

Programming Assignment: Baby Names (20 points)

Due: Wednesday, December 16, 2009, 11:30 PM

Special thanks to Stanford lecturer Nick Parlante for the original concept of this assignment!

Stuart Reges and Marty Stepp wrote the initial version of this document

This assignment focuses on reading input files. Turn in a file named `BabyNames.java`. You will need `DrawingPanel.java` to write this program.

Program Description:

Every 10 years, the Social Security Administration gives data about the 1000 most popular boy and girl names for children born in the US (<http://www.ssa.gov/OACT/babynames/>). Your task in this program is to prompt the user for a name, and then to display the name's meaning and popularity statistics about that name for each decade since 1900. You will display the data as console text and as a graphical bar chart on a `DrawingPanel`. The input data about names' popularity rankings and meanings comes from two input files from the website.

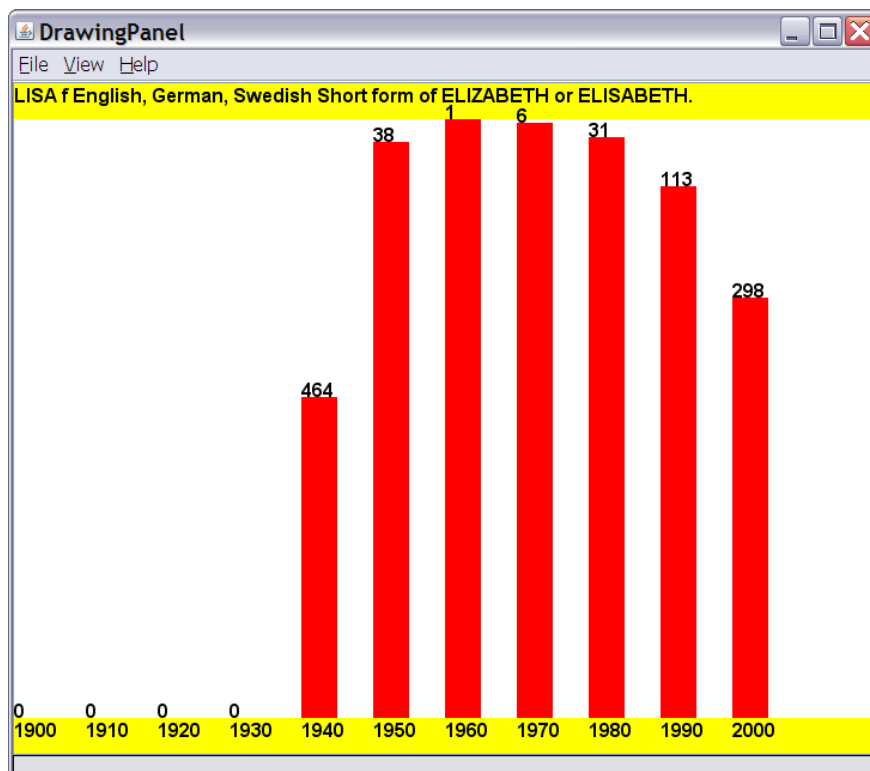
Your program gives an introduction and then prompts the user for a first name. It reads a file searching for that name, case-insensitively (that is, you should find the name regardless of the capitalization the user uses when typing it). If the name is found in the file, you will print a line of statistics about that name's popularity in each decade. You will also look up that name's meaning in a second file and display information about its meaning.

This program graphs the popularity of a name in statistics recorded since the year 1900.

Type a name: lisa


Lisa 0 0 0 0 464 38 1 6 31 113 298

LISA f English, German, Swedish Short form of ELIZABETH or ELISABETH.



Input Data and Files:

Your program reads data from two files. Download them from our web site to the same folder as your program.

1.  names.txt: *popularity rankings for each name in each decade from 1900-2000*

Each line of names.txt contains a name followed by that name's rank in 1900, 1910, 1920, etc. The default file has 11 numbers/line, so the last represents the ranking in 2000. Rank #1 was the most popular that year, while rank #999 was not popular. Rank 0 means the name did not appear in the top 1000. For example:

```
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
```

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


Once the user types a name, search each line of names.txt to see if it has data for that name. If the name is found, output its data line to the console, then construct a DrawingPanel to graph the data.

If the name is not found, output a "not found" message and not draw any data. No DrawingPanel should appear.

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

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

Though the data shown above has 11 decades' worth of rankings, your program should work properly with any number of decades of data (at least 1). Since there is a limit to the size of the DrawingPanel, you'd only be able to see data from 12 decades, but your code should process as many decades of data as it finds in the line. **Do not assume that there will be exactly 11 decades when writing this program.** On the course website is a file named names2.txt with 8 decades of data to help you test this behavior.

2.  meanings.txt: *descriptions of the meanings of each name*

If the name is found in names.txt, you should also read meanings.txt to find its meaning. The line containing the name's meaning should be printed to the console and also drawn on the DrawingPanel. Every name in names.txt is also in meanings.txt, so you do not need to worry about a name having rankings but no meaning data. Some names have long meanings that may stretch past the right edge of the DrawingPanel.

Each line of meanings.txt contains a name in upper case, followed by the name's meaning. For example:

```
LIONEL m French Pet form of LON
LISA f English, German, Swedish Short form of ELIZABETH or ELISABETH.
LISE f French French short form of ELISABETH
```

Note that even though the two input files contain different data, the task of searching for a name in names.txt is very similar to the task of searching for a name in meanings.txt; both contain the name as the first token of each line. Your code should take advantage of this fact and should avoid redundancy.

Graphical Output:

The panel's overall size is 720x560 pixels. **You may choose what to make your graph look like**, but below are the specifications for the graph pictured above in case you aren't feeling creative! As an extra challenge, draw a line graph instead of a bar graph. No matter what you choose your graph to look like, you need to make sure ranks of 0 are pictured at the bottom.

Default Graph Specifications:

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 open area of 720x500 pixels in the middle. The line of data about the name's meaning appears on the panel at (0, 16).

Each decade is represented by a width of 60 pixels. The bottom yellow rectangle contains black labels for each decade, at y=546. For example, the text "1900" is at (0, 546) and "1910" is at (60, 546).

Starting at the same x-coordinate, a red bar shows the name ranking data over each decade. The bar is 30px thick (½ as wide as each decade). The table at right shows the mapping between rankings and y-values of the tops of bars. Y-values start at 30, and there is a vertical scaling factor of 2 between pixels and rankings; divide a ranking by 2 when calculating its y-coordinate. For example, a ranking of 38 in 1950 results in a 30x481 bar occupying (300, 49) through (329, 529).

Rank	Top y
1	30
2, 3	31
4, 5	32
6, 7	33
...	...
996, 997	528
998, 999	529
0	530

At the same coordinate as the top-left of each red bar, black text shows the name's rank for that decade. For example, Lisa was #38 in 1950, so "38" appears at (300, 49). A 0 rank means the name wasn't in the top 1000. No red bar should appear in such a case, and "0" should be drawn at the bottom at y=530. For example, Lisa's 0 in 1910 is drawn at (60, 530).

Implementation Guidelines:

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. (Hint: Treat rank 0 as a rank of 1000.)

Your program should work correctly regardless of the capitalization the user uses to type the name. If the user types "Lisa" or "lisa", you should find it even though the input files have it as "Lisa". and "LISA".

Draw text labels on the `DrawingPanel` using the `drawString` method of the `Graphics` object. To draw an `int` as text, you can convert it into a `String` using the `+` operator with an empty string. For example, for an `int` variable named `n` with value 100, the expression `" " + n` yields the string "100". To draw this at (50, 120), you could write:

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

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

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

Stylistic Guidelines:

You should have the following **two class constants**. If the constant values are changed, your output should adapt.

- The **starting year** of the input data, as an integer (default of 1900)
e.g. If you change the start year to 1825, the program should assume the data comes from 1825, 1835, etc.
- The **width** of each decade on the `DrawingPanel`, as an integer (default of 60)
e.g. If you change the width to 50, each red decade bar is 50px apart and 25px thick. The panel's width should also adjust. The original width of 720 mentioned previously really comes from 60px per decade times 12 decades. But if you change the constant to 50, the panel's width becomes 600px.

I will be especially picky about redundancy. For full credit, your methods should obey these constraints:

- The `main` method should not draw on a `DrawingPanel`, nor read lines of input from a file (`nextLine`).
- The method that asks the user for a name must not also read lines of input from a file.
- Split the displaying of graphical data into at least two methods. For example, you could have one method to draw "fixed" graphics (yellow bars, etc.) and another for graphics that come from the file (red bars, ranks).

Your methods should be well-structured and avoid redundancy, and your `main` method should be a concise summary of the overall program. Avoid "chaining," which is when many methods call each other without ever returning to `main`.

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, my solution occupies ~100 lines and has 4 methods other than `main`.