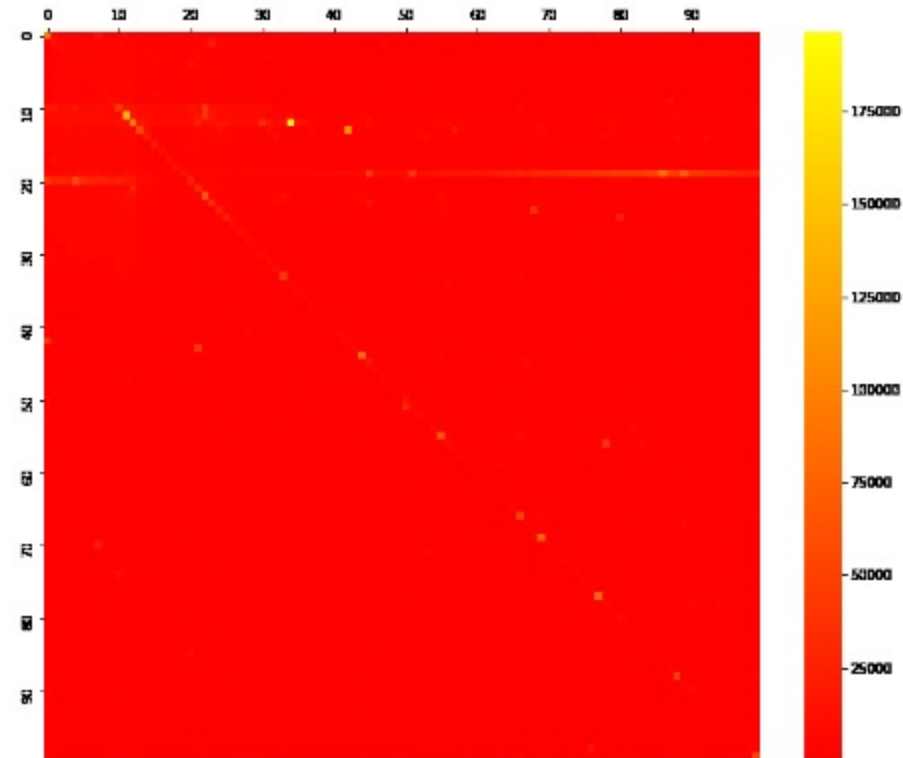# Visualizations

A powerful way to identify patterns in data that otherwise can be hard to find and analyze
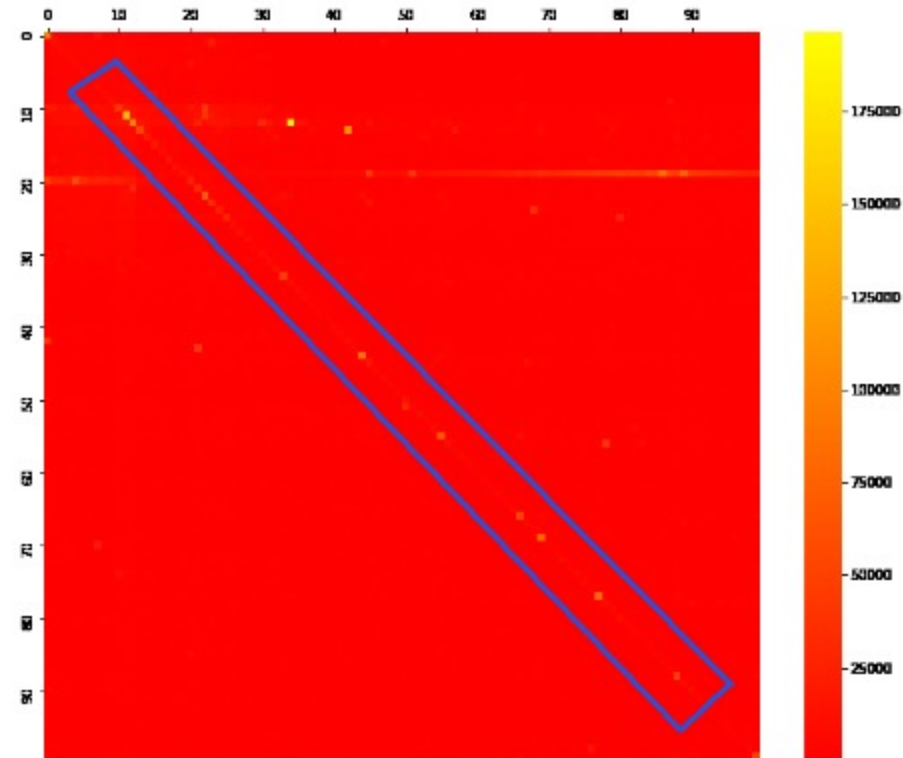
Visualizations: Raw Data

What patterns can you see in these raw data of common PIN numbers?

1010, 1234, 5489, 2626, 3737, 1001, 1111, 1122, 6666,
6969, 4321, 1313, 7777, 9854, 5609, 1460, 1111, 4545,
1234, 9643, 0909, 1983, 1934, 2001, 5602, 1987, 1234,
9065, 1988, 0101, 5555, 3939, 6201, 3794, 2006, 1998,
4567, 1234, 5789, 1357, 8888, 9870, 1956, 2468, 2019,
2626, 8546, 6666, 6969, 1234, 0000, 1111, 8456, 1978,
1004, 2000, 1212, 6709, 1990, 4053, 3690, 1000, 0258,
1800, 4598, 0129, 2222, 0190, 2471, 1100, 1212, 6359,
2121, 4567, 1234, 0011, 0101, 4509, 8899, 3241, 5643,
3467, 8282, 1234, 2323, 1967, 2345, 0132, 4242, 1331,
5921, 3061, 8205, 1370, 0909, 1256, 8324, 1111, 4693,
0000, 7823, 7410, 1010, 2222, 1234, 8367, 9247, 5555,
7639, 1092, 8536, 2828, 6969, 3291, 2109, 3689, 1212,
8028, 9797, 1023, 4529, 1029, 4289, 8209, 1523, 6829,
1028, 2323, 7430, 1998, 9090, 5439, 9010, 7834, 1008,
3028, 1010, 3298, 1111, 8729, 1234, 7320, 3434, 1995,
4268, 9090, 1023, 8239, 1090, 6382, 9347, 1111, 0101,
6328, 9427, 8888, 0202, 1313, 7832, 5555, 2020, 7256,
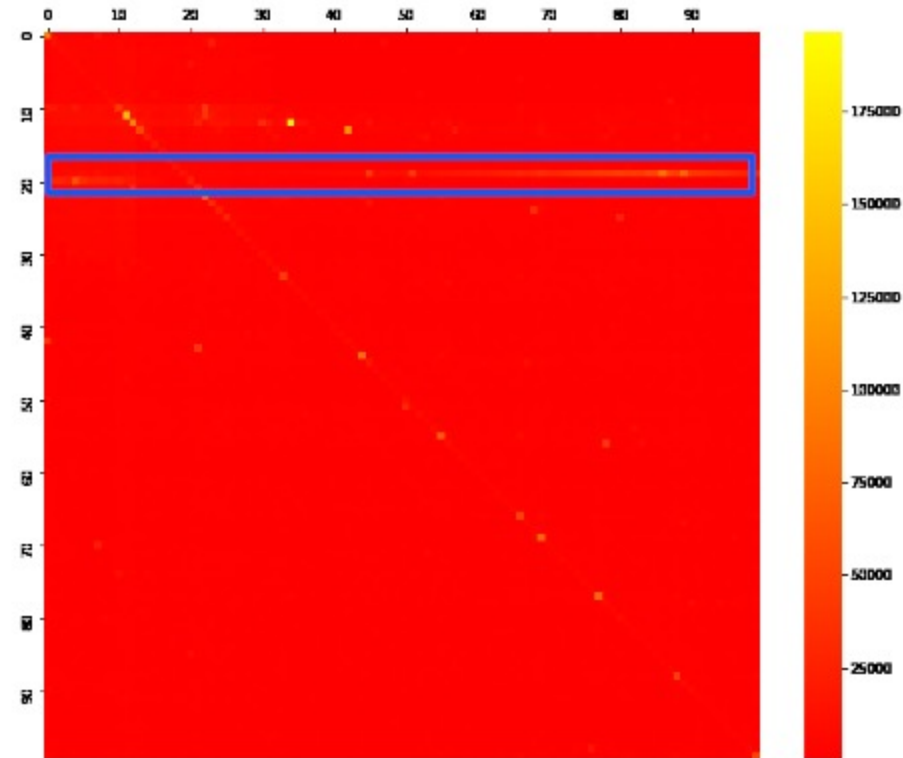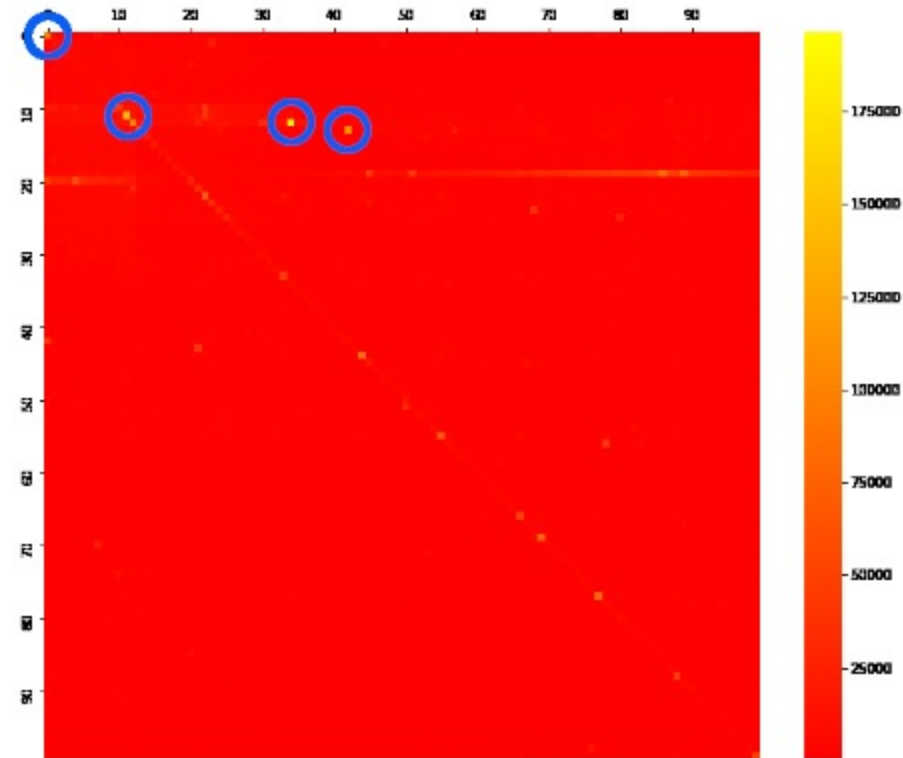8301, 6389, 1212, 2345, 7272, 8282, 1478, 3232, 1984

Visualizations: Heatmap

Visualizations: Heatmap

Visualizations: Heatmap

Visualizations: Heatmap

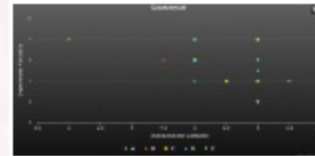# Visualizations: Chart Types

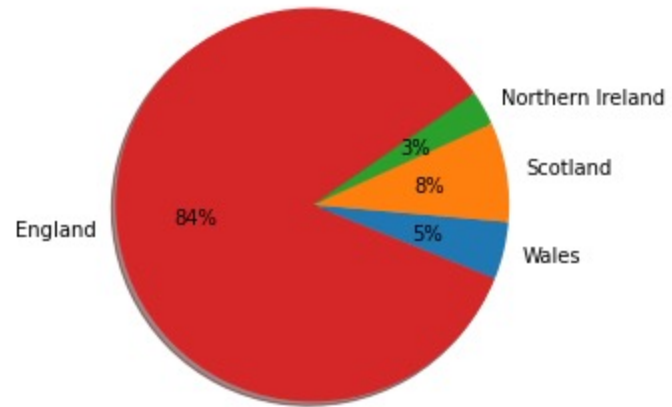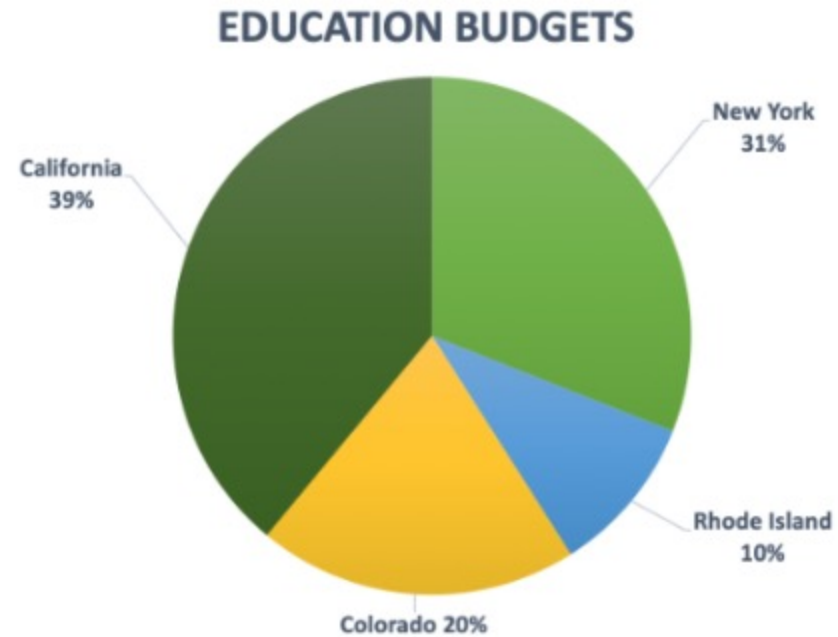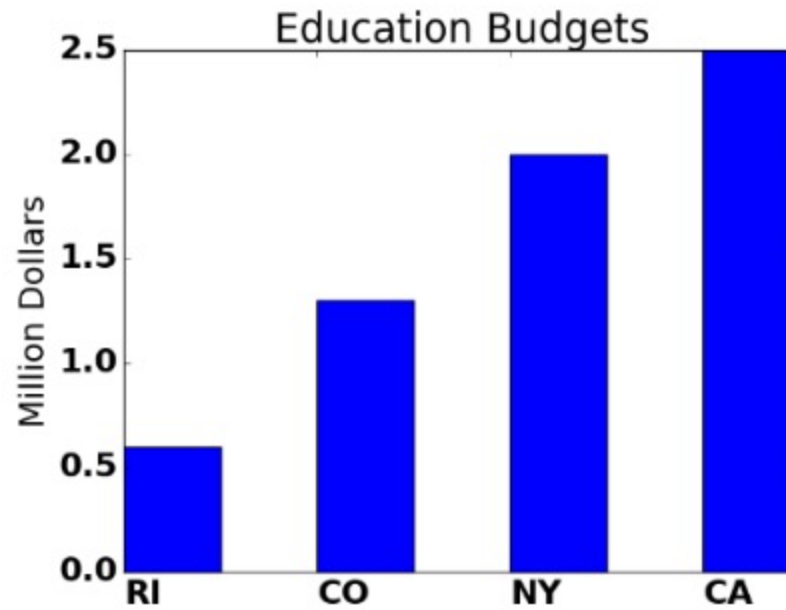Heatmap

Pie Chart

Line Chart

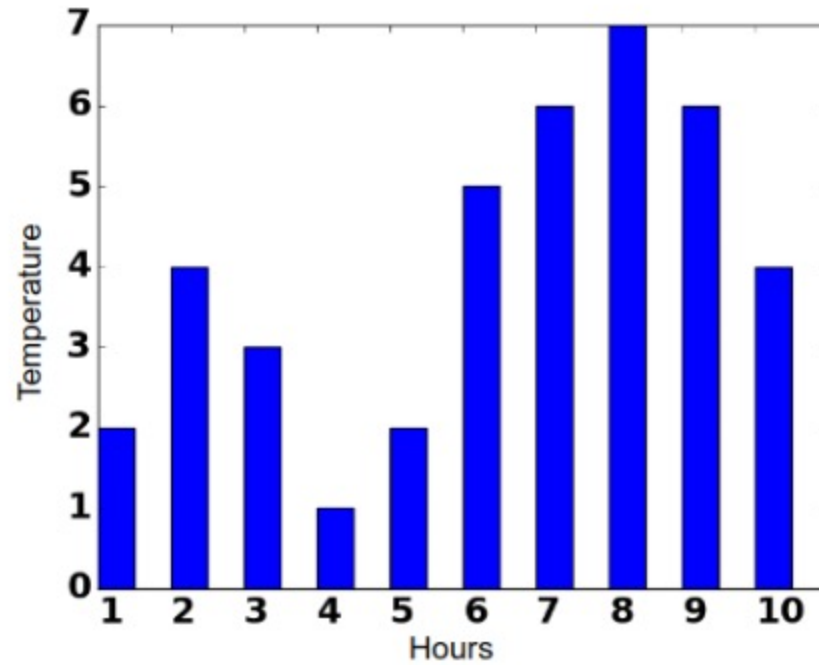Bar Chart

Scatter Plot

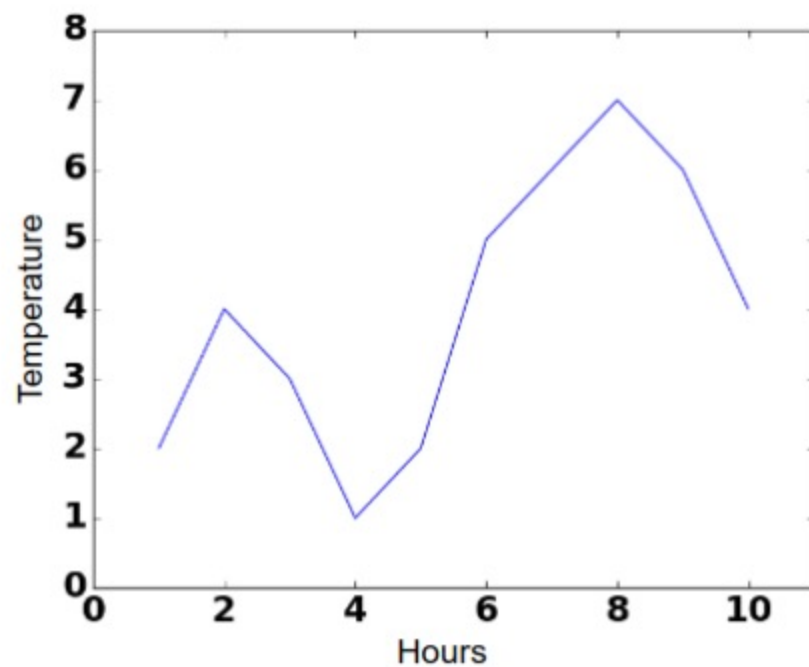# Visualizations: Pie Charts

Visualizations: Pie Charts

EDUCATION BUDGETS

- California 39%
- New York 31%
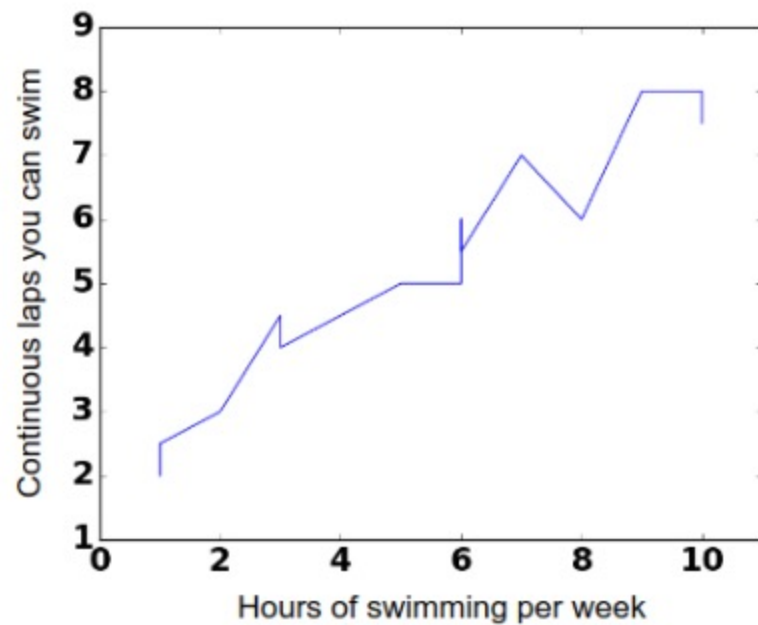- Rhode Island 10%
- Colorado 20%

Visualizations: Bar Charts
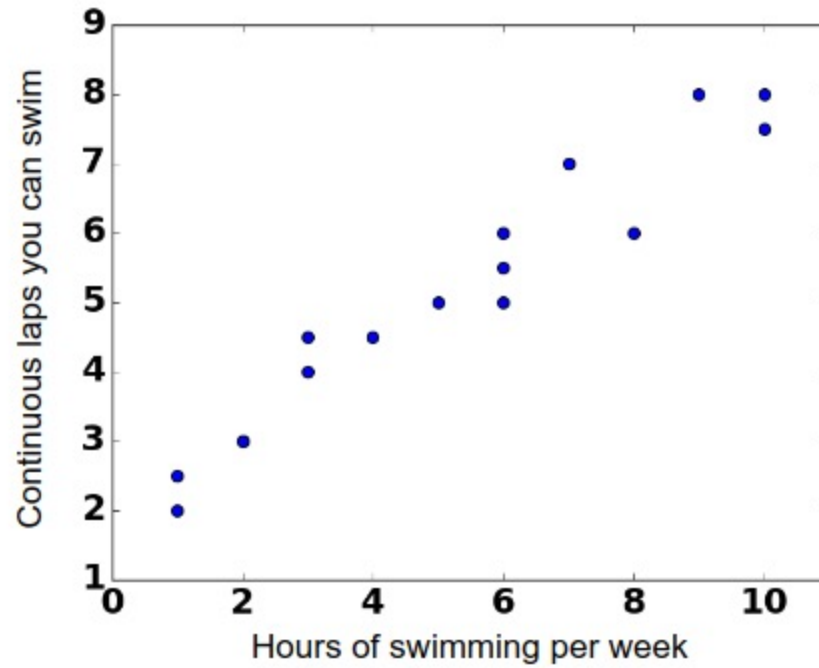
Visualizations: Bar Charts
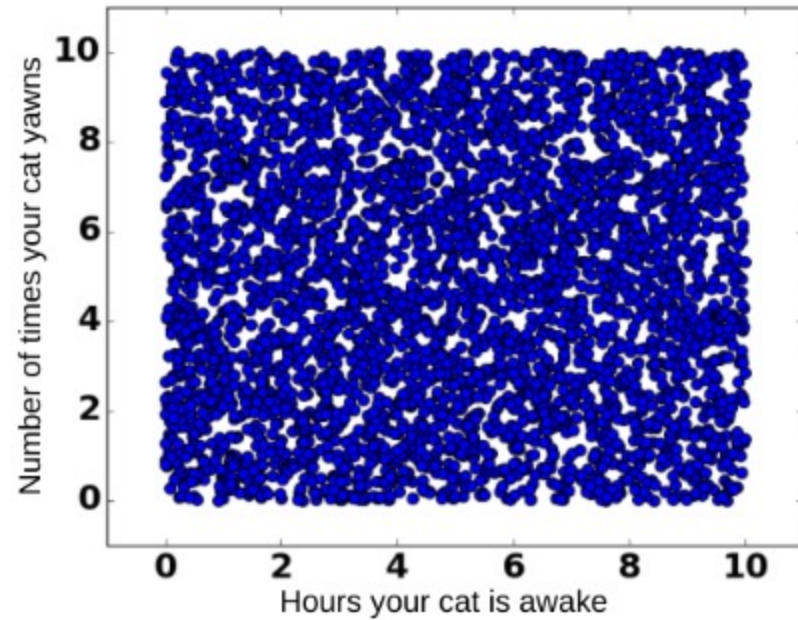
Visualizations: Line Charts
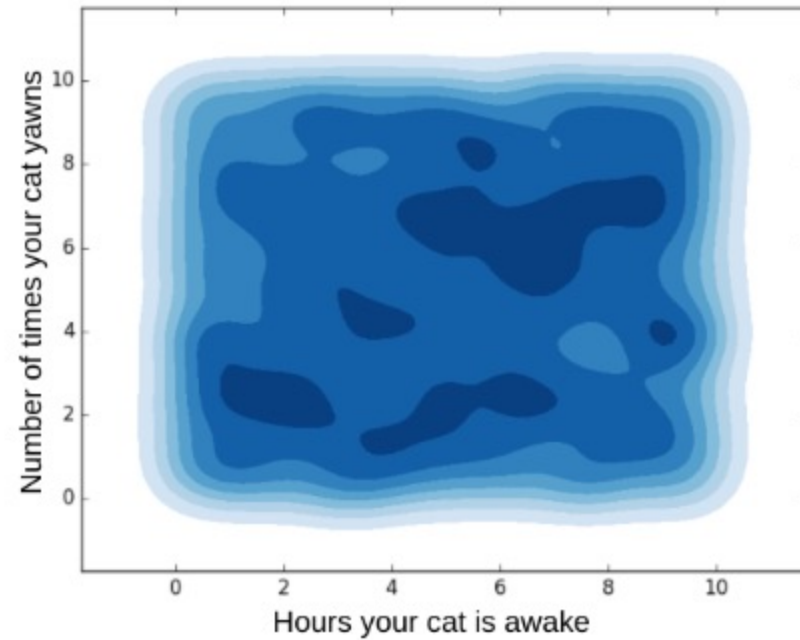
Visualizations: Line Charts

Visualizations: Scatter Plots

Visualizations: Scatter Plots

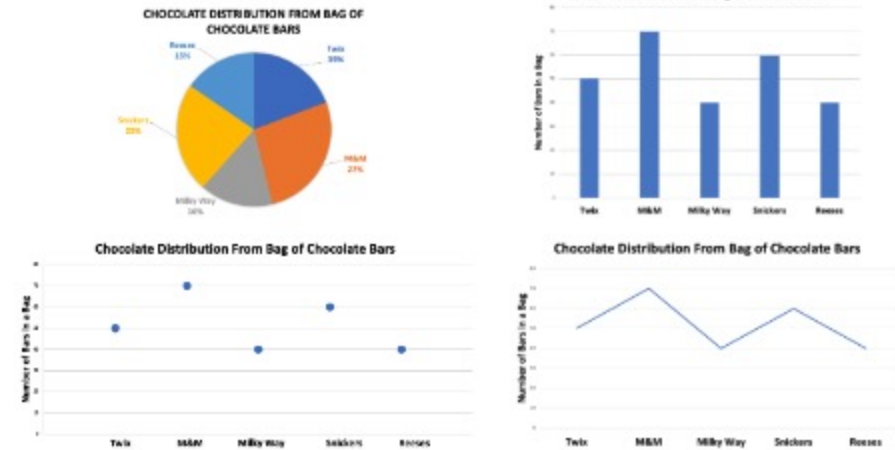# Visualizations: Heat Maps

Which Visualization is Best?

Which type of visualization do you think would best represent the data below?

- Line chart
- Bar chart
- Scatter Plot
- Line chart or bar chart with averages
- Heat map
- Pie Chart

Bag of Chocolate Bars (250 Count)	
Twix	50
M&M	70
Milky Way	40
Snickers	60
Reeses	40

Which Visualization is Best?

Which Visualization is Best?

Average monthly revenues for a small business

```
January: $15,000 | February: $17,500 | ...
```

Which Visualization is Best?

Times for running a program based on input length

```
6 digits: 1:34:07 | 6 digits: 1:26:55 | 7 digits: 2:13:47 | ...
```

Which Visualization is Best?

Total time taken to commute to work compared to departure time

8:00am: 15 mins | 8:01am: 17mins | 8:00am: 14 mins | ...

Which Visualization is Best?

Concentration of hardware stores by geographical location

```
(latitude, longitude) pairs
```

Which Visualization is Best?

Student poll responses to the question: "Do you live on or off campus?"

Visualizations

Matplotlib & seaborn

Your Turn!