

# Compsci 101

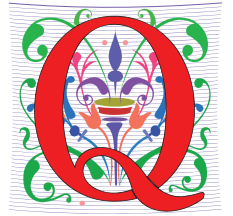
## Sorting, CSV

### Part 1 of 2

Susan Rodger  
Nicki Washington  
March 25, 2021



Q is for ...



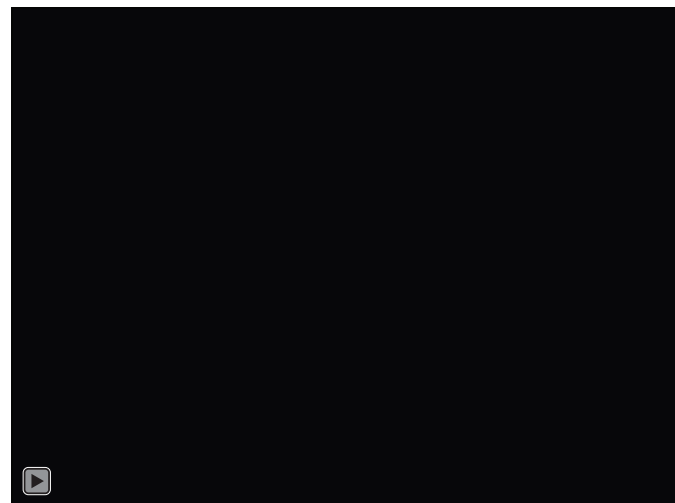
- **QR code**
  - Black and white and read all over
- **Quicksort**
  - Sort of choice before Timsort?
- **QWERTY**
  - When bad ideas persist



## PFTD

- **Sorting**
  - Sorting using standard Python APIs
- **CSV Library**
  - How to read data using standard Python APIs
- **Lambda**
  - Language construct to make sorting simpler

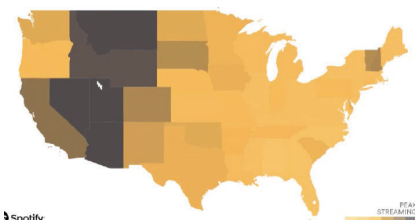
Song: Total Eclipse of the Heart, Bonnie Tyler  
<https://www.youtube.com/watch?v=lcOxhH8N3Bo>



## Why Sort Data?



- Help understand data
  - Great American Eclipse, August 21, 2017
  - <http://bit.ly/spotify-eclipse-cnet>
  - Spotify tracked the playing of the song



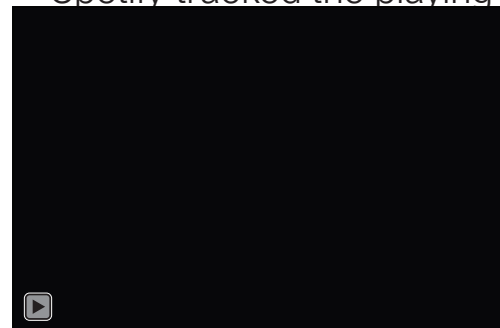
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## Why Sort Data?

- Every field needs to visualize and understand data
  - Sorting helps with this from movies to policy to sports to location of infections to

<https://www.esri.com/arcgis-blog/products/apps/local-government/how-your-gis-department-can-respond-to-covid-19/>

How your GIS department can  
respond to COVID-19

Local Government  
March 09, 2020



Mike Schoelen

A staggering wealth of geospatial information has emerged regarding the COVID-19 outbreak. Dashboards, near real-time services, and GitHub repositories have built the foundation for an extraordinarily transparent response effort.

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## How To Sort: Algorithms



- Does scale matter? It depends!
- You're playing Spades, Hearts, Bridge, Go-Fish
  - How you sort doesn't really matter, but whether you sort makes play more efficient? Better?
- Many ways to sort
  - Bubble, Insertion, Selection
  - Quick, Merge, Tim, Bogo

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## Katherine Johnson



- Died Monday, Feb 24, 2020
- “Hidden Figures” – book/movie
- NASA Mathematician – “computer”
- Calculated by hand, trajectories for space flights.
- One of first African-American women to work as NASA Scientist
- “In the early days of NASA women were not allowed to put their names on the reports – no woman in my division had had her name on a report. I was working with Ted Skopinski and he wanted to leave and go to Houston ... but Henry Pearson, our supervisor – he was not a fan of women – kept pushing him to finish the report we were working on. Finally, Ted told him, “Katherine should finish the report, she's done most of the work anyway.” So Ted left Pearson with no choice; I finished the report and my name went on it, and that was the first time a woman in our division had her name on something”

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## Compsci 101 Sorting, CSV Part 2 of 2

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March 25, 2021



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## Python Sorting API

- We'll use both `sorted()` and `.sort()` API
  - How to call, what options are
  - How to sort on several criteria
- Creating a new list, modifying existing list
  - `sorted(..)` creates new list from .. Iterable
  - `x.sort()` modifies the list x, no return value!

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## Sorting Examples

- Use `key=function` argument and `reverse=True`
  - What if we want to write our own function?

```
In[2]: a = ["red", "orange", "green", "blue", "indigo", "violet"]
In[3]: sorted(a)
Out[3]: ['blue', 'green', 'indigo', 'orange', 'red', 'violet']
In[4]: sorted(a, key=len)
Out[4]: ['red', 'blue', 'green', 'orange', 'indigo', 'violet']
In[5]: sorted(a, key=len, reverse=True)
Out[5]: ['orange', 'indigo', 'violet', 'green', 'blue', 'red']
```

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