rank`	the ranking of the names in this file
`male-name`	a male name of this rank
`male-number`	number of males with this name
`female-name`	a female name of this rank
`female-number`	number of females with this name

This is the format of database files obtained from the U.S. Social Security Administration of the top 1000 registered baby names. Each line begins with a rank, followed by the male name at that rank, followed by the number of males with that name, etc. Here is an example showing data from the year 2002:

```
1,Jacob,30568,Emily,24463
2,Michael,28246,Madison,21773
3,Joshua,25986,Hannah,18819
4,Matthew,25151,Emma,16538
5,Ethan,22108,Alexis,15636
6,Andrew,22017,Ashley,15342
7,Joseph,21891,Abigail,15297
8,Christopher,21681,Sarah,14758
9,Nicholas,21389,Samantha,14662
10,Daniel,21315,Olivia,14630
...
```

```
996,Ean,157,Johana,221
997,Jovanni,157,Juana,221
998,Alton,156,Juanita,221
999,Gerard,156,Katerina,221
1000,Keandre,156,Amiya,220
```

As you can see from the above, in 2002, there were 30,568 male babies named Jacob and 24,463 female babies named Emily, making them the most popular (rank 1) names used in that year. Similarly, going down the list, we see that there were 220 newborn females named Amiya, making it the 1000th most popular female baby name.

2 Requirements

1. You should write a `PopularName` class that stores the name, rank in popularity and total number of babies with that name. You may store additional data such as the percentage of babies with that name.

2. Your program will first ask the user for a filename. The user enters a filename that contains the data in above format. You will then read the file and build two ArrayLists (ArrayList of PopularName objects) to store the baby names found in the file, one ArrayList for the male names and one for the female names.

3. You will sort the ArrayLists in alphabetical order by name. You may use bubble sort or selection sort both of which were discussed during recitations.

4. Your program then asks the user to enter a gender and a name. After reading in the gender (male or female) and the name, it will look up the name in the appropriate ArrayList and report the following statistics:

   (a) index in sorted list - just an integer indicating the position of the name in your sorted ArrayList (for that gender) so that we can verify your list is sorted

   (b) rank in popularity (Note that this data is given in the file.)

   (c) number - the number of babies given that name

   (d) percentage - the percentage of babies given that name (for that gender)

For example, if user enters the gender "female" and the name "Emma' (female), the following statistics should be printed if we give the file for year 2002.

```
Emma:
index in sorted list: 326
rank in popularity: 4
number of babies: 16538
percentage of babies: 1.18%
```

A sample run is as follows:

```
Enter a file name:
names2002.csv

File is uploaded.

Do you want to search for a name and see its statistics (y/n)?
y

Enter a gender:
female

Enter a name:
Emma

Emma:
index in sorted list: 326
rank in popularity: 4
number of babies: 16538
percentage of babies: 1.18\%

Do you want to search for a name and see its statistics (y/n)?
n
```