State, Slicing, and A3

Learning goals:

- **Understand how state works within a notebook.**
- **Understand slicing DataFrames.**
- **Get hints for a bunch of questions on A3.**

COGS 108 Spring 2020
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Discussion 4

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OH: Fri 10a-11a on Zoom

Materials adapted from Sam Lau WI20

Why does my code sometimes break?

Keeping track of notebook state is subtle!

What is df_income?

	first_name	id	income	last_name
0	Lauren	1592	23951.49	Murphy
1	Rebecca	27495	31019.37	Walls
2	Alejandra	19776	19058.09	Garcia
...	...	...	...	...
12662	Mark	58060	50696.11	Torres
12663	Peter	13881	0.00	Gibson
12664	Michele	35147	19864.48	Robinson

```
df_income.drop(['first_name', 'last_name'], axis=1)
```

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1	27495	31019.37
2	19776	19058.09
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12665 rows × 2 columns

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In [ ]:
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Edited to ->

```
df_income = df_income.drop(['last_name'], axis=1)
```

```
In [ ]: df_income
```

You will pass the local tests but **fail the autograder**! Be very careful when editing cells that mutate variables.

Okay, so I how do not screw things up?

- Avoid mutation until absolutely necessary!
  - Use temporary variables to work around this.
- If a cell has code that results in mutation, only run it once.
  - If you need to run it again (e.g. because of a bug), run all cells above it first.
- Restart kernel and run all cells often, and especially before you turn in your assignment.

What's the deal with brackets?

- **Why do I need brackets? When do I use parentheses and when do I use brackets?**
- **Why do I sometimes put strings in brackets but other times an expression?**
- **Why do I sometimes need double brackets??**

For more on this: http://bit.ly/sam-pandas-01

Use brackets when taking slices (subsets) of a DF

Key idea: Only **one** value goes into the brackets.

	Candidate	Party	%	Year	Result
0	Obama	Democratic	52.9	2008	win
1	McCain	Republican	45.7	2008	loss
2	Obama	Democratic	51.1	2012	win
3	Romney	Republican	47.2	2012	loss
4	Clinton	Democratic	48.2	2016	loss
5	Trump	Republican	46.1	2016	win

How do I grab a single column?

```
elections["Candidate"].head(6)
```

```
0      Reagan
1      Carter
2    Anderson
3      Reagan
4     Mondale
5        Bush
Name: Candidate, dtype: object
```

This is a Series!

How do I grab multiple columns?

```
elections[["Candidate", "Party"]].head(6)
```

	Candidate	Party
0	Reagan	Republican
1	Carter	Democratic
2	Anderson	Independent
3	Reagan	Republican
4	Mondale	Democratic
5	Bush	Republican

This is a DF!

Use brackets when taking slices (subsets) of a DF

	Candidate	Party	%	Year	Result
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2	Obama	Democratic	51.1	2012	win
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4	Clinton	Democratic	48.2	2016	loss
5	Trump	Republican	46.1	2016	win

How do I grab rows?

```
elections[0:3]
```

	Candidate	Party	%	Year	Result
0	Reagan	Republican	50.7	1980	win
1	Carter	Democratic	41.0	1980	loss
2	Anderson	Independent	6.6	1980	loss

This is a DF!

```
elections[elections['Party'] == 'Independent']
```

	Candidate	Party	%	Year	Result
2	Anderson	Independent	6.6	1980	loss
9	Perot	Independent	18.9	1992	loss
12	Perot	Independent	8.4	1996	loss

Whoa, what's going on here?

Demo with Elections Data

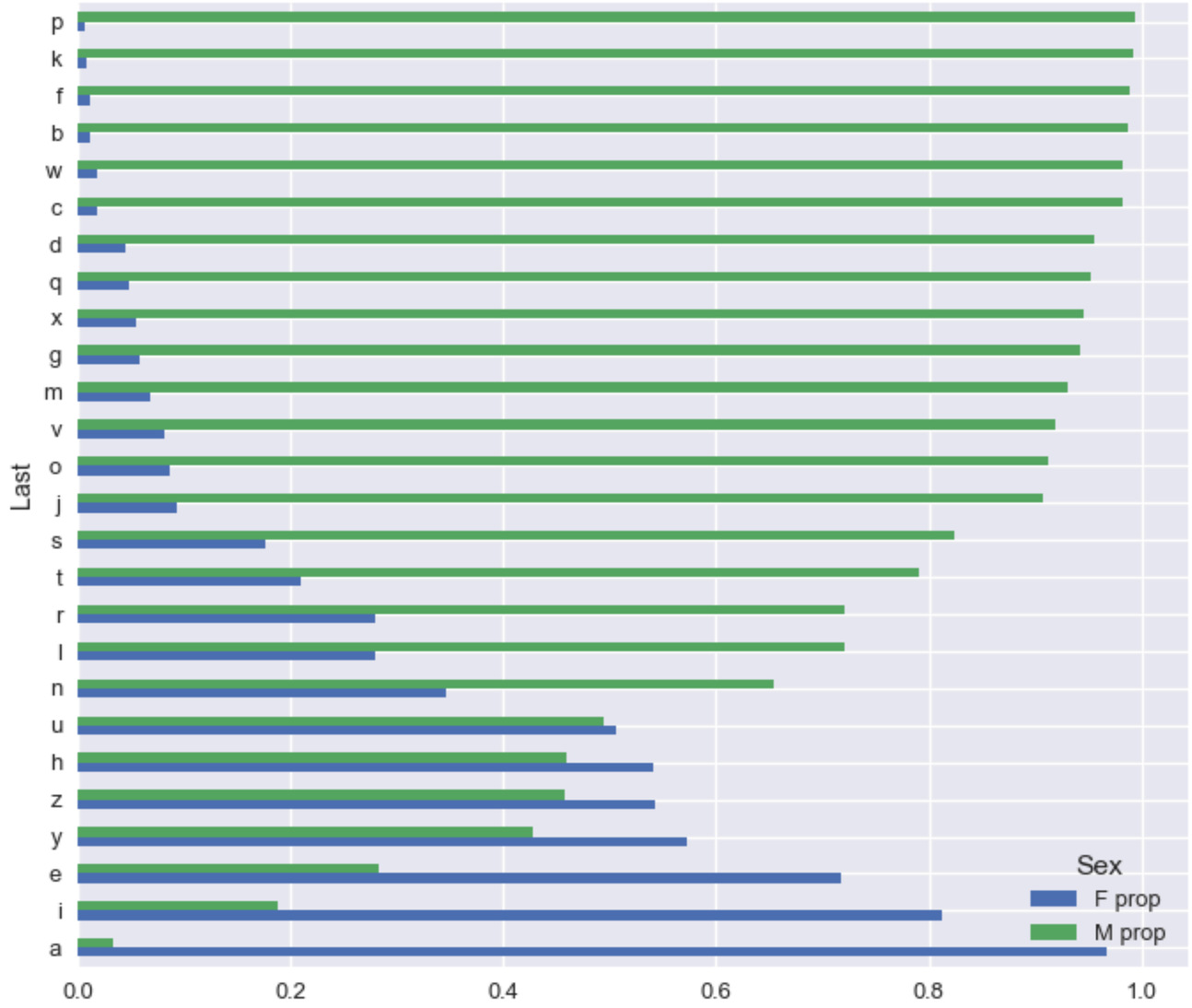
Bracket Takeaways?

- **Brackets = slicing a DF.**
  Parentheses = calculating something about a DF.
- **Strings in brackets = grabbing column (Series)**
  List of strings in brackets = grabbing columns (DF)
- **Slice in brackets = grabbing rows (DF)**
  Boolean expression in brackets = grabbing rows (DF)
  (You will need this last one for question 4b.)

Preview of next week

String methods: how do I work with text?

Using last letter of a person's first name to predict birth sex



A3 quick tips

- 1b: Use pd.read_json
- 1e: Leave blank if your columns are already in the right order.
- 2a: Use Series.isna()
- Part 3: Use plt.hist(). Ignore warnings for 3d.
- 4b, 4f, 5e: Use boolean slicing
- 4d: Use np.log10(), not np.log()
- 6i: the better predictor is the one with the most non-zero correlation.