# CSc 110, Autumn 2017
# Programming Assignment #7: Baby Names (20 points)
## Due: Tuesday, October 17, 2017, 11:30 PM

*Thanks to Nick Parlante from Stanford for the assignment concept and to Marty Stepp and Stuart Reges for parts of this document.*

This assignment focuses on reading input files. Turn in a file named `baby_names.py`.
You will need `DrawingPanel.py`, which you used on previous assignments, to write this program.

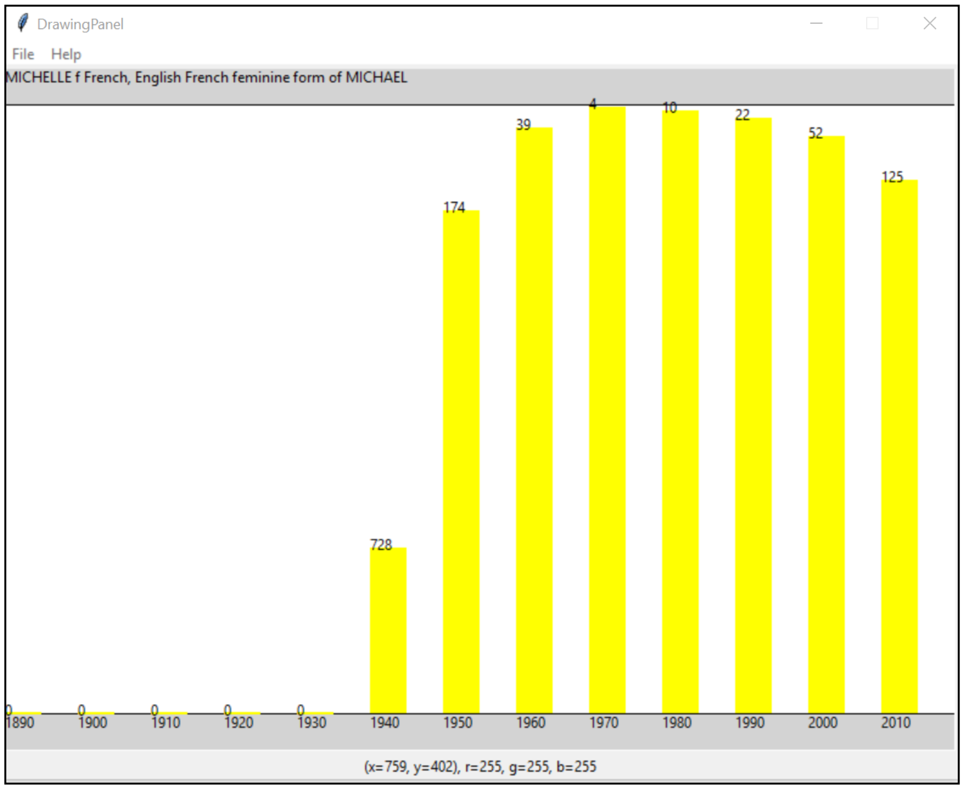
## Program Description:

The Social Security Administration has published the 1000 most popular boy and girl names for children born in the US for all years after 1879 (see http://www.ssa.gov/OACT/babynames/). For this project, you will prompt the user for a name and gender, and then display the name's meaning and popularity 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 provided on the course web site.

Your program should give an introduction and then prompt the user for a first name and gender. It should then read the name rank data file searching for that name and first letter of the gender, case-insensitively (that is, you should find the name and gender regardless of the capitalization the user uses when typing them in). If the name and gender combination is found in the file, your program should print a line of statistics about that name's popularity in each decade, the name's meaning and display information about the name graphically.

```
This program allows you to search through the
data from the Social Security Administration
to see how popular a particular name has been
since 1890.

Name: michelle
Gender: female
Michelle f 0 0 0 0 0 728 174 39 4 10 22 52 125
MICHELLE f French, English French feminine form of MICHAEL
```



## 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 1890-2010*

Each line of `names.txt` contains a name followed by that name's rank in 1890, 1900, 1910, etc. The default file has 13 numbers/line, so the last represents the ranking in 2010. 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:

```
Michelle f 0 0 0 0 0 728 174 39 4 10 22 52 125
Michelle m 0 0 0 0 0 0 0 0 736 897 0 0 0
Michial m 0 0 0 0 0 0 987 0 0 0 0 0 0
```

"Michelle" as a female name first made the list in 1940 and peaked in 1970 at #4. It has been on a steady decline in popularity since. "Michial" only made the top-1000 in 1950.

Once the user types a name and gender, search each line of `names.txt` to see if it contains data for that name and gender. If the name and gender combination is found, output its data line to the console, then construct a `DrawingPanel` to graph the data (see next page). **Your code should not assume that the file is sorted alphabetically**.

If the name and gender combination is not found, output a "not found" message and don't show any data. No `DrawingPanel` should appear.

```
This program allows you to search through the
data from the Social Security Administration
to see how popular a particular name has been
since 1890.

Name: haYdEn
Gender: uncertain
"haYdEn" not found.
```

Though the data shown above has 13 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 13 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 13 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 and gender combination 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 gender and meaning. For example:

```
MICHELLE f French, English French feminine form of MICHAEL
MICHELYNE f English (Modern) Pet form of MICHELLE
MICHI f Japanese Means "pathway" in Japanese.
MICHIAL m (no meaning found)
```

Though the two input files contain different data, the task of searching for a name and gender in `names.txt` is very similar to the task of searching for a name and gender in `meanings.txt`. Your code should take advantage of this fact and should avoid redundancy. You should write your code in such a way that you stop searching a file once you find a line that has the name you're searching for.

## Graphical Output:

The panel's overall size is 780x560 pixels. Its background is white. It has light gray (`"light gray"`) filled rectangles along its top and bottom with a black line at their bottom and top, respectively. The two rectangles are each 30 pixels tall and span across the entire panel, leaving an open area of 780x500 pixels in the middle. The line of data about the name's meaning appears at (0, 0) in the upper gray rectangle.

Each decade is represented by a width of 60 pixels. The bottom light gray rectangle contains black labels for each decade, that start from the same height as the top of the gray bar.

Starting at the same x-coordinate, a bar shows the name ranking data for each year. The bars are green for male names and yellow for female names. Bars are half as wide as each decade (30px). The table at right shows the mapping between rankings and y-values of the tops of bars. Y-values start at 30 (below the top gray rectangle), and there is a vertical scaling factor of 2 between pixels and rankings; divide a ranking by 2 to get its y-coordinate.

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

10 pixels above the coordinate of the top-left of each bar, black text shows the name's rank for that decade. For example, Michelle was #4 in 1970, so "4" appears at (480, 22). A 0 rank means the name was not in the top 1000. No bar should appear in such a case, and "0" should be drawn right above the bottom gray bar.

## Implementation Guidelines:

We suggest you begin with the text output and file processing, then any "fixed" graphical output, and then the 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"`.

## Stylistic Guidelines:

You should have at least these **three constants**. If the constant values are changed, your output should adapt.

- The **starting year** of the input data, as an integer (default of `1890`)
  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 green or yellow decade bar is 50px apart and 25px thick.
- The **height** of the legend rectangles, as an integer (default of `30`)
  e.g. If you change the legend height to 20, the gray rectangles at top and bottom are 20px tall. The panel is 540px tall so that the open area in the middle is 500px tall. The decade labels are at y=532.

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

- The `main` function should not draw on a `DrawingPanel`, nor read lines of input from a file.
- The function 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 functions. For example, you could have one function to draw "fixed" graphics (gray legend rectangles, etc.) and another for graphics that come from the file (bars, ranks).

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

For this assignment you are limited to the language features in lectures 1 - 21. 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 function, and on complex sections of code. You may not have global variables or nest functions in one another.