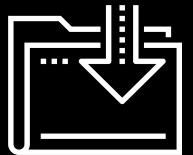




Data Boot Camp  
Lesson 5.1



# The Big Picture





## **Bootcamp Pointer:**

Using documentation to solve problems should become second nature to you!

**Don't stop practicing!**

## Module 5

# This Week: Matplotlib

# This Week: Matplotlib

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By the end of this week, you'll know how to:



Create line, bar, scatter, bubble, pie, and box-and-whisker plots using Matplotlib



Add and modify features of Matplotlib charts



Add error bars to line and bar charts



Determine mean, median, and mode using Pandas, NumPy, and SciPy statistics



## This Week's Challenge

Create a summary DataFrame of ride-sharing data by city type and a multiple-line graph showing weekly fares for each city type.



## **Career Connection**

How will you use this module's content in your career?

## Module 5

# How to Succeed This Week





## **Quick Tip for Success:**

As we go through different plotting tools, remember to treat these challenging weeks as learning opportunities.

## Module 5

# Today's Agenda

# Today's Agenda

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By completing today's activities, you'll learn the following skills:

01

Create line, bar, pie, and scatter charts

02

Add and modify chart features

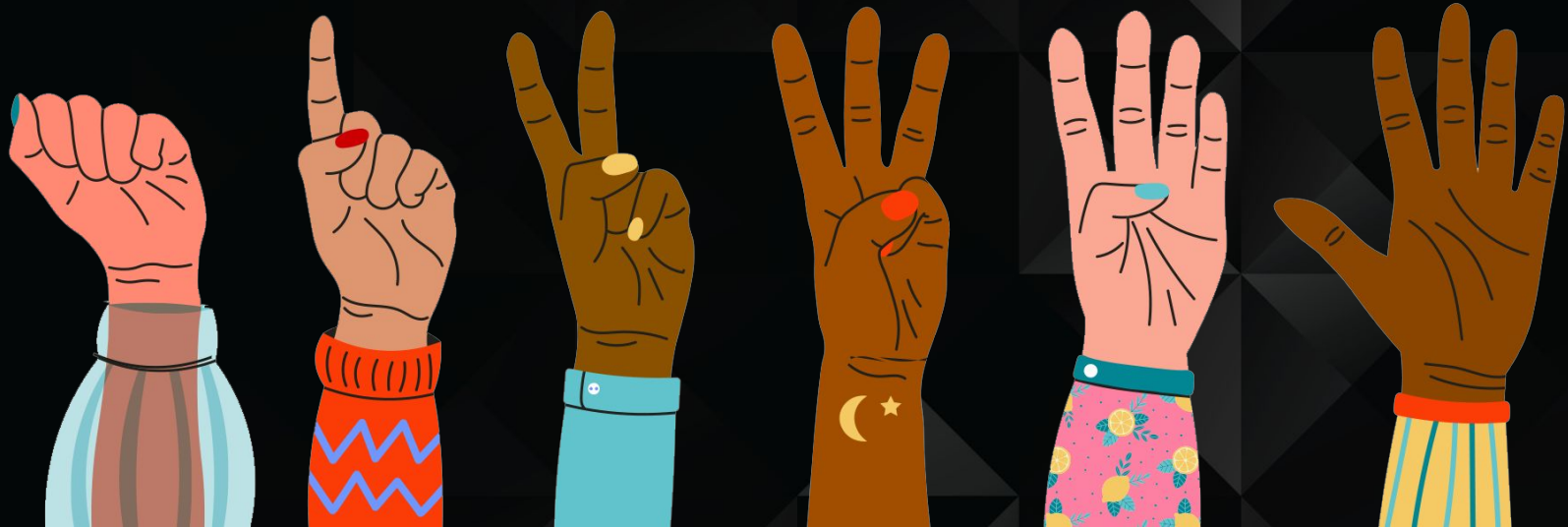


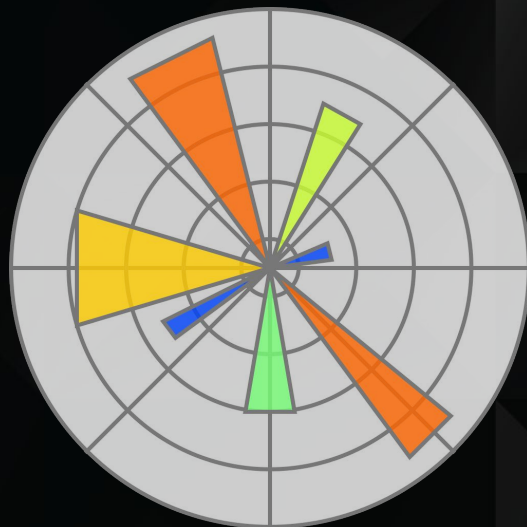
**Make sure you've downloaded  
any relevant class files!**

## FIST TO FIVE:

---

How comfortable do you feel with this topic?





# What Is Matplotlib?

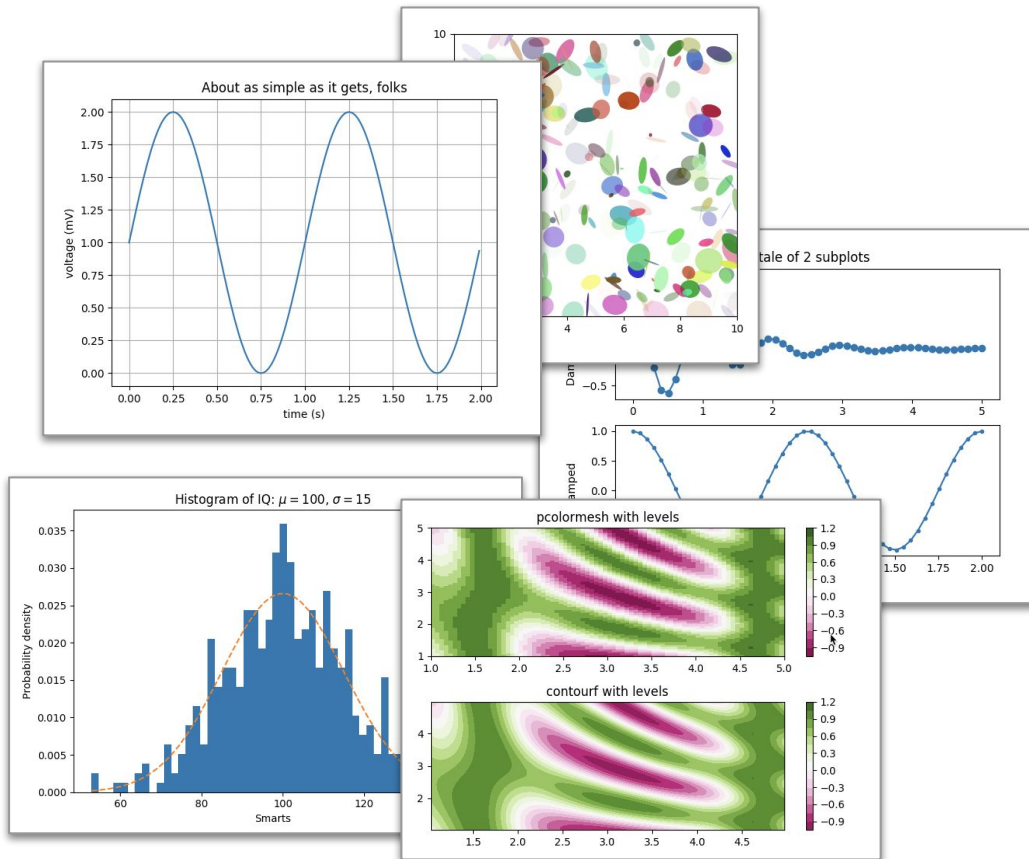
# Matplotlib: A Python Library that Visualizes a Dataset

## Types of datasets include:

- Pandas DataFrames
- Lists, tuples, and dictionaries
- NumPy arrays

## Types of visualisations include:

- Bar charts
- Pie charts
- Line charts
- Scatter plots
- And more!



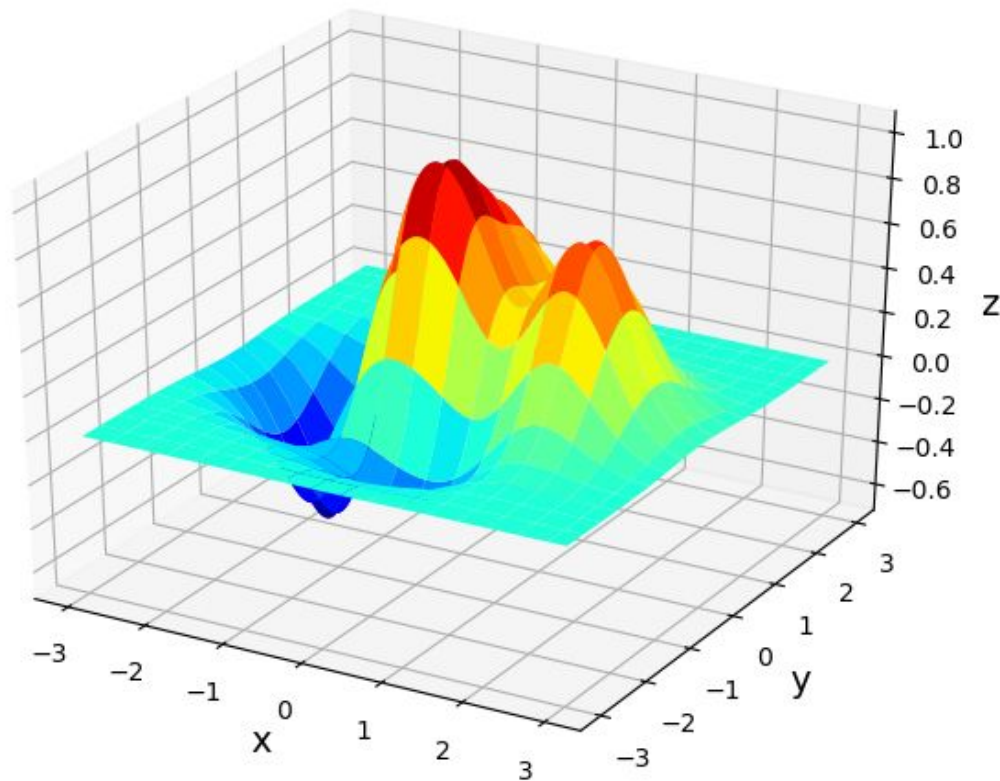
# The Pyplot Module = The Heart of Matplotlib

---

- Accepts many forms of input values
- Enables custom colours, shapes, labels, etc.
- Does most of the plotting logistics for us; we simply tell it which plot to make



Trust us: you'll love it!



# General Plotting Process Using Pyplot

---

01

## Create your dataset.

Data can be generated from functions, pulled from Pandas DataFrames, etc.

02

## Generate your plot.

Use the `pyplot.plot()` function to tell Matplotlib what data to use and which plot to make.

03

## Customize your plot.

Change the axes, label the figures, color the data points—make the plot as informative to the reader as possible.





# Instructor Demonstration

## Different Plots

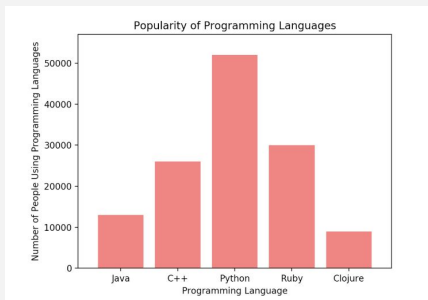
# Questions?



# Matplotlib: Not Just for Line Plots!

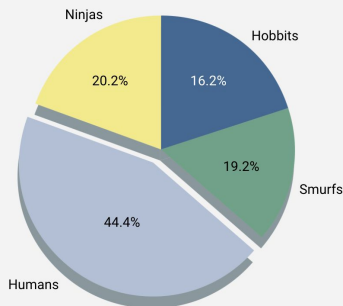
## Bar Charts

Useful for comparing different entities with one another



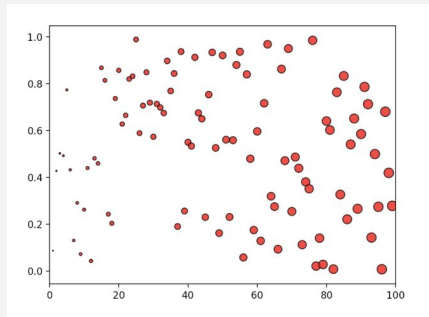
## Pie Charts

Useful for demonstrating different elements of a complete dataset



## Scatter Plots

Useful for displaying where values fall with respect to two factors





It's **very** important to  
choose the right plot  
for a given dataset!



# Instructor Demonstration

## Bar Charts

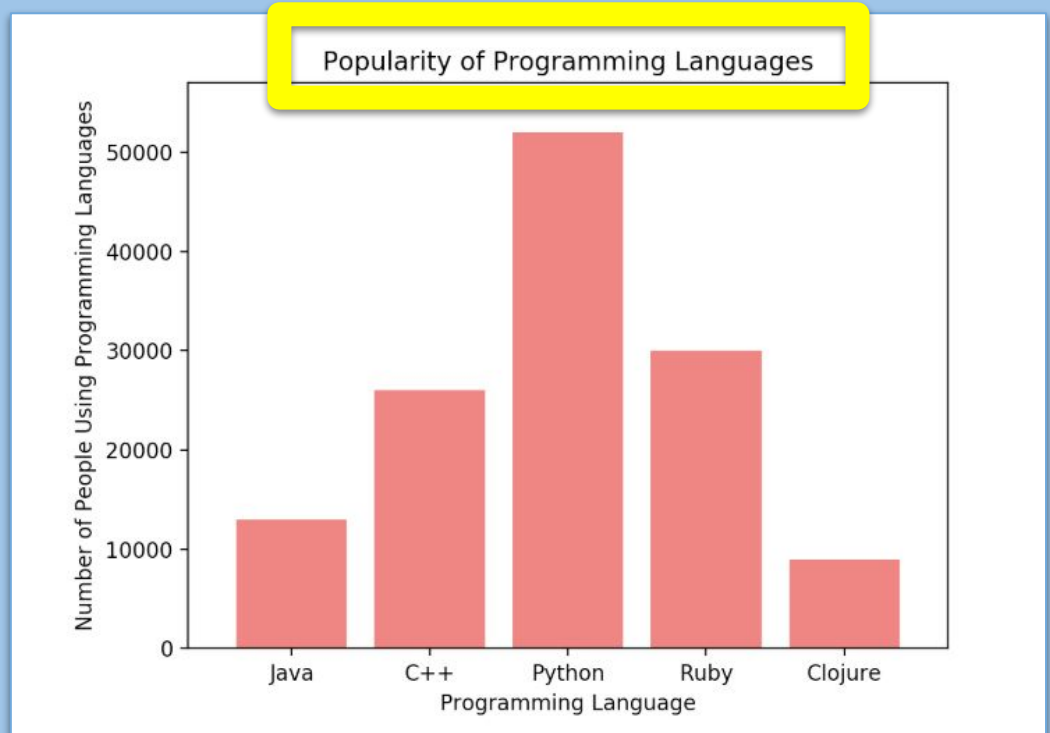
# Bar Charts Help to Visualize Univariate Data

**Univariate data** refers to data with one variable, or one type of measurement.

Examples:

- Amount of rainfall, in millimetres
- Number of votes in a poll
- Number of people per category

Bar charts are particularly useful when a single variable is being counted multiple times.



## Bar charts are **NOT** effective for visualizing bivariate data.

- Bivariate data refers to data with **two** variables. Anything you can plot as a line or scatter plot is bivariate data.
- Example: A dataset comparing the number of ice cream bars sold versus daily temperature.

Think of other examples where a **bar chart** would be effective.







## Activity: Bars Bar Chart

In this activity, you will create a bar chart that visualizes the density of bars within major US cities.

**Suggested Time:**  
10 minutes



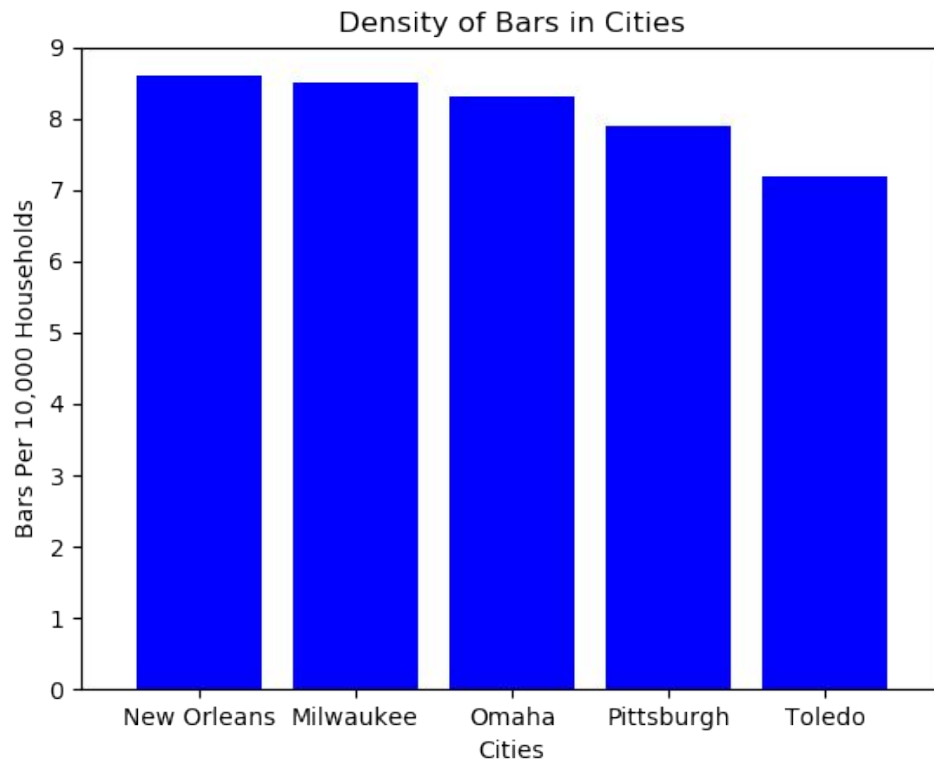
# Bars Bar Chart Instructions

---

Using the starter code provided in your folders, recreate the figure as shown:

File:

`Unsolved/pyBars.ipynb`





**Let's Review**



# Instructor Demonstration

## Pie Charts

# Pie Charts Help Visualize Simple Categorical Data

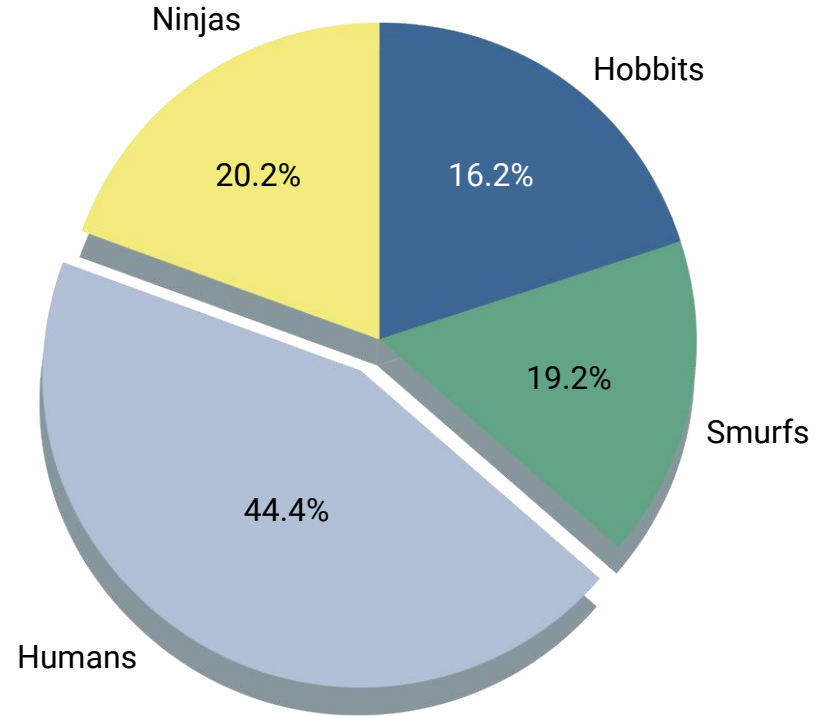
Pie charts are great for visualising data that is percentages or proportions.

## Examples:

- Proportions of Democrat versus Republican versus independent voters
- Percentages of children's favorite story characters
- Distribution of left-handed versus right-handed pitchers in baseball




Fewer categories increase the effectiveness of a pie chart.





Pie charts are NOT effective for large or multivariate datasets.

- With more than ~10 categories, pie charts become too crowded and lose effectiveness.
  - Like bar charts, pie charts are only effective for visualizing univariate data.
  - When in doubt, just use a bar chart.
- 

Think of other  
examples where a  
**pie chart** would  
be effective.





## Activity: Pies Pie Chart

In this activity, you will create a pie chart that visualizes the favorite pies of people in US.

**Suggested Time:**  
10 Minutes



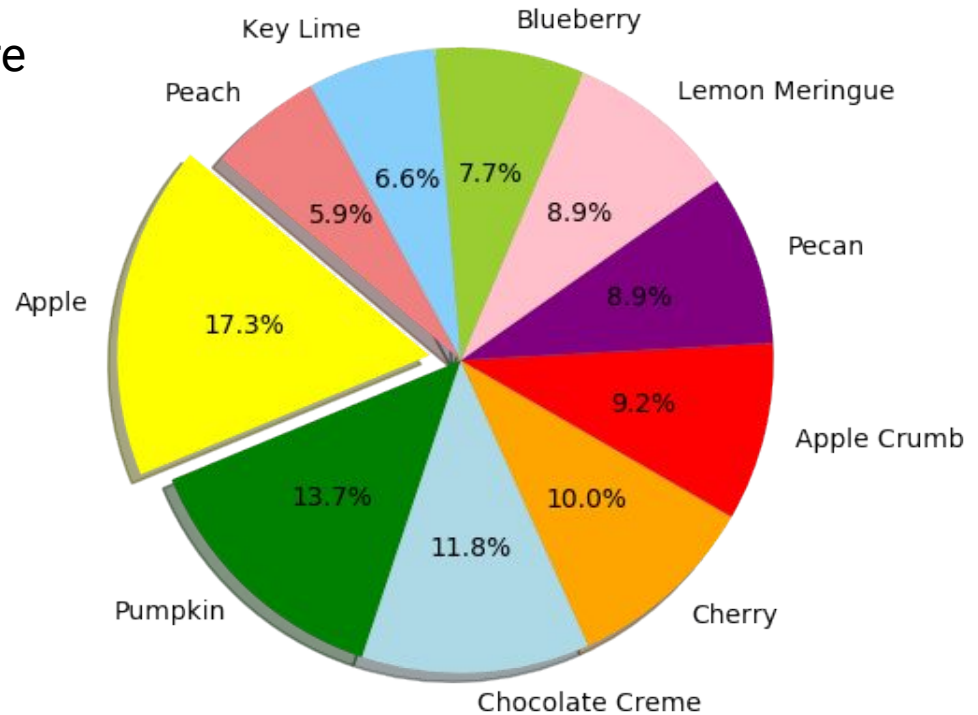


# Pies Pie Chart Instructions

---

Using the provided starter code in your folders, recreate the figure as shown.

File: `iUnsolved/py_pie.ipynbi`





**Let's Review**



# Instructor Demonstration

## Scatter Plots

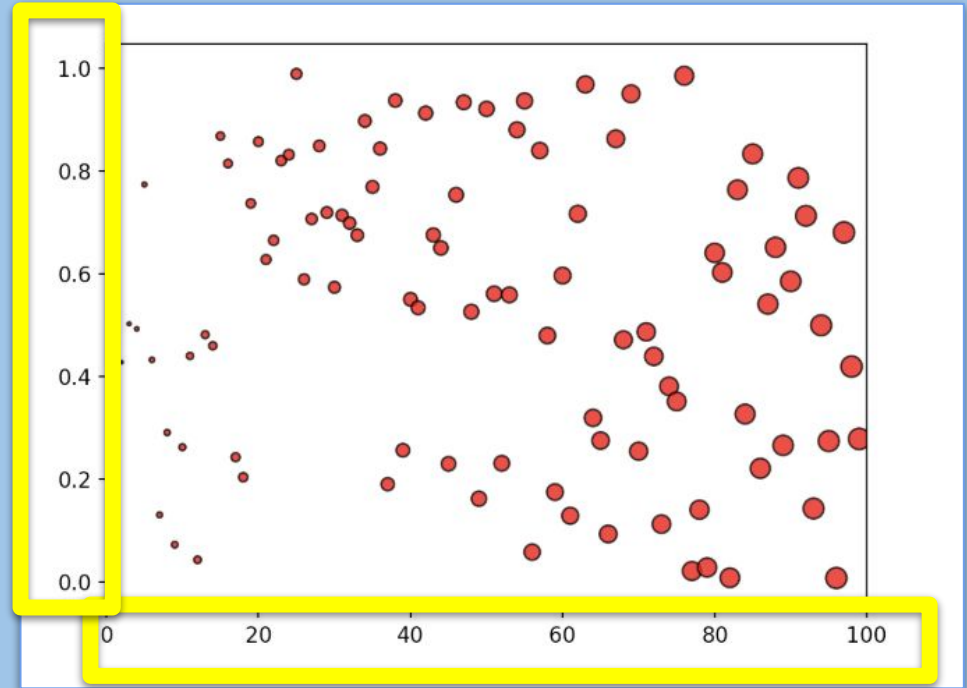
# Scatter Plots = Powerful Visualisations for Bivariate Data

**Bivariate data** refers to data with two variables.

- Each data point is a combination of two variables
- Anything plotted on an x- and y-axis is bivariate data
- Example: The amount of ice cream sold per daily temperature
- Scatter plots are helpful for visualising large datasets (i.e., thousands of data points).



Scatter plots are frequently used to visualise clustering in a dataset.



## Scatter plots are NOT effective for continuous measurements.

- When data is continuous, we'll often want to interpolate between measurements.
  - The most common continuous data is time-series data.
- Scatter plots visualize “scattered” data, so interpolation is almost impossible.
- Line plots allow the audience to read between the data points.

Think of other  
examples where a  
**scatter plot** would  
be effective.





## Activity: Scatter Py

In this activity, you will create a scatter plot that visualizes the relationship between ice cream sales and the increase in temperature.

**Suggested Time:**  
10 Minutes



# Scatter Py Instructions

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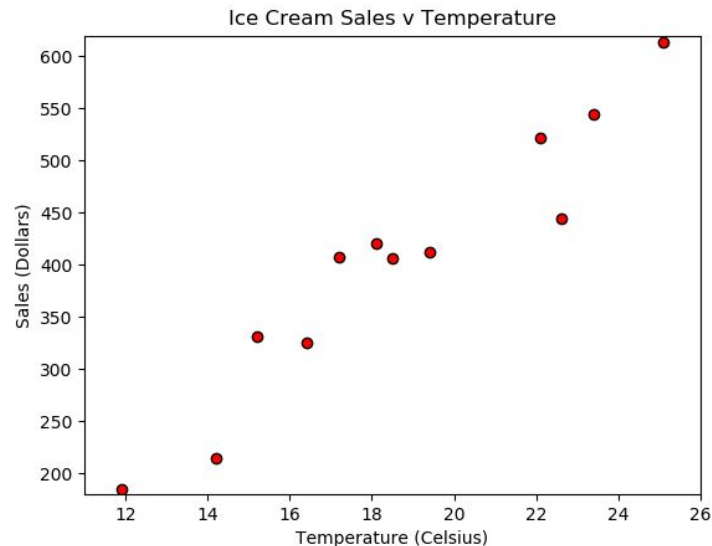
Using the provided starter code in your folders, recreate the figure as shown.

File:

```
iUnsolved/ice_cream_sales.ipynb
```

## Bonus

Create a new list called `scoop_price`, fill it with values, and then set it so that the size of the dots are set according to those values.







**Let's Review**

# Questions?

