Making a scatter plot

INTRODUCTION TO DATA SCIENCE IN PYTHON

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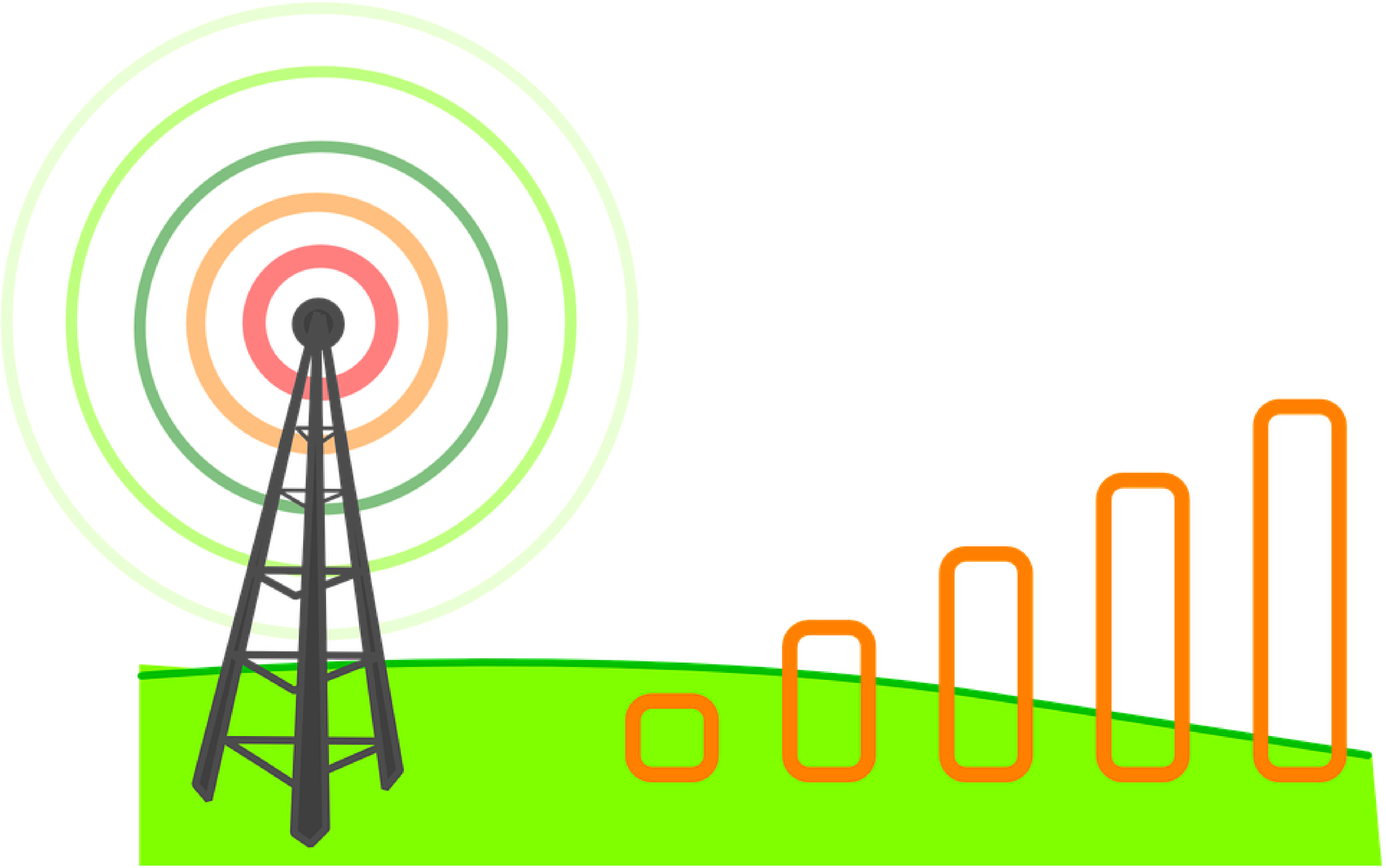
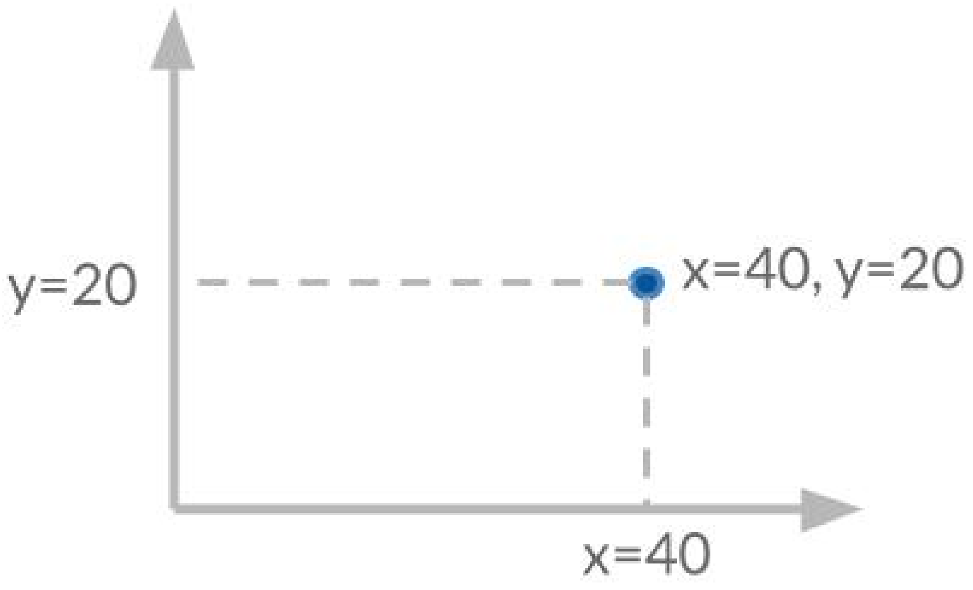
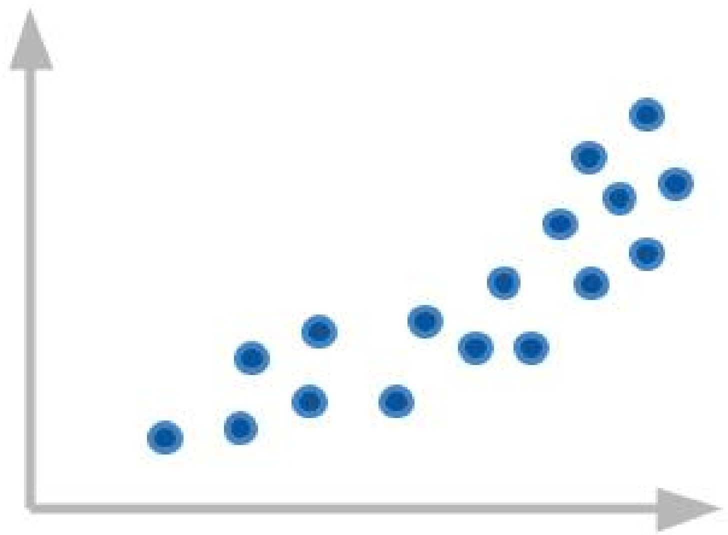
Mapping Cell Phone Signals

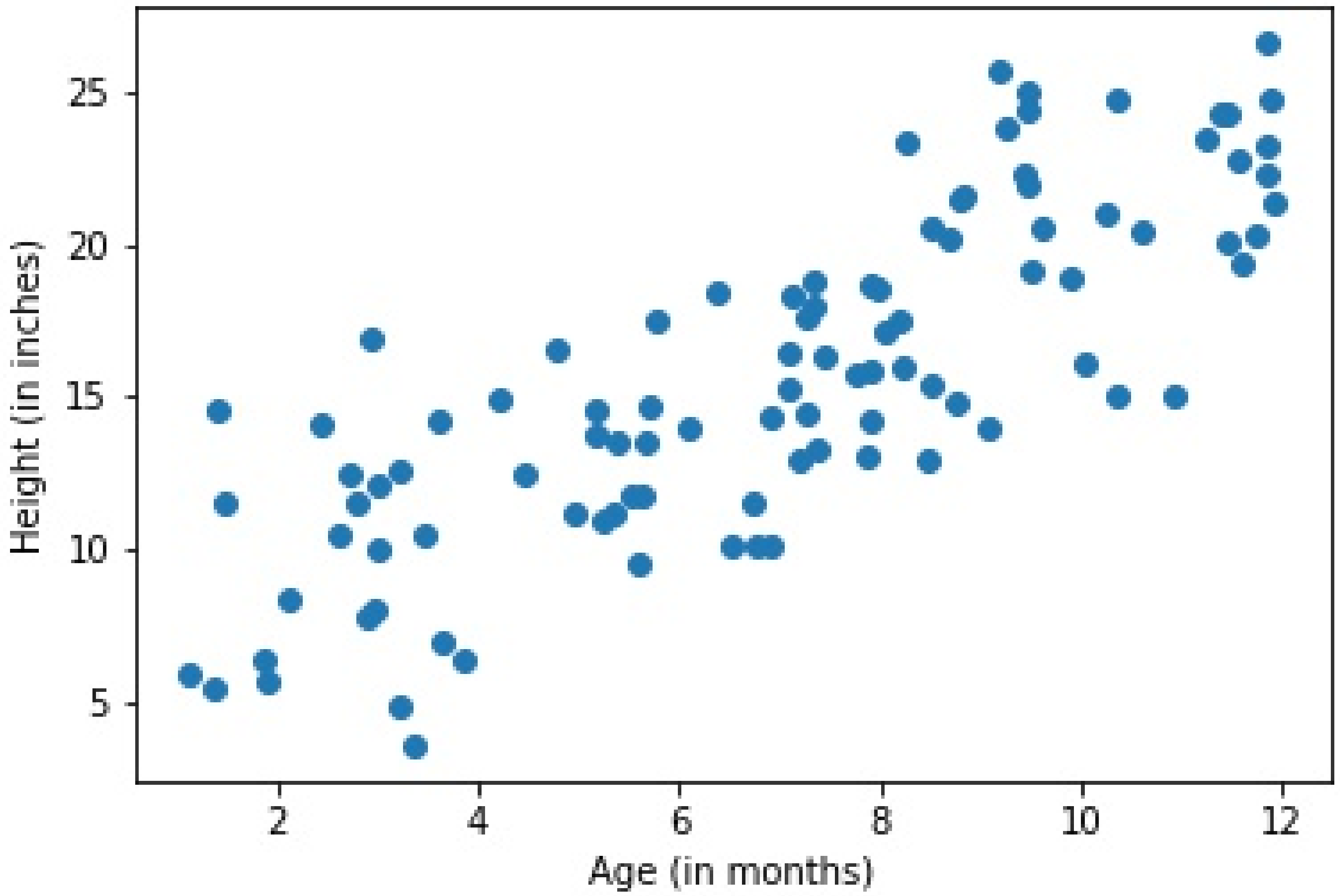


What is a scatter plot?





What is a scatter plot?

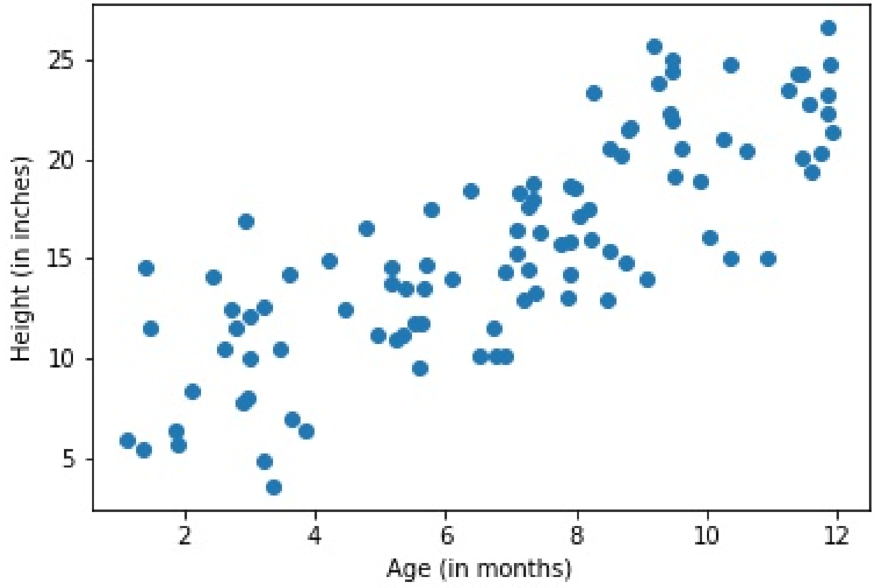


Creating a scatter plot

```
plt.scatter(df.age, df.height)
```

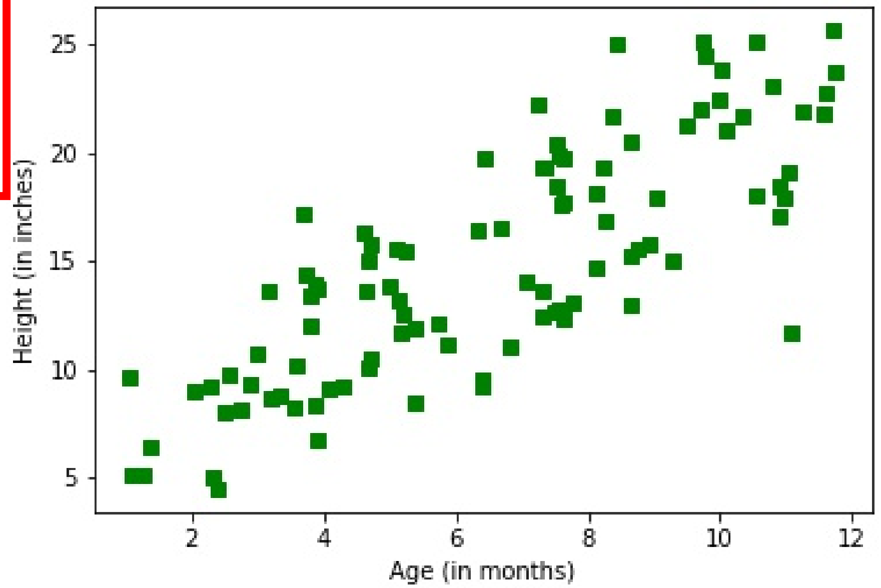
```
plt.xlabel('Age (in months)')
plt.ylabel('Height (in inches)')

plt.show()
```

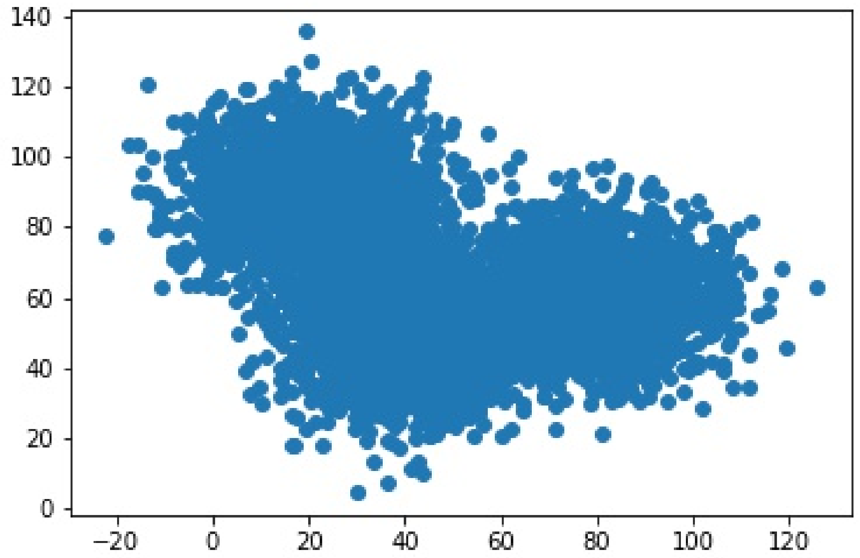


Keyword arguments

```
plt.scatter(df.age, df.height,
            color='green',
            marker='s')
```

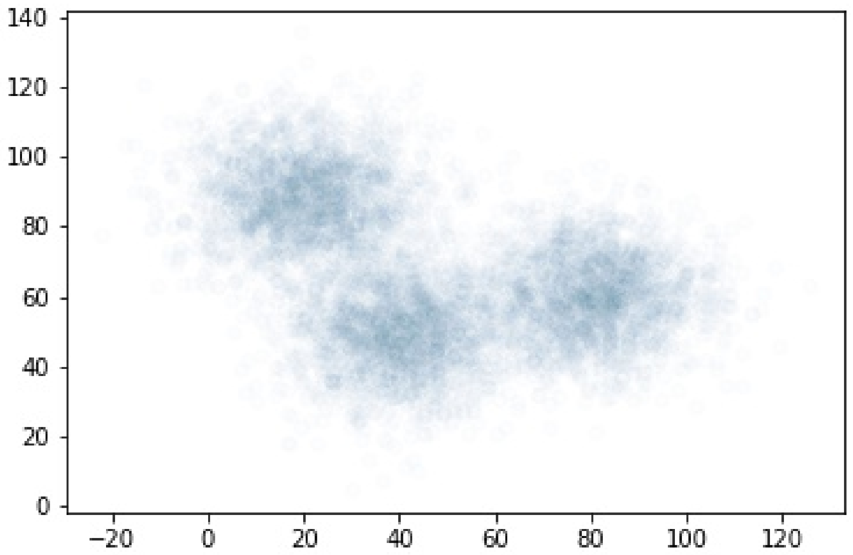


Changing marker transparency



```
plt.scatter(df.x_data,
            df.y_data,
            alpha=0.1)
```

changes the transparency of the scatterplot



Let's practice!

INTRODUCTION TO DATA SCIENCE IN PYTHON

Making a bar chart

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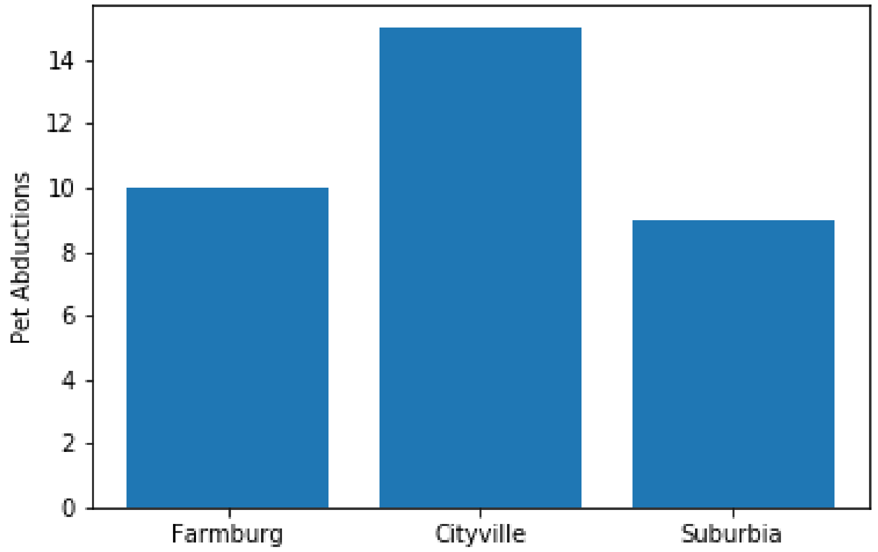
Comparing pet crimes

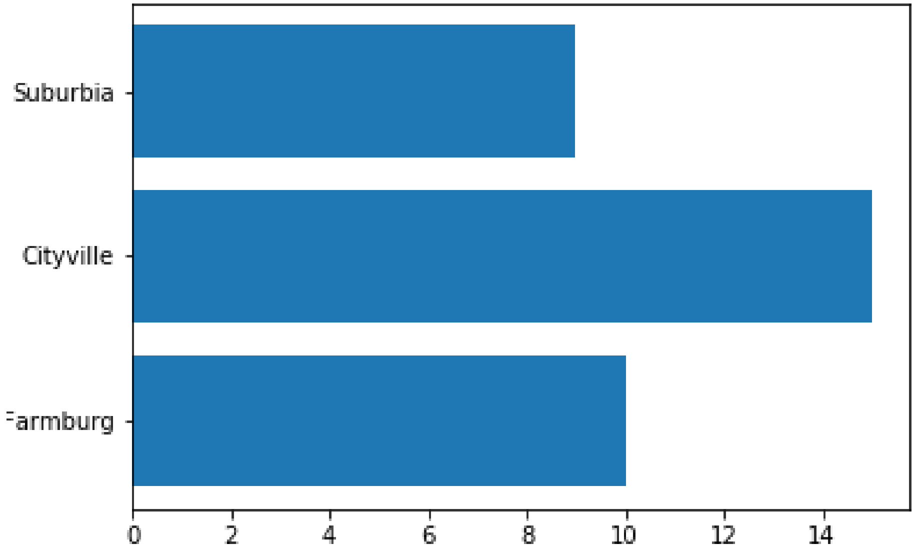
precinct	pets_abducted
Farmburg	10
Cityville	15
Suburbia	9

```
plt.bar(df.precinct,
        df.pets_abducted)

plt.ylabel('Pet Abductions')
plt.show()
```



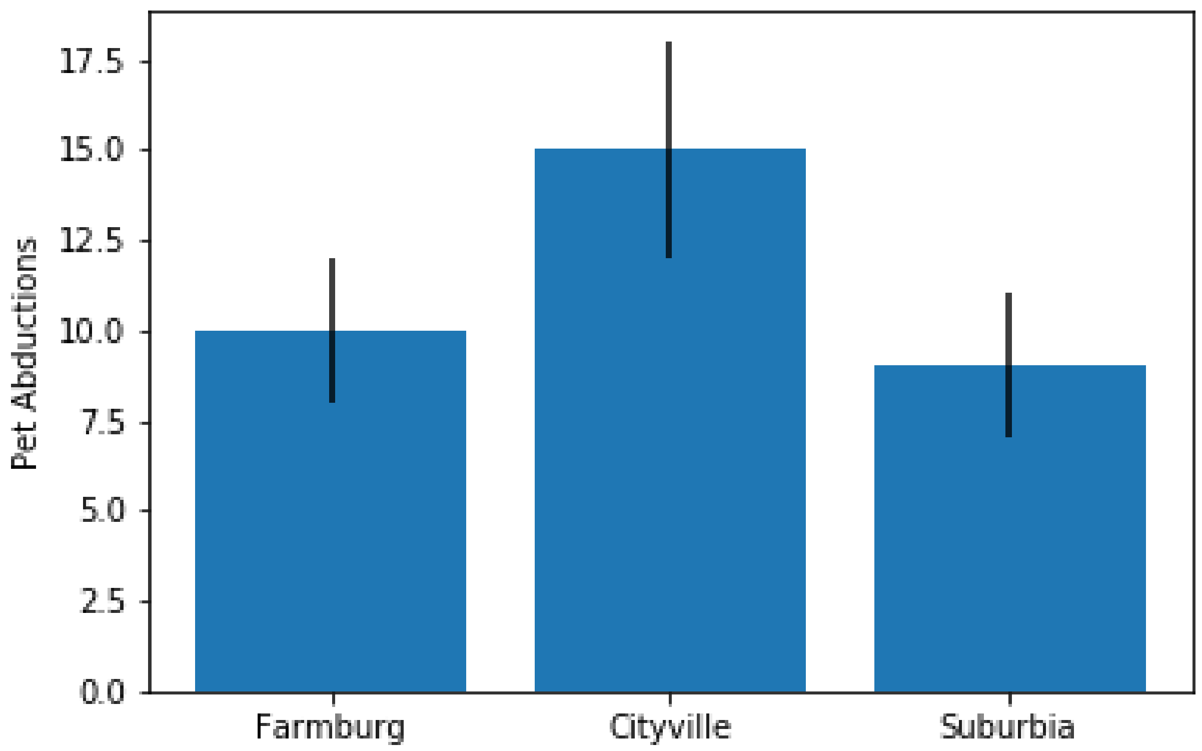
Horizontal bar charts

```
plt.barh(df.precinct,
         df.pets_abducted)

plt.ylabel('Pet Abductions')
plt.show()
```

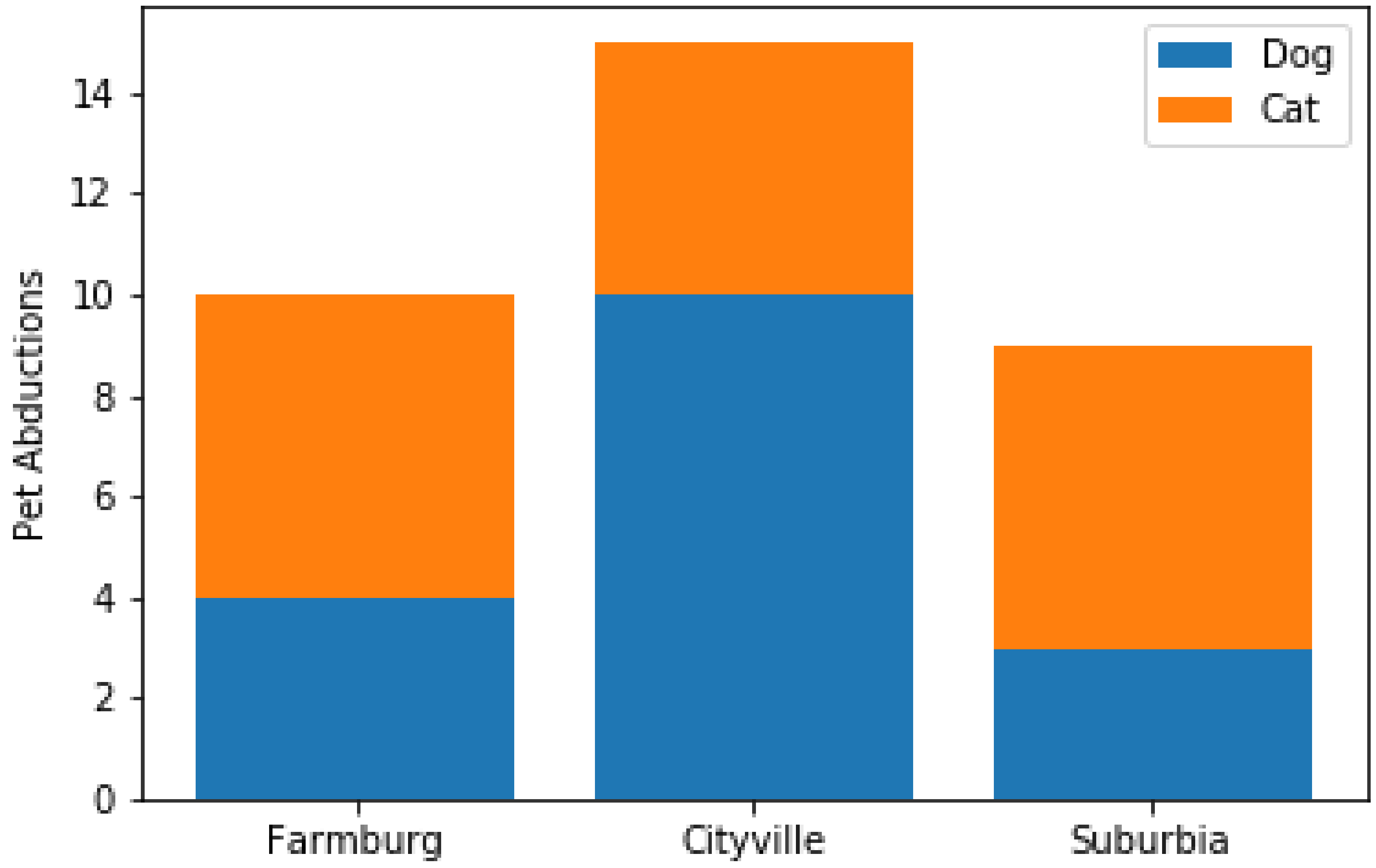


Adding error bars

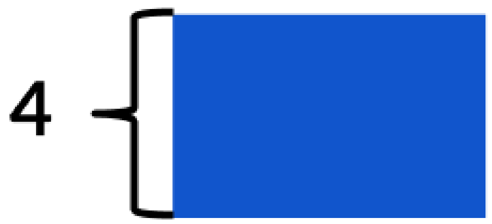
```
plt.bar(df.precinct, df.pet_abductions,
        yerr=df.error)

plt.ylabel('Pet Abductions')
plt.show()
```



Stacked bar charts

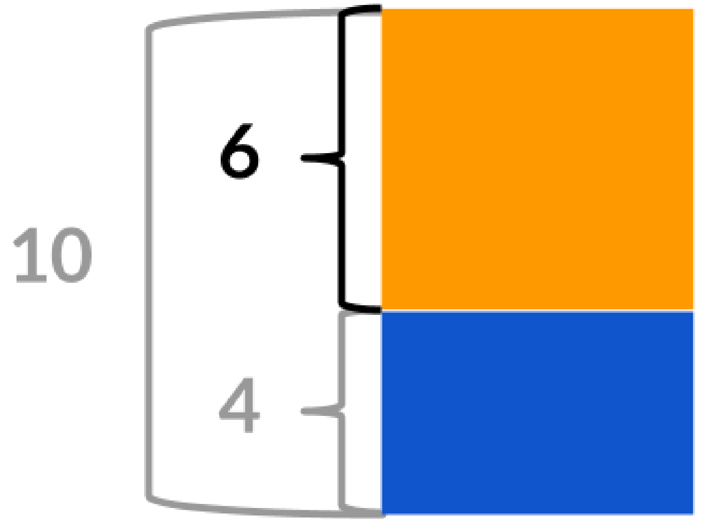


Stacked bar charts



```
plt.bar(df.precinct, df.dog)
```

Stacked bar charts

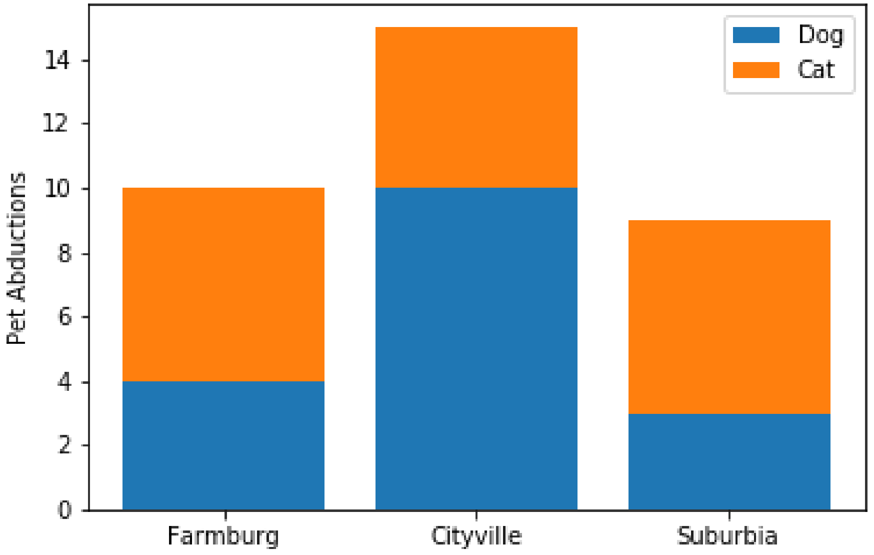


```
plt.bar(df.precinct, df.cat,
                     bottom=df.dog)
```

```
plt.bar(df.precinct, df.dog)
```

Stacked bar charts

```
plt.bar(df.precinct, df.dog,
        label='Dog')

plt.bar(df.precinct, df.cat,
        bottom=df.dog,
        label='Cat')

plt.legend()
plt.show()
```



Let's practice!

INTRODUCTION TO DATA SCIENCE IN PYTHON

Making a histogram

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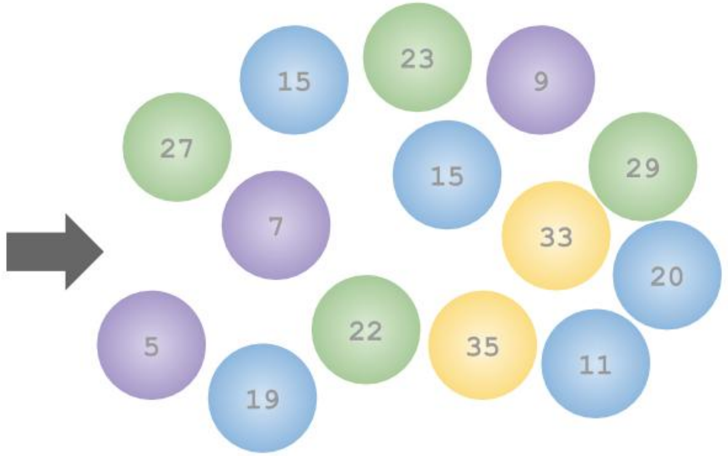
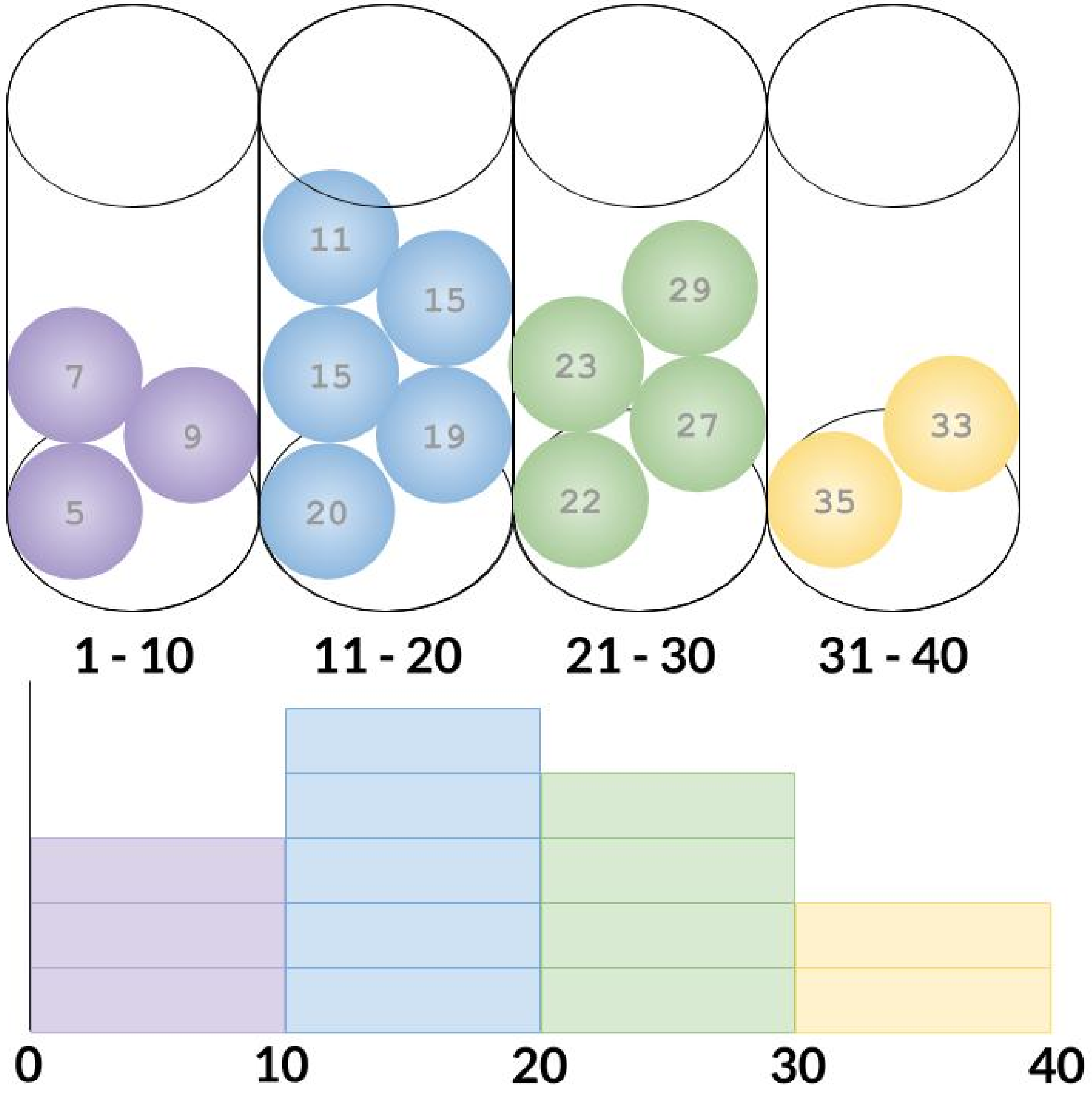
Tracking down the kidnapper

Gravel Radius (mm)
5
17
7
20
42
35
21
...

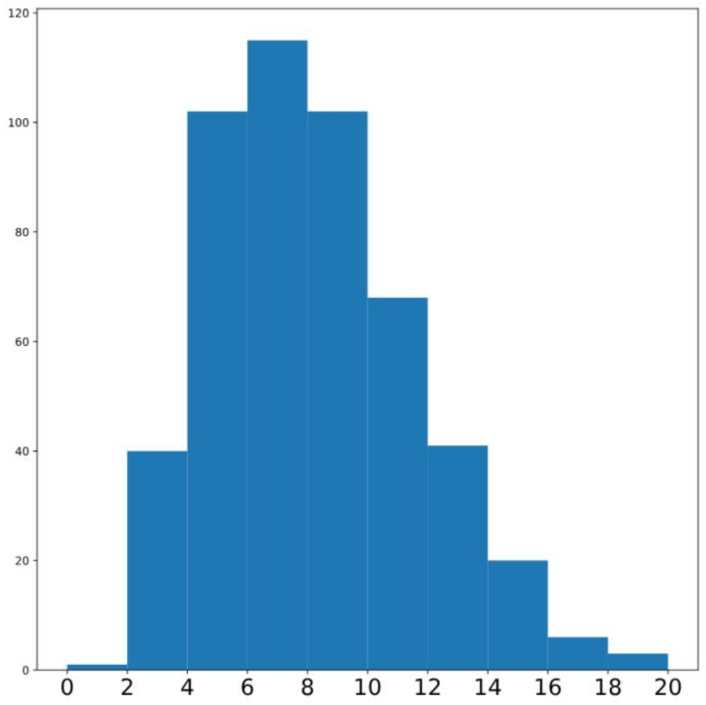


What is a histogram?



Histograms with matplotlib

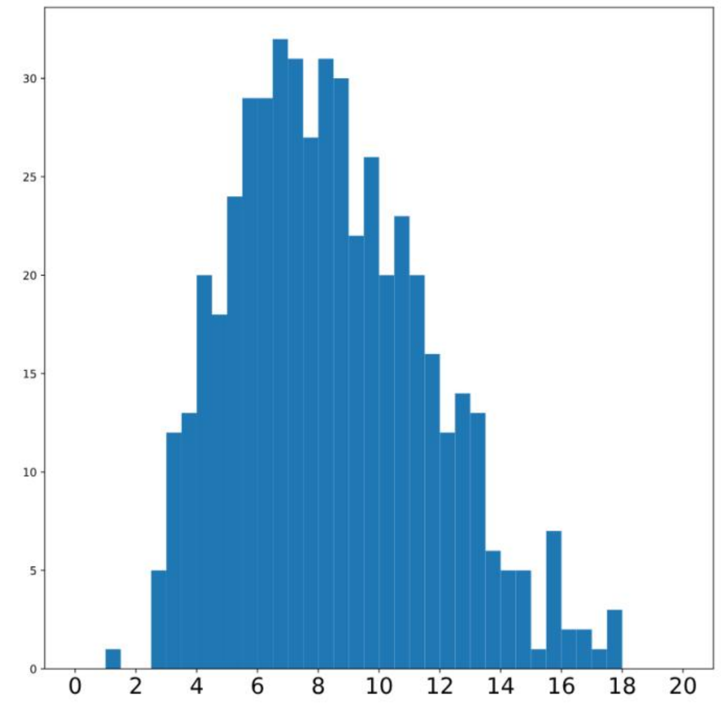
```
plt.hist(gravel.mass)


plt.show()
```



Changing bins

```
plt.hist(data, bins=nbins)
```

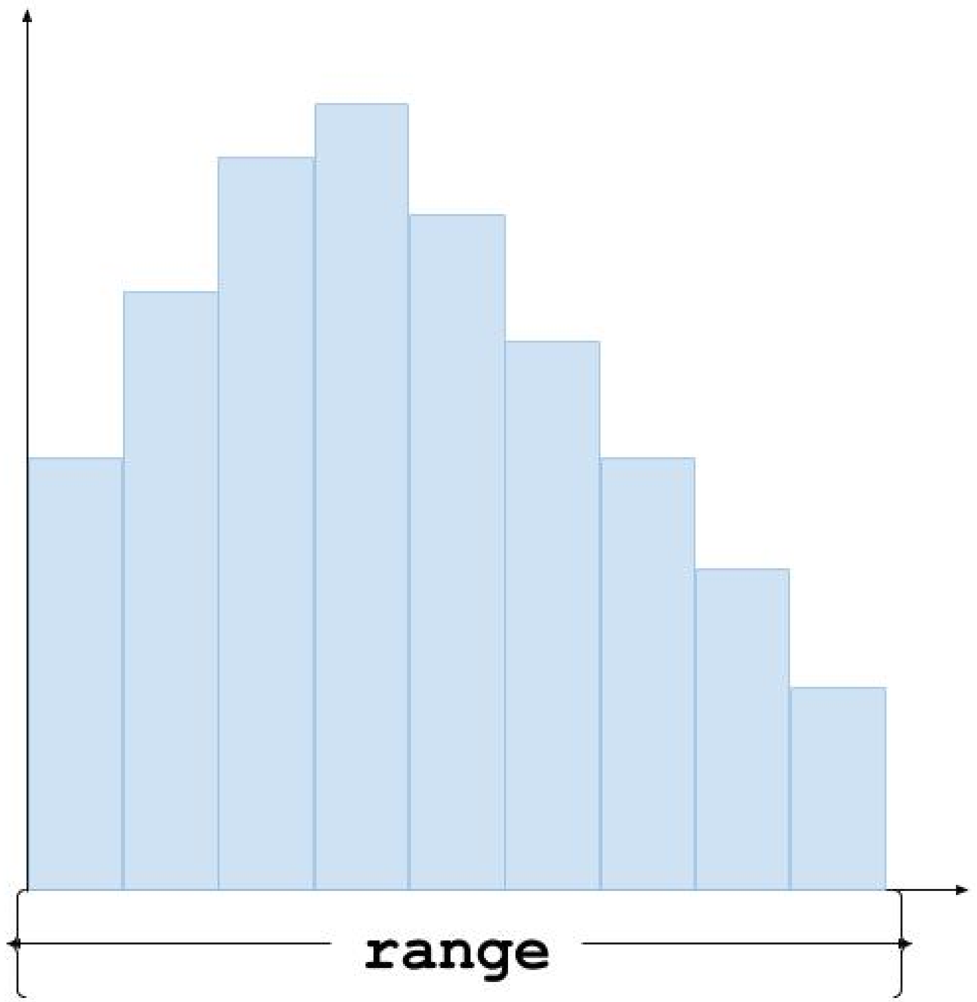
```
plt.hist(gravel.mass, bins=40)
```



Changing range

```
plt.hist(data,
         range=(xmin, xmax))
```

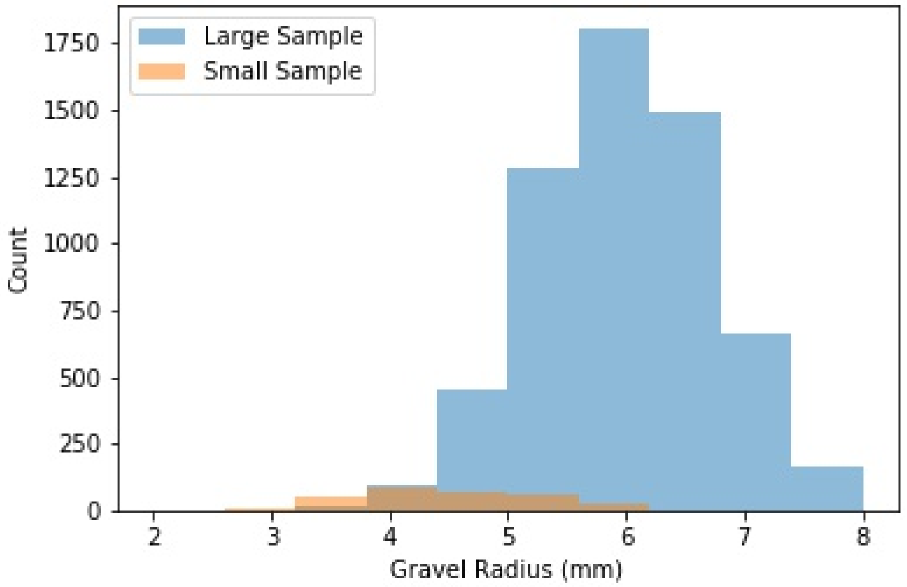
```
plt.hist(gravel.mass,
         range=(50, 100))
```



Normalizing

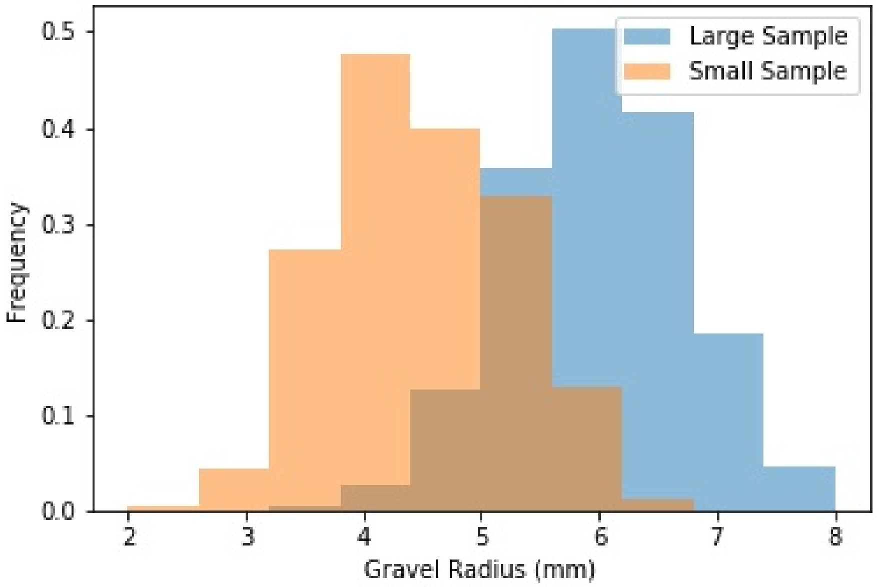
Unnormalized bar plot

```
plt.hist(male_weight)
plt.hist(female_weight)
```



Sum of bar area = 1

```
plt.hist(male_weight, density=True)
plt.hist(female_weight, density=True)
```



7. Normalizing

of male and female puppies. For some reason, we were able to collect many more samples of male puppy weights than female puppy weights. When we plot both histograms on the same axes, we can't actually see the difference in the distributions. In this case, we don't actually care about the absolute number of male puppies with a given weight. Instead, we care about what proportion of the dataset has that weight. We can solve this problem with normalization. Normalization reduces the height of each bar by a constant factor so that the sum of the areas of each bar adds to one. This would make our two histograms comparable, even if the sample sizes are different. We can normalize our histogram by using the keyword argument density equals True. Now each bar represents a proportion of the entire dataset. If a bar from the male puppies has the same height as a bar from the female puppies, both bars represent the same proportion of each population.

Let's practice!

INTRODUCTION TO DATA SCIENCE IN PYTHON

Recap of the rescue

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You did it!

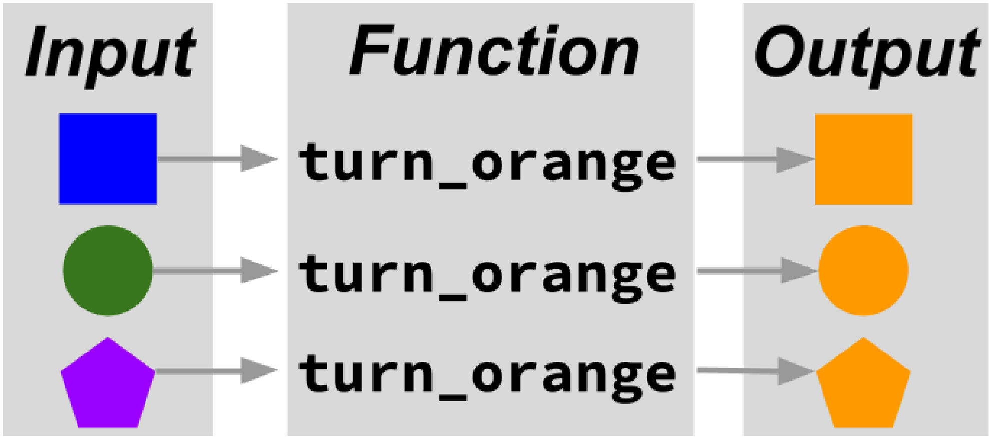
Modules and variables

- Modules group functions together
- Add a module using `import`
- `import` happens at the beginning of a script file
- Variables store data: strings or floats

```python
import pandas as pd
import numpy as np
```

Using functions

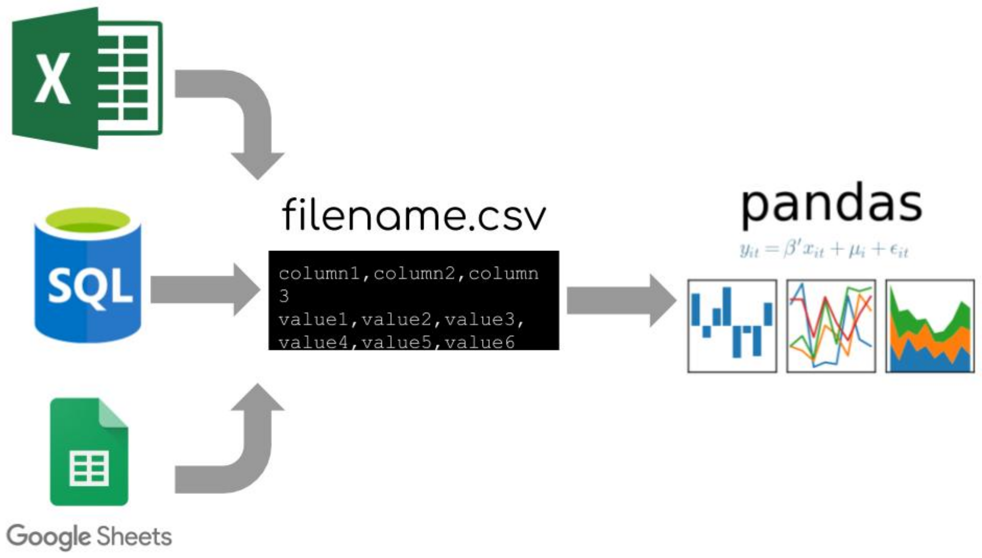
- Perform a task
- Positional arguments
- Keyword arguments



Working with tabular data

- `import pandas as pd`
- DataFrames store tabular data
- Inspect data using `.head()` or `.info()`
- Select rows using logic

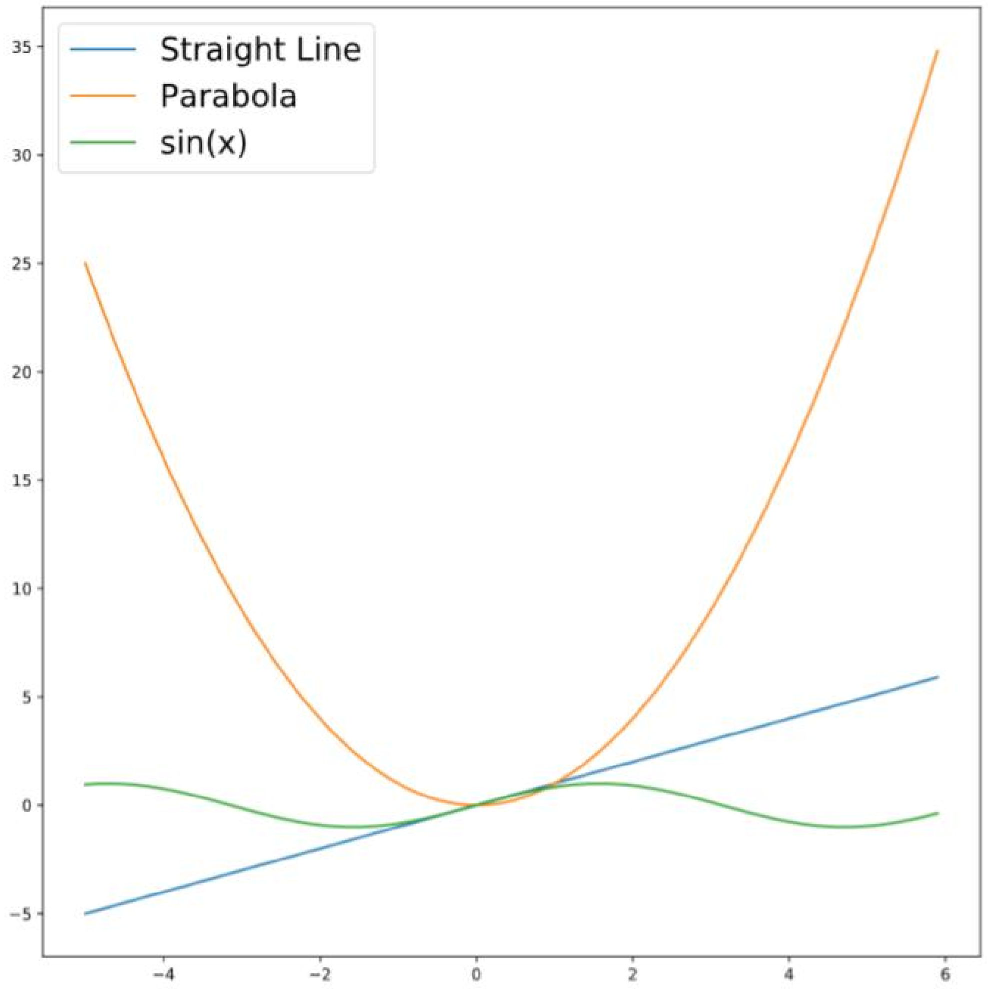
```
credit_reports[
    credit_report.suspect ==
    'Freddy Frequentist']
```



```
column1,column2,column
3
value1,value2,value3,
value4,value5,value6
```

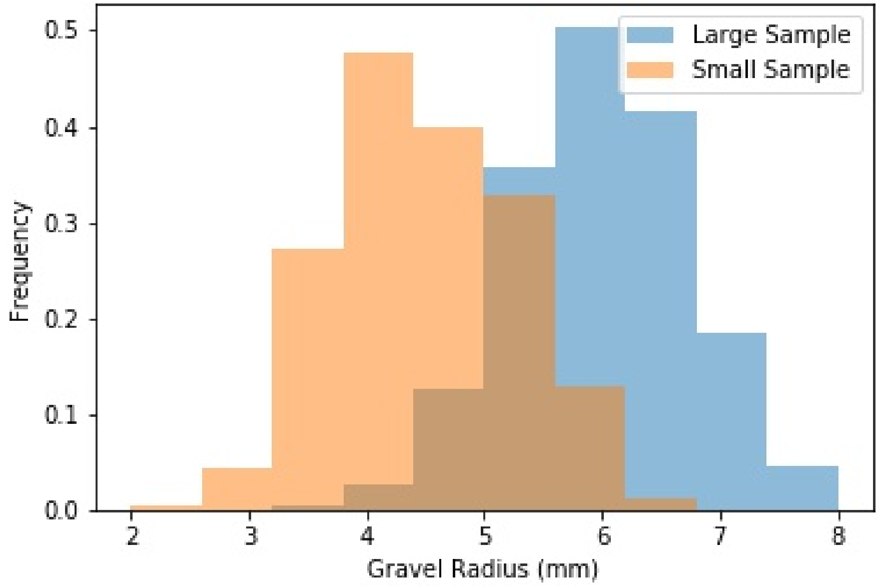
Creating line plots

- `from matplotlib import pyplot as plt`
- Use `plt.plot()` to create a line plot
- Modify line plots with keyword arguments
- Add labels and legends



More plot types

- `plt.scatter()` shows individual data points
- `plt.bar()` creates bar charts
- `plt.hist()` visualizes distributions



Great job!

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