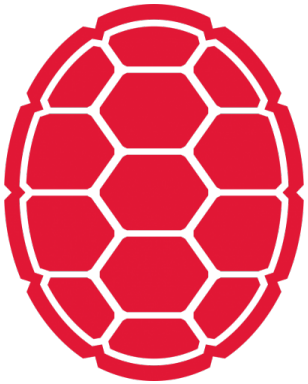

Data Wrangling

Data Science: Jordan Boyd-Graber
University of Maryland
JANUARY 13, 2018

Administrivia

- Course Staff: Apoorva / Pedro
- Moodle self-enrollment now working
- Questions?

Big Picture

- Data are messy (this isn't so messy!)
- The first step to doing anything cool is using data
- Need to use common sense and brute force often
- You'll see more in first homework (up tomorrow, due Sept. 8)

First Steps: Get Data

- From FEC
- Odd formatting

First Steps: Get Data

- From FEC
- Odd formatting
- Today: pure Python (easier with Pandas), will help expose level of Python you'll need

Look at file . . .

Look at file . . .

- Periods instead of commas (vice versa)
- Odd New York parties
- Semi-colon delimiters
- Includes totals

Read in Data

Read in Data

```
from csv import DictReader
votes = list(DictReader(open("2012pres.csv", 'r'),
                                              delimiter=";"))
```

Read in Data

Read in Data

```
from csv import DictReader
votes = list(DictReader(open("2012pres.csv", 'r'),
                                              delimiter=";"))
```

How many votes were cast?

How many votes were cast?

Total votes 129085410

How many votes were cast?

Total votes 129085410

```
total_votes = sum(int(x["TOTAL VOTES #"].replace(".", ""))
  for x in votes if x["TOTAL VOTES #"])
```

What state had the largest numerical margin between first and second place?

What state had the largest numerical margin between first and second place?

Largest numerical margin 3014327 in California

What state had the largest numerical margin between first and second place?

Largest numerical margin 3014327 in California

```
margins = {}
for ss in set(x["STATE"] for x in votes):
    margins[ss] = winner(votes, ss)[1] - second(votes, ss)[1
num_margin = argmax(margins)
print("Largest numerical margin %i in %s" %
      (max(margins.values()), num_margin))
```

What state had the largest percentage margin between first and second place?

What state had the largest percentage margin between first and second place?

Largest percentage margin 48.04 in Utah

What state had the largest percentage margin between first and second place?

Largest percentage margin 48.04 in Utah

```
margins = {}
for ss in set(x["STATE"] for x in votes
              if x["STATE"] != "District of Columbia"):
    margins[ss] = winner(votes, ss)[2] - \
        second(votes, ss)[2]
num_margin = argmax(margins)
print("Largest percentage margin %f in %s" %
      (max(margins.values()), num_margin))
```

What state had the largest numerical third party vote (and for whom)?

What state had the largest numerical third party vote (and for whom)?

Johnson had largest third party vote in California with 143221

What state had the largest numerical third party vote (and for whom)?

Johnson had largest third party vote in California with 143221

```
all_third_vote = {}
top_third_vote = {}
for ss in set(x["STATE"] for x in votes):
    try:
        all_third_vote[ss] = \
          dict((x["LAST NAME"],
                parseint(x["GENERAL RESULTS"]))
               for x in votes
               if x["STATE"] == ss
                 and x["LAST NAME"] not in kMAJOR
                 and x["LAST NAME"])
    except ValueError:
        all_third_vote[ss] = {}
    if all_third_vote[ss]:
        top_third_vote[ss] = max(all_third_vote[ss].val
```

What state had the largest percentage vote (and for whom)?

What state had the largest percentage vote (and for whom)?

Johnson had largest third party percent in New Mexico with 3.55

What state had the largest percentage vote (and for whom)?

Johnson had largest third party percent in New Mexico with 3.55

```
all_third_vote = {}
top_third_vote = {}
for ss in set(x["STATE"] for x in votes):
    try:
        all_third_vote[ss] = \
          dict((x["LAST NAME"],
                parseint(x["GENERAL RESULTS"]))
               for x in votes
               if x["STATE"] == ss
                 and x["LAST NAME"] not in kMAJOR
                 and x["LAST NAME"])
    except ValueError:
        all_third_vote[ss] = {}
    if all_third_vote[ss]:
        top_third_vote[ss] = max(all_third_vote[ss].val
```

Summary

- Data are messy
- Easier with formatted data (e.g., csv)
- Need basic data structures
- Check whether answers are reasonable

Next Time . . .

- Lecture: make sure to do reading
- Probability foundations (if you found today boring . . .)
- Math needed for the course (quiz likely)