CSE 142, Winter 2008
Programming Assignment #6: Baby Names (20 points)
Due: Tuesday, February 26, 2008, 4:00 PM

Special thanks to Stanford lecturer Nick Parlante for the original concept of this assignment!
also see: http://www.peggyorenstein.com/articles/2003_baby_names.html

Program Description:

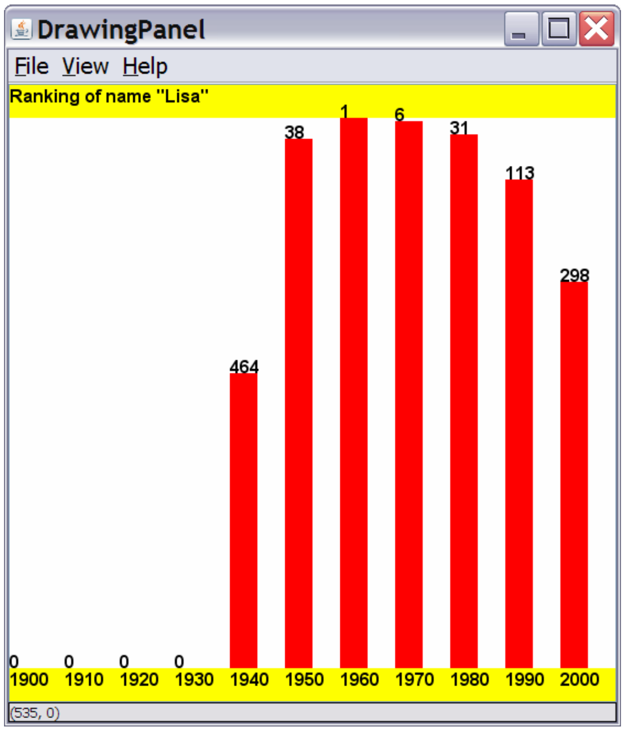
This assignment focuses on file processing. You will need `DrawingPanel.java`. Turn in a file named `BabyNames.java`.

Every 10 years, the Social Security Administration gives data about the 1000 most popular boy and girl names for children born in the US. This data is provided on the web at http://www.ssa.gov/OACT/babynames/. Your task in this program is to prompt the user for a name, and then to display popularity statistics about that name for each decade since 1900. You will display both a text output of this data and a graphical bar chart of this data on a `DrawingPanel`.

```
This program graphs the popularity of a
name in 11 decades' worth of statistics
recorded since the year 1900.

Type a name: Lisa
Lisa 0 0 0 0 464 38 1 6 31 113 298

<< your custom message here >>
```



The last bit of text output is up to you. Print a message of your choice related to the data. For example:

- Google about your name's meaning (e.g. "Marty" means "warlike") and display this information.
- Give your explanation for why the graph data for your name is the way it is. Why is your name so popular or unpopular? How do you explain the rise or fall of your name in the graph over the years?

Your program gives an introduction and then prompts the user for a name. Then it reads a file searching for that name, ignoring case. If the name is found in the file, print the line of statistics about that name's popularity in each decade.

Your program will read its data from a file named `names.txt`. Assume that this file exists in the same folder as your program. Each line of the file has a name, followed by the rank of that name in 1900, 1910, 1920, and so on. The default input file has 11 numbers per line, meaning that the last number represents the ranking in the year 2000. A rank of 1 was the most popular name that year, while a rank of 999 was not very popular. A rank of 0 means the name did not appear in the top 1000 that year at all. Here is a sample of the data:

```
Lionel 387 344 369 333 399 386 408 553 492 829 972
Lisa 0 0 0 0 464 38 1 6 31 113 298
Lise 0 0 0 0 0 997 0 0 0 0 0
Lisette 0 0 0 0 0 0 0 816 958 0 864
```

"Lionel" was #387 in 1900 and is slowly decreasing. "Lisa" first made the list in 1940 and peaked in 1960 at #1.

If the name is found, you must also construct a `DrawingPanel` to graph the data. Your panel must exactly reproduce the window appearance of the examples for the same user input.

The panel's overall size is 550x560 pixels. Its background is white. It has yellow filled rectangles along its top and bottom, each being 30 pixels tall and spanning across the entire panel, leaving an area of 550x500 pixels in the middle. At (0, 16), the following message appears in the top yellow bar for Lisa:

```
Ranking of name "Lisa"
```

If the name is not found in the file, you should output that it was not found, and not draw any data. No `DrawingPanel` should appear in this case. The following is an example:

```
This program graphs the popularity of a name
in 11 decades' worth of statistics
recorded since the year 1900.

Type a name: zOIDberG
"zOIDberG" not found.
```

Graphical Output:

Each decade is represented by a width of 50 pixels. The bottom yellow rectangle contains black labels for each decade, left-aligned with the text's bottom at y=546. For example, the text "1900" is at (0, 546) and "1910" is at (50, 546).

Starting at the same x-coordinate, a red bar shows the name ranking data over each decade. The bar is 25px thick (half as wide as each decade). The table at right shows the mapping between rankings and y-values of the tops of these bars. The y-values start at 30, and there is a vertical scaling factor of 2 between pixels and rankings, so you should divide a ranking by 2 when calculating its y-coordinate. For example, a ranking of 38 in 1950 results in a 25x481 bar occupying the pixels from (250, 49) through (274, 529).

Rank	**Top y**
1	30
2, 3	31
4, 5	32
...	...
998, 999	529
0	530

At the same coordinate as the top-left corner of each red bar, black text shows the name's rank for that decade. For example, "38" appears at (250, 49) because "Lisa" had a rank of 38 in 1950. A rank of 0 means the name didn’t appear in the top 1000. No red bar should appear for such a case, and the number 0 should be drawn at the bottom of the plot range at y=530. For example, Lisa's 0 ranking in 1910 is drawn at (50, 530).

Implementation Guidelines:

We suggest you begin with the text output and file processing, then any "fixed" graphical output, and then the red bars. The 0-ranking case is particularly tricky to draw, so you may want to do this last.

Your program should work correctly regardless of the capitalization the user uses to type the name. For example, if the user asks you to search for `"LISA"` or `"lisa"`, you should find it even though the input file has it as `"Lisa"`. The name that is displayed on the console and `DrawingPanel` should have capitalization matching the way it appears in the file.

Draw the text labels on the `DrawingPanel` using the `drawString` method of the `Graphics` object. Some text you'll want to write will be `int`s, but you can convert them into `String`s using the `+` operator with an empty string. For example, for an `int` named `n` with value `100`, the expression `"" + n` yields the string `"100"`. To draw this at (50, 120), you'd write:

```
    g.drawString("" + n, 50, 120);
```

All text is drawn using bold `"SansSerif"` font at size 16. Set this by using the `Graphics` object's `setFont` method:

```
    g.setFont(new Font("SansSerif", Font.BOLD, 16));
```

Stylistic Guidelines:

For this program you should have **four class constants** to represent the following values:

- the **name of the input file**, as a `String` (default of `"names.txt"`)
- the **starting year** of the input data, as an integer (default of `1900`)
- the **number of decades**' worth of data in each line of the file, as an integer (default of `11`)
- the **width** of each decade on the `DrawingPanel`, as an integer (default of `50`)

If the constants values are changed, your output should adapt. For example, if you change the starting year to 1825, the program should assume the data comes from 1825, 1835, and so on. The panel's width should adjust if your width or decades constants change. For example, if you change width to 70 and decades to 5, the panel's size becomes 350x560 and each red bar becomes 35px thick. On the course website is a file `names2.txt` with 8 decades of data to test your constants. You may assume each line of the input file contains exactly as many integers as your decades constant.

We will be especially picky about redundancy. Remember to factor `if/else` code as described in book section 4.3. Use methods for structure and to avoid redundancy. For full credit, your methods should obey the following constraints:

- The `main` method should not draw on a `DrawingPanel`, nor should it read any lines of input from a file.
- The code that asks the user for a name must not be in the same method as any code to read lines of input from a file.
- Split the task of displaying the data into at least two methods. For example, you could have one method to draw "fixed" graphics (yellow bars, decade labels) and another for graphics that come from the file (red bars, rankings).

For this assignment you are limited to the language features in Chapters 1 through 6 of the textbook. In particular, **you are not allowed to use arrays on this assignment.** Follow past stylistic guidelines about indentation, line lengths, identifier names, and localizing variables, and commenting at the beginning of your program, at the start of each method, and on complex sections of code. For reference, our solution occupies 100 lines and has 4 methods other than `main`.