



Data Wrangling

Introduction to Data Science Algorithms Jordan Boyd-Graber and Michael Paul

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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

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

Look at file ...

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

How many votes were cast?

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Total votes 129085410

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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?

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Largest numerical margin 3014327 in California

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```
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))
```

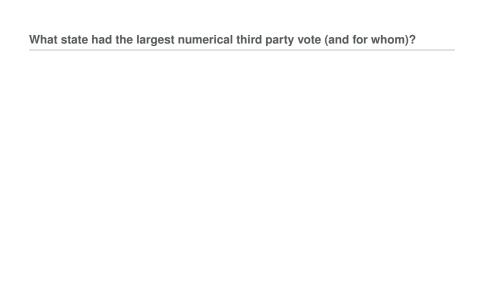
What state had the largest percentage margin between first and second place?

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Largest percentage margin 48.04 in Utah

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Largest percentage margin 48.04 in Utah



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

Johnson had largest third party vote in California with 143221

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```
all third vote = {}
top third vote = {}
for ss in set(x["STATE"] for x in votes):
    trv:
        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
```

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Johnson had largest third party percent in New Mexico with 3.55

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```

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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)