MIST.3050
Homework 2 - Animation for Data Visualization

In this assignment, you are provided with a *BartChart* class and data files containing historical records (e.g., most populous cities in the world from 1500 to 2018, most valuable brands from 2000 to 2018). The primary task is to produce an animated bar chart to visualize historical data.

The *BarChart* class is in the barchart.py file, which also includes a *main*() function to show how to use the class. The *chart_demo.py* file shows how to use the *BarChart* class to create animation: the key idea is to make bar charts iteratively and pause a fraction of a second between iterations.

The data files are well structured. Take the *cities.txt* as an example. Below are sample contents in the file:

```
The most populous cities in the world from 1500 to 2018
Population (thousands)
Sources: SEDAC; United Nations; Demographia

12
1500,Beijing,China,672,East Asia
1500,Cairo,Egypt,400,Middle East
1500,Cuttack,India,140,South Asia
1500,Fez,Morocco,130,Middle East
1500,Gauda,India,200,South Asia
1500,Guangzhou,China,150,East Asia
1500,Hangzhou,China,250,East Asia
1500,Istanbul,Turkey,200,Europe
1500,Nanjing,China,147,East Asia
1500,Paris,France,185,Europe
1500,Tabriz,Iran,250,Middle East
1500,Vijayanagar,India,500,South Asia

12
1501,Beijing,China,672,East Asia
1501,Cairo,Egypt,399,Middle East
...

12
2018,Beijing,China,22674,East Asia
2018,Cairo,Egypt,19850,Middle East
2018,Delhi,India,27890,South Asia
2018,Dhaka,Bangladesh,19633,South Asia
2018,Karachi,Pakistan,18185,South Asia
2018,Mexico City,Mexico,21520,Latin America
2018,Mumbai,India,22120,South Asia
2018,New York,United States,18713,North America
2018,Osaka,Japan,20409,East Asia
2018,Shanghai,China,25779,East Asia
2018,São Paulo,Brazil,21698,Latin America
2018,Tokyo,Japan,38194,East Asia
```

The first three lines contains information title, x-axis label, and data source. The rest are data records in groups, where groups are separated by an empty line and organized chronically. Each group's first line is an integer, indicating the number of records in the group. Each record is on a separate line and contains comma-separated values for year, name, country, value, and category. The records are ordered alphabetically according to the second item (city name in the cities example).

Think about:
- how to process the data file
- how to represent information in each record
- how to represent each group

Then think about the "algorithm" of your program. At a high level: we want to create and draw a bar chart for each group. Make sure to reset the chart, add bars to it, and pause a fraction of a second between groups.

When creating a bar chart, bars need to be added sequentially according to the order based on the fourth item of each record (e.g., high to low population in the cities example). This means you need to sort the records in each group.

What to submit:

In addition to the items documented in Homework Submission, include a video that demonstrate your animation - this video is your documentation of testing. Test your program with at least two data files provided. Record your narration audio as well - so that the viewer understands what you are demonstrating. A straightforward way of producing the video is by using Zoom: you share your desktop and record your "meeting". Or you can use your phone to record your computer screen. If the video file is too big for uploading to Blackboard, you can share it via OneDrive.

Notes:

The assignment is adapted from http://nifty.stanford.edu/2020/wayne-bar-chart-racer/