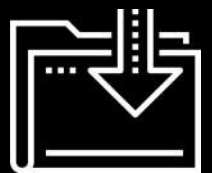# Egad! It's Excel

Data Boot Camp

Lesson 1.2

A Few Admin Things

Class Repository and Zoom Video Feed

Class Git Repository

Classroom content,
homework assignments

Class Videos

Automatically uploaded,
on-demand videos

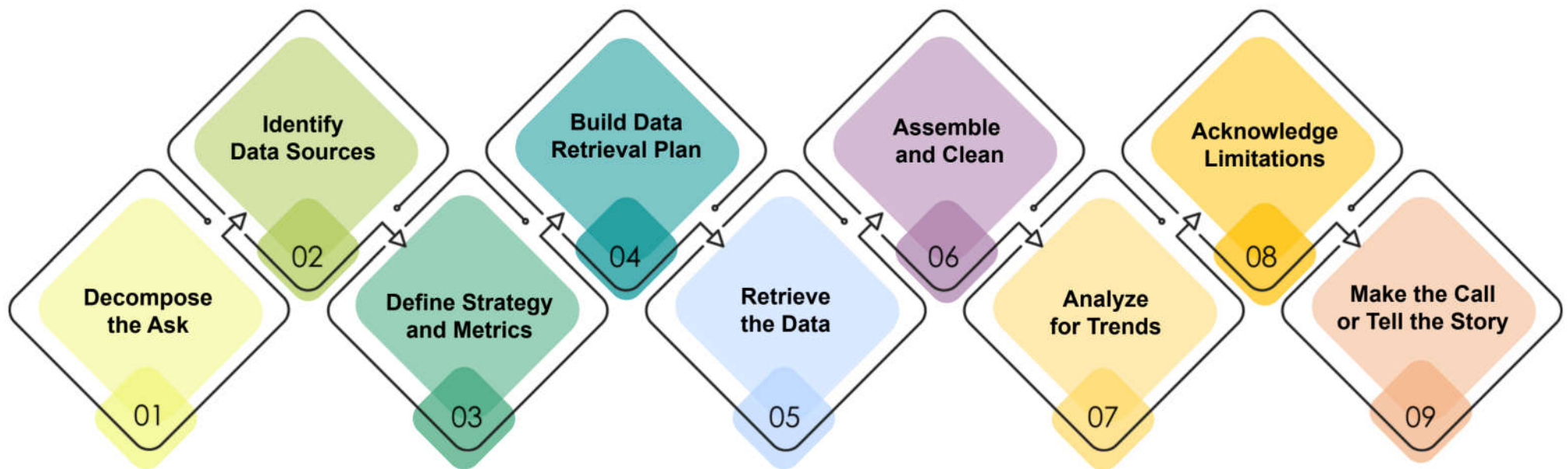# Quick Refresher

Data analytics is about what two things?

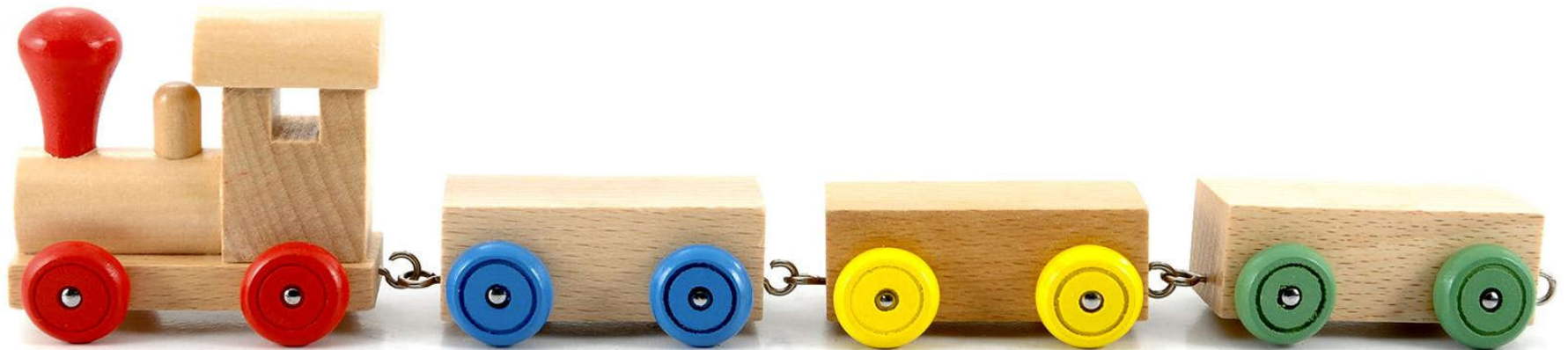**A** Fundamentally, data analytics is about **storytelling** and **truth-telling.**

What are the steps in the analytics paradigm?

Analytics Paradigm

This paradigm provides a general and repeatable pathway for effective data problem-solving.

Let's Start with the Basics

Instructor Demonstration

Excel Playground

Excited to get started?!

Formulas

Ooh...Coding! (Sort Of)

Excel has introduced you to a sort of proto-programming. When you write scripts, you will rely on `functions` (methods) that work on or with `arguments`.

$$= \quad SUM(\quad 1, 2, 3 \quad)$$

Function   **Arguments**   **Function**

Ooh...Coding! (Sort Of)

When we reference a range or a set of ranges, Excel is given a set of `variable` inputs. Excel will determine the actual values of these inputs prior to executing the function.

=	AVG(	F4:F6	)
	Function	**Variable Arguments**	**Function**

Ooh...Coding! (Sort Of)

What about this example?
Which is the function?
Which are the arguments?

```
= SUM( AVG(F4:F6), AVG(G4:G6) )
```

Ooh…Coding! (Sort Of)

Q **What about this example?**
Which is the function?
Which are the arguments?

A The **AVG functions** take the provided ranges as their arguments.

```
= SUM( AVG(F4:F6), AVG(G4:G6) )
```

Ooh…Coding! (Sort Of)

Q **What about this example?**
Which is the function?
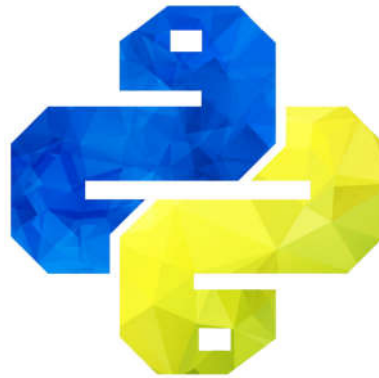Which are the arguments?

A This is a **nested function**. We'll be doing plenty of complex nests in this class.

```
= SUM( AVG(F4:F6), AVG(G4:G6) )
```

You Can Code Too!

Here's a Python snippet from the previous class.

```
requests.get(target_url_italian, headers=headers).json()
requests.get(target_url_mexican, headers=headers).json()
```

You Can Code Too!

Syntax and capabilities may differ across technologies and platforms, but fundamental concepts remain the same.

Function   **Arguments**

```
requests.   get   (target_url_italian, headers=headers)   .json   ()
requests.   get   (target_url_mexican, headers=headers)   .json   ()
```

Another Function
(Chained)
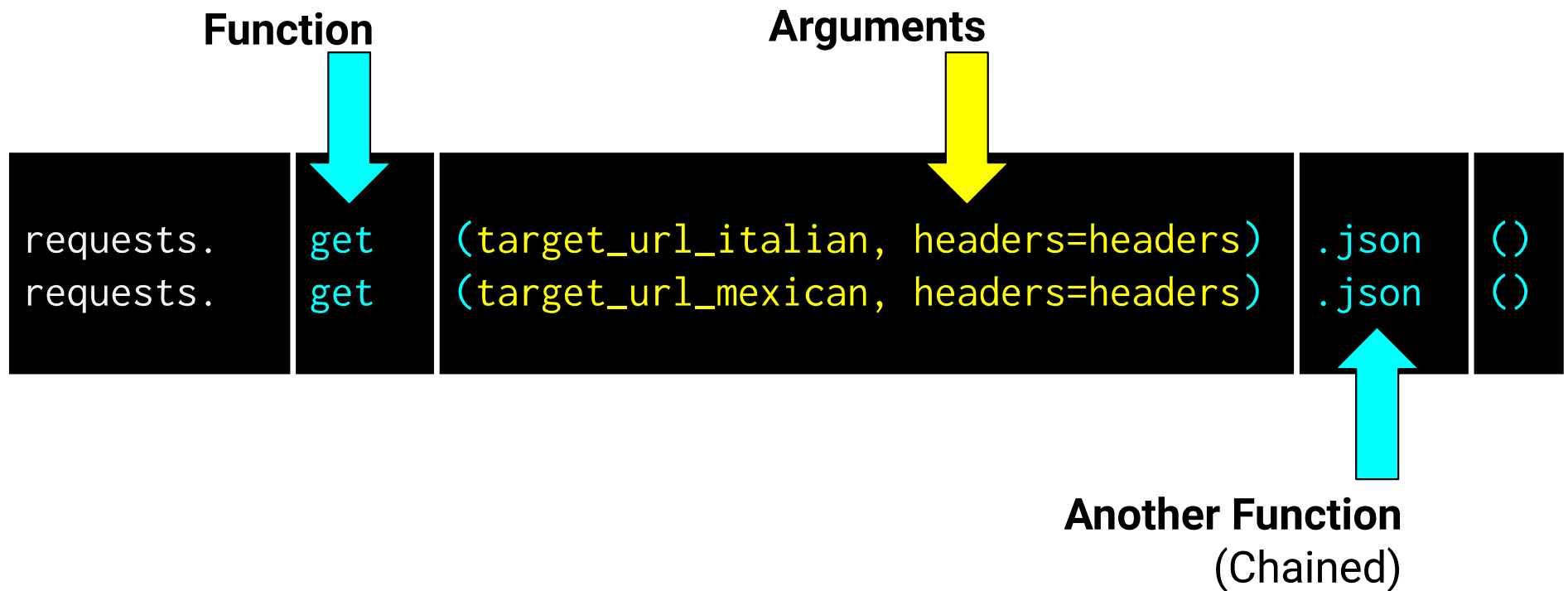
Time to <code>

Excel Playground

Instructor Demonstration

Named Ranges

There are multiple ways to select data in a formula

Most of us learned to select a range of cells to input in a function.

$$=AVG(A1:A10)$$

There are multiple ways to select data in a formula

But we can also name a range of values to make interpreting formulas easier!

`=AVG(A1:A10)` ➡️ `=AVG(prices)`

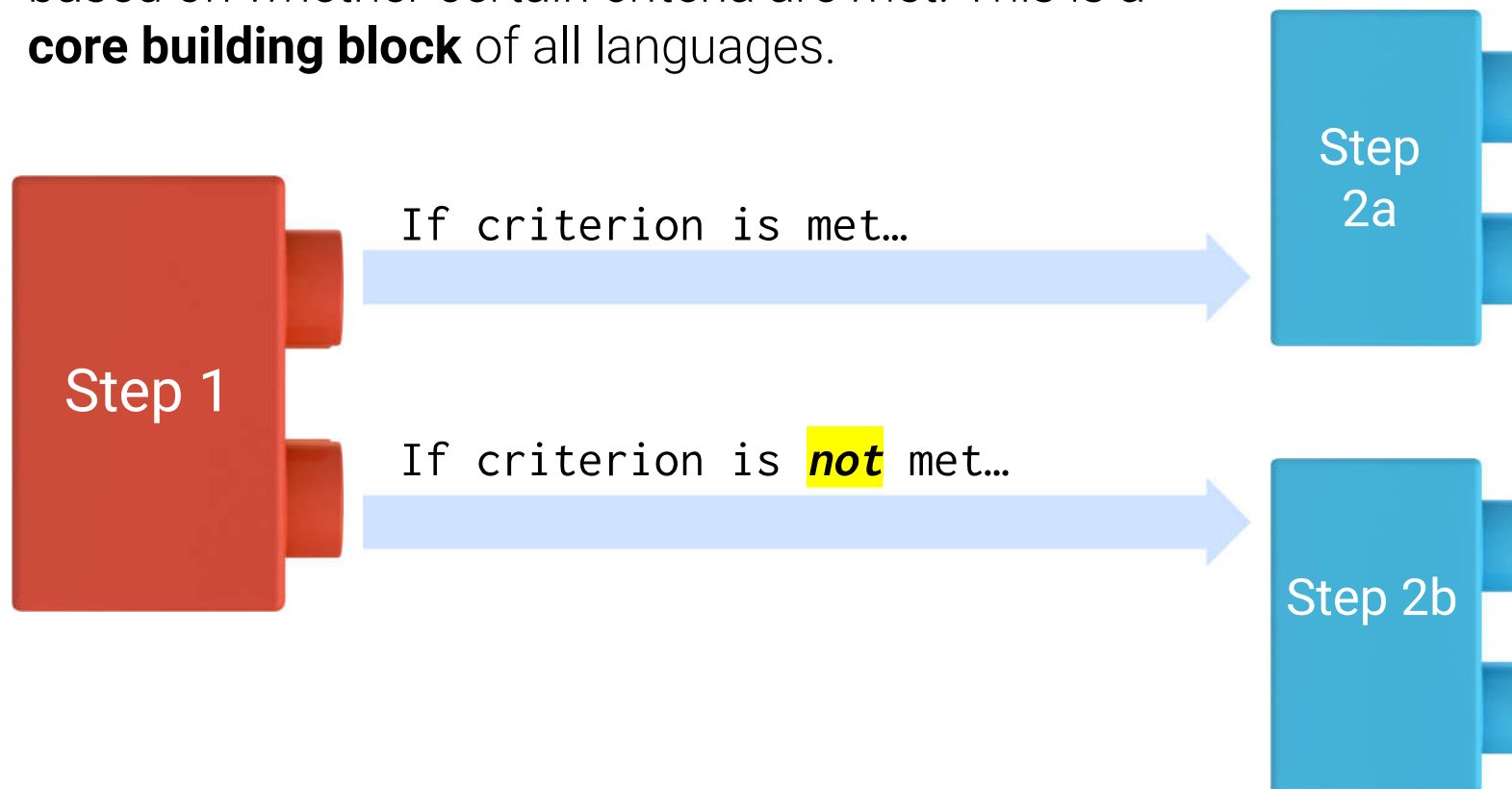# Time to <code>

Excel Playground

Instructor Demonstration
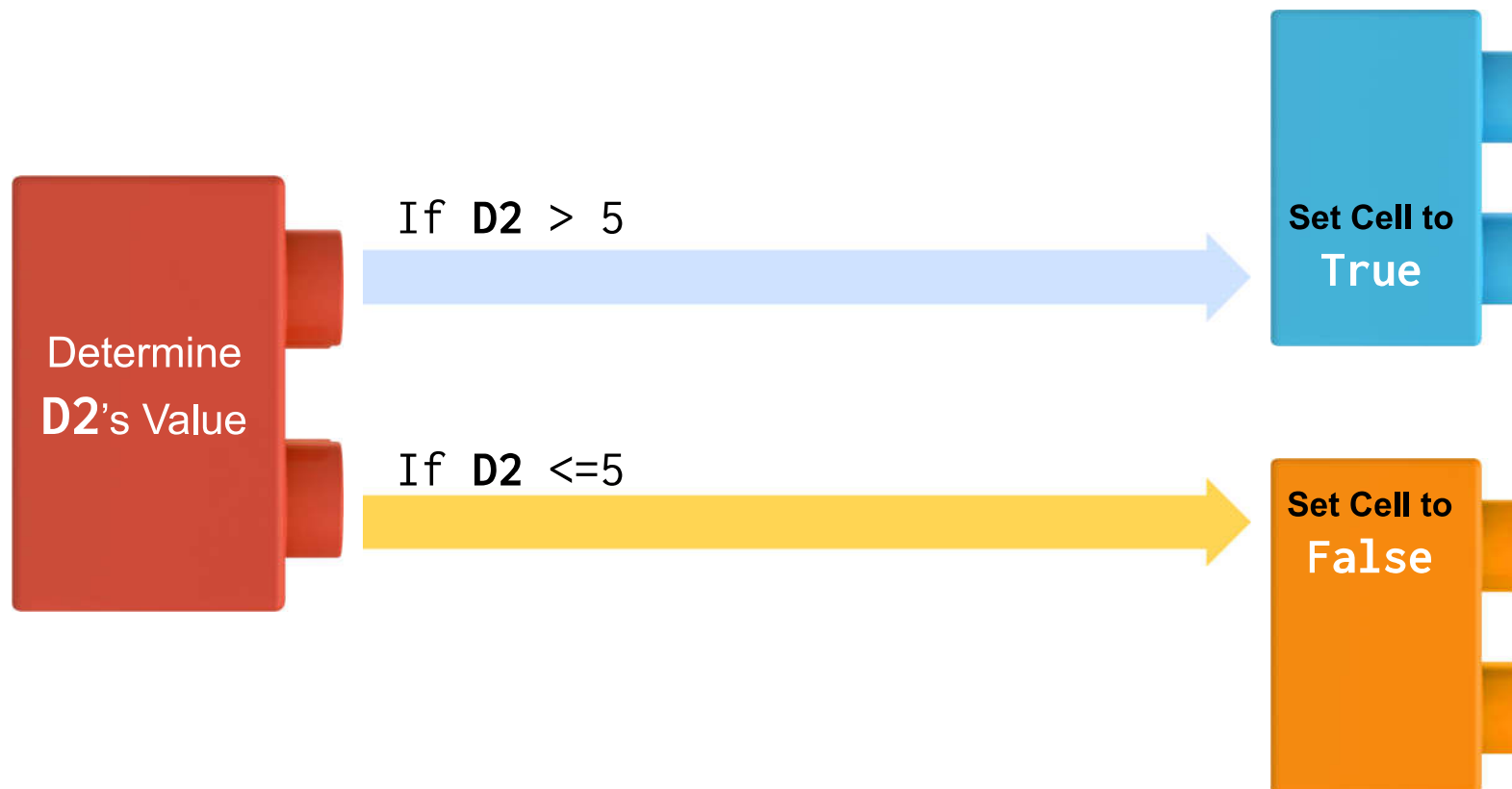
Color Counter

Conditionals: If This, Then That

Conditionals give us a way to control the flow of logic based on whether certain criteria are met. This is a **core building block** of all languages.

Step 1

`If criterion is met…`

Step 2a

`If criterion is `***`not`***` met…`

Step 2b

Conditionals: If This, Then That

`=IF(D2>5,TRUE,FALSE)`

Determine **D2**'s Value

If **D2** > 5

Set Cell to
True

If **D2** <=5

Set Cell to
False

But what if we want to combine conditions?

A

AND, NOT, OR

Ooh...Coding! (Sort Of)

Q But what if we want
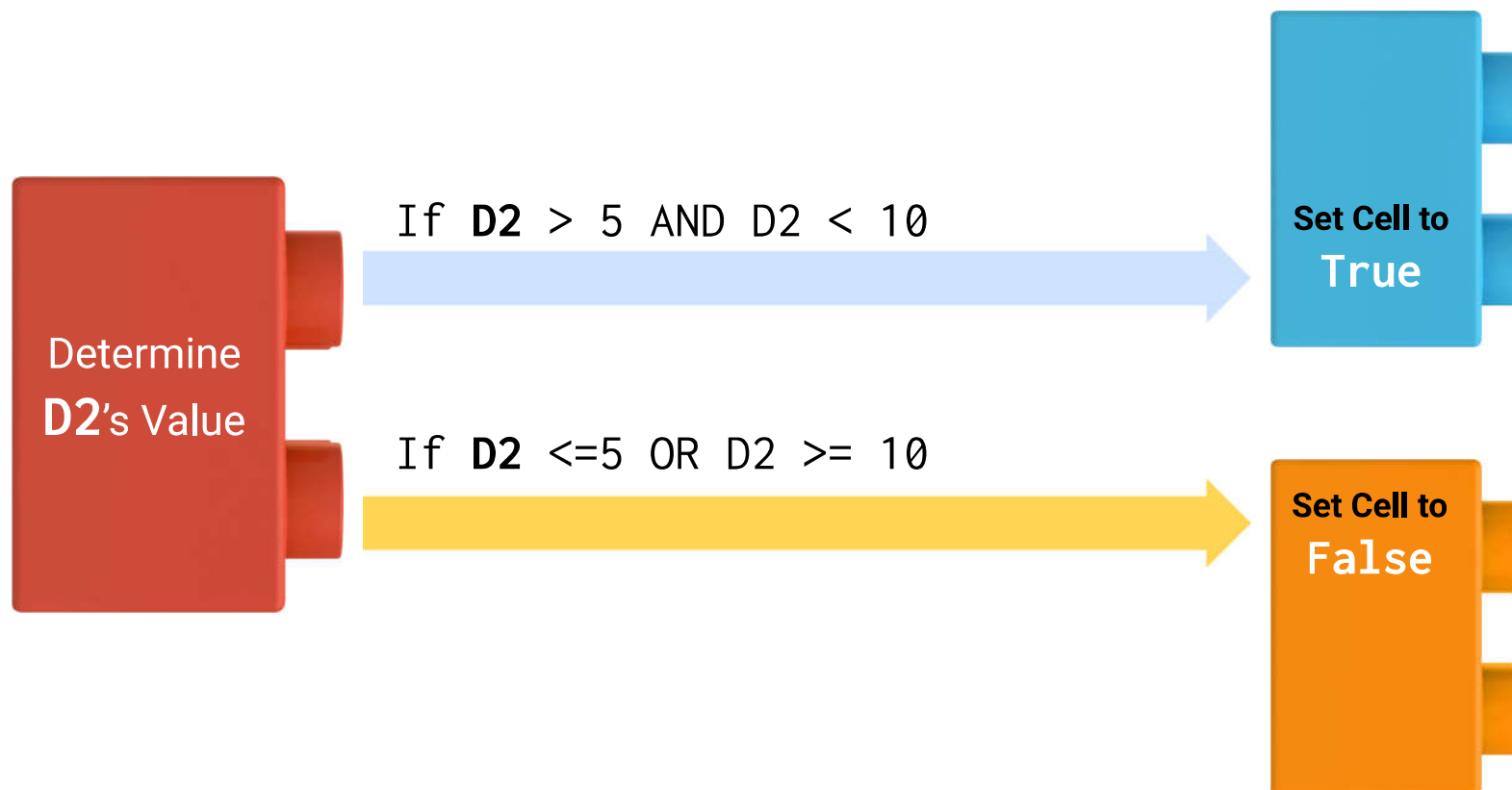to **combine** conditions?

A AND, NOT, OR

```
=IF(AND(D2>5, D2<10),TRUE,FALSE)
```

Conditionals: If This, Then That

Nested conditionals are powerful but can become convoluted very quickly!

If **D2** > 5 AND D2 < 10

Set Cell to
True

Determine
D2's Value

If **D2** <=5 OR D2 >= 10

Set Cell to
False

Time to <code>

Excel Playground

Activity: Grade Book

Create a formula that calculates the final grade for a student based on their previous exams and papers.

Suggested Time:

15 minutes

Activity: Grade Book

To do	• Create a formula that calculates the final grade for a student based up their previous exams and papers.
When making this calculation	• Consider every paper and exam to be equal in weight; each should comprise one-fourth of the overall grade. • Round the result to the nearest integer. • Using conditionals, create a formula that returns `PASS` if a student's final grade is greater than or equal to 60. If a student's final grade is below 60, the formula should return `FAIL`.
Bonus	• Greater than or equal to 90 = A • Greater than or equal to 80 and less than 90 = B • Greater than or equal to 70 and less than 80 = C • Greater than or equal to 60 and less than 70 = D • Anything less than 60 = F

Time's Up! Let's Review.

Instructor Demonstration

Measures of Central Tendency

What are "measures of central tendency"?

Values used to describe the center of a data set

Central Tendency

Three most common measures of central tendency:

Mean

The "arithmetic" average

To calculate: The sum of all values, divided by the number of values

Median

The middle value of a data set

To calculate: Sort the data set and find the center

Median

The most frequent value of a data set

To calculate: Count the frequency of each value in a data set, determine the most frequent value

Time to <code>

Break

Instructor Demonstration

Formatting

Formatting in Excel falls into two categories

01	Data Formatting

- Changes the way a value is represented in a cell.
- Used to help with interpretation or to add context to the range of values
- Examples:
  - Date and Time
  - Currency
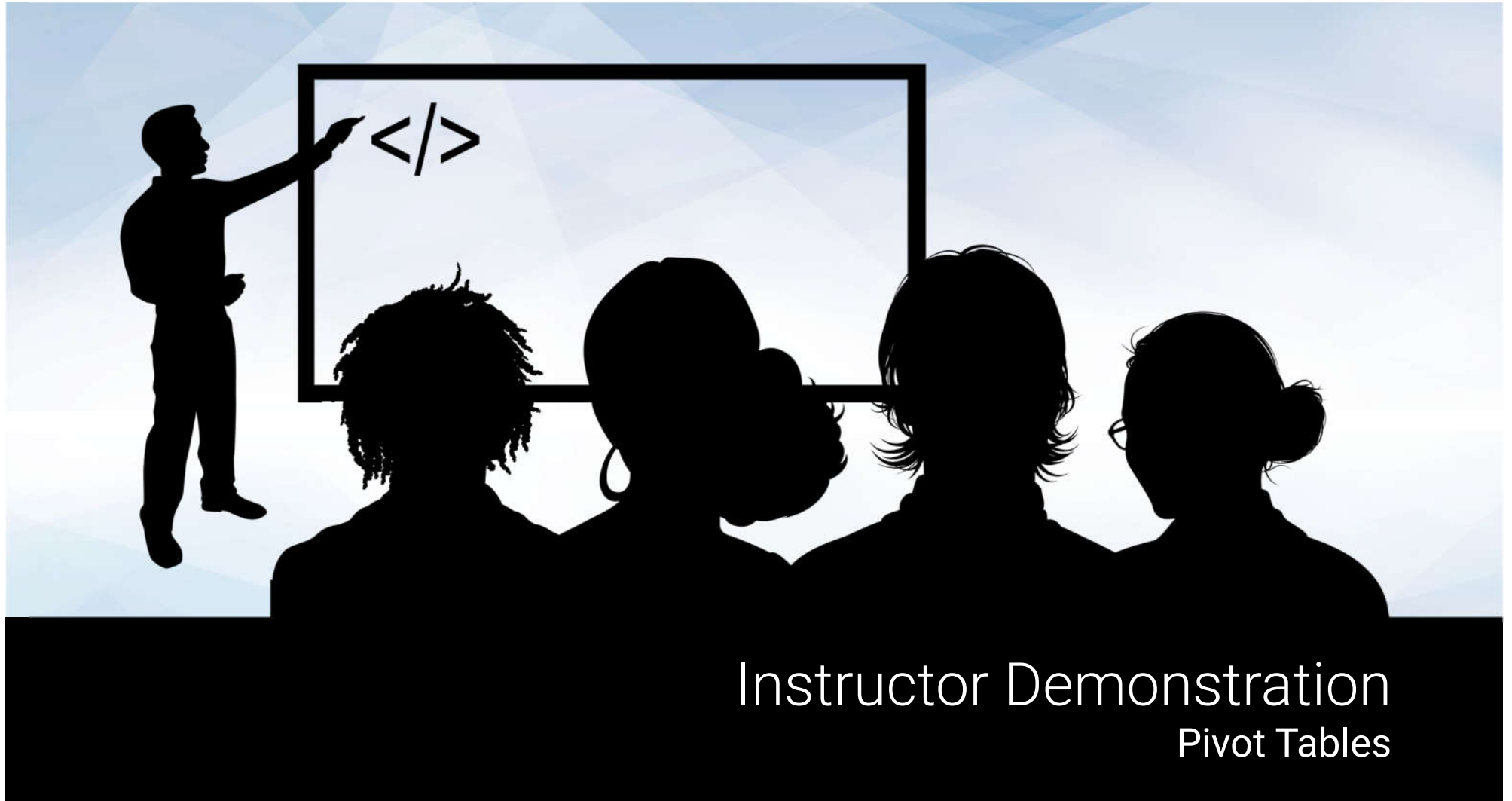 - Percentage
  - Scientific Notation

02	Style Formatting

- Changes the way the cell and text are viewed
- Can include font color, cell highlighting, borders, etc.
- Can be performed manually or using formulas/logic (conditional formatting)

<Time for Excel>
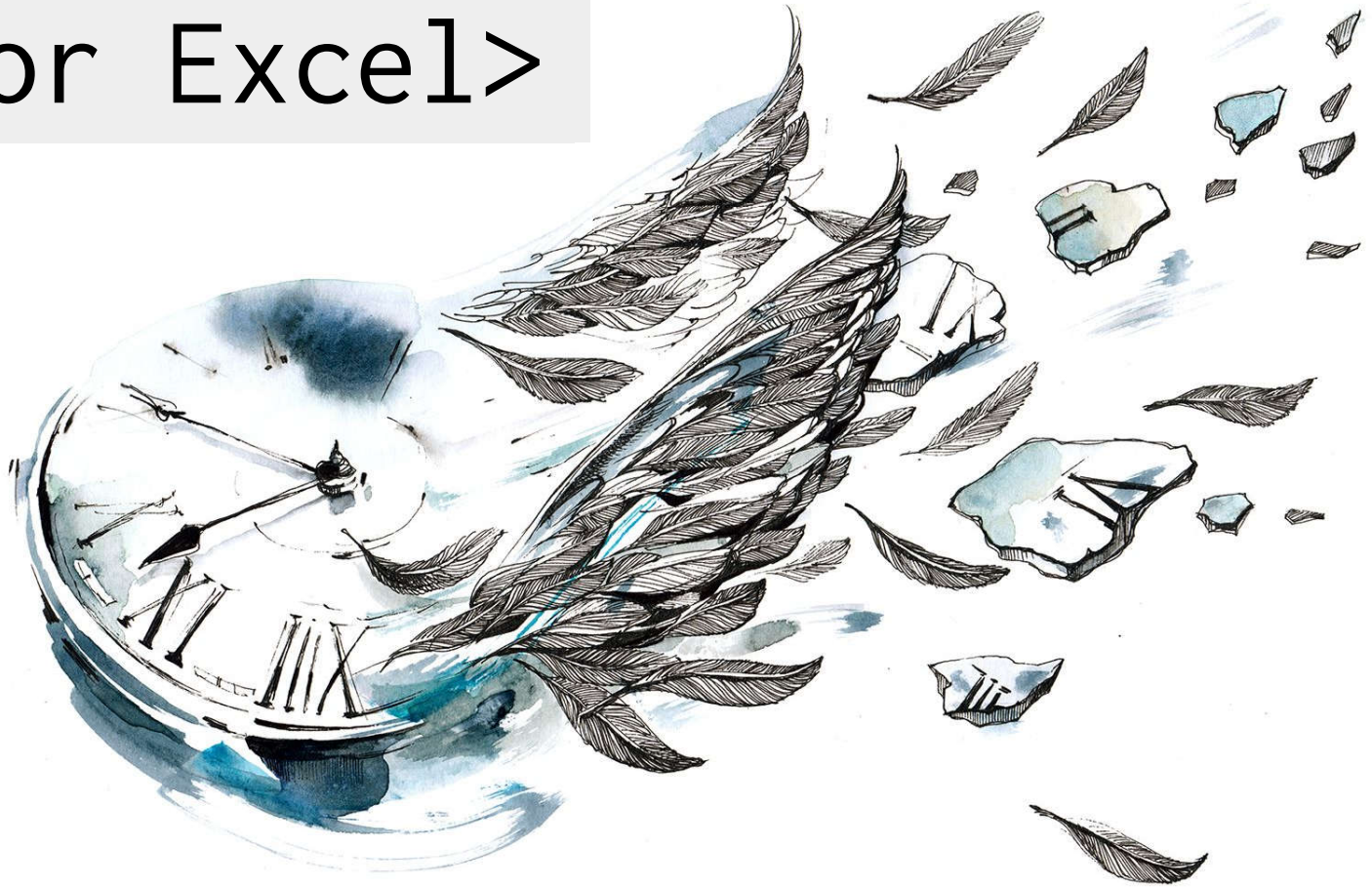
Instructor Demonstration

Pivot Tables

Getting pivot with it

Pivot tables are one of the most important data visualization concepts to master in this class. (Don't worry. They are a very user-friendly.)

Getting pivot with it

Basically, a pivot table is a **summative** analytic tool that allows us to perform aggregate functions that allow any combination of fields. (The term *pivot table* comes from the fact that we are pivoting along a data axis).

Seller	Qty. Sold	Date
Joseph	$42.50	1/1/17
Jacob	$65.00	1/3/17
Jacob	$5.25	1/6/17
Joseph	$125.00	1/6/17
Jacob	$3.50	1/7/17
Matt	$32.00	1/9/17

| Seller	Total Sold
Joseph	$167.50
Jacob	$73.75
Matt	$32.00

Word to the wise: Keep it flat!

Modern Business Intelligence (BI) tools like Tableau, Sisense, and Salesforce work best if data is stored in flat CSVs—meaning column headers represent fields (vertically) on the spreadsheet. This is largely because all of these technologies heavily utilize pivot tables as a tool for their visualizations. **Don't try to confuse this simplicity. "Spreadsheet magic" is a nightmare to analyze.**

B	C	D	E	F	G	H
DateTime	Week #	Section?	Pace	Academic Support	Self-Mastery	Instructor Er
2016-09-11T04:00:00.000Z	18	RCB0503FSF - CCC	3	5	5	4
2016-09-11T05:00:00.000Z	6	UT0726FSF	3	5	3	4
2016-09-12T04:00:00.000Z	11	UCF062016FSF	4	4	3	5
2016-09-12T04:00:00.000Z	23	UCF0329FSF	2	4	5	1
2016-09-12T04:00:00.000Z	9	UNC0712FSF	3	4	4	3
2016-09-12T04:00:00.000Z	23	UCF0328FSF	4	3	2	3
2016-09-12T04:00:00.000Z	6	RUT0725FSF-NB	5	4	4	5
2016-09-12T04:00:00.000Z	6	RUT0725FSF-NB	5	5	4	5
2016-09-12T04:00:00.000Z	6	RUT0725FSF-NB	2	4	4	4
2016-09-12T04:00:00.000Z	11	UCF062016FSF	4	5	4	5
2016-09-12T04:00:00.000Z	13	UCF061416FSF	4	5	1	5

<Time for Excel>
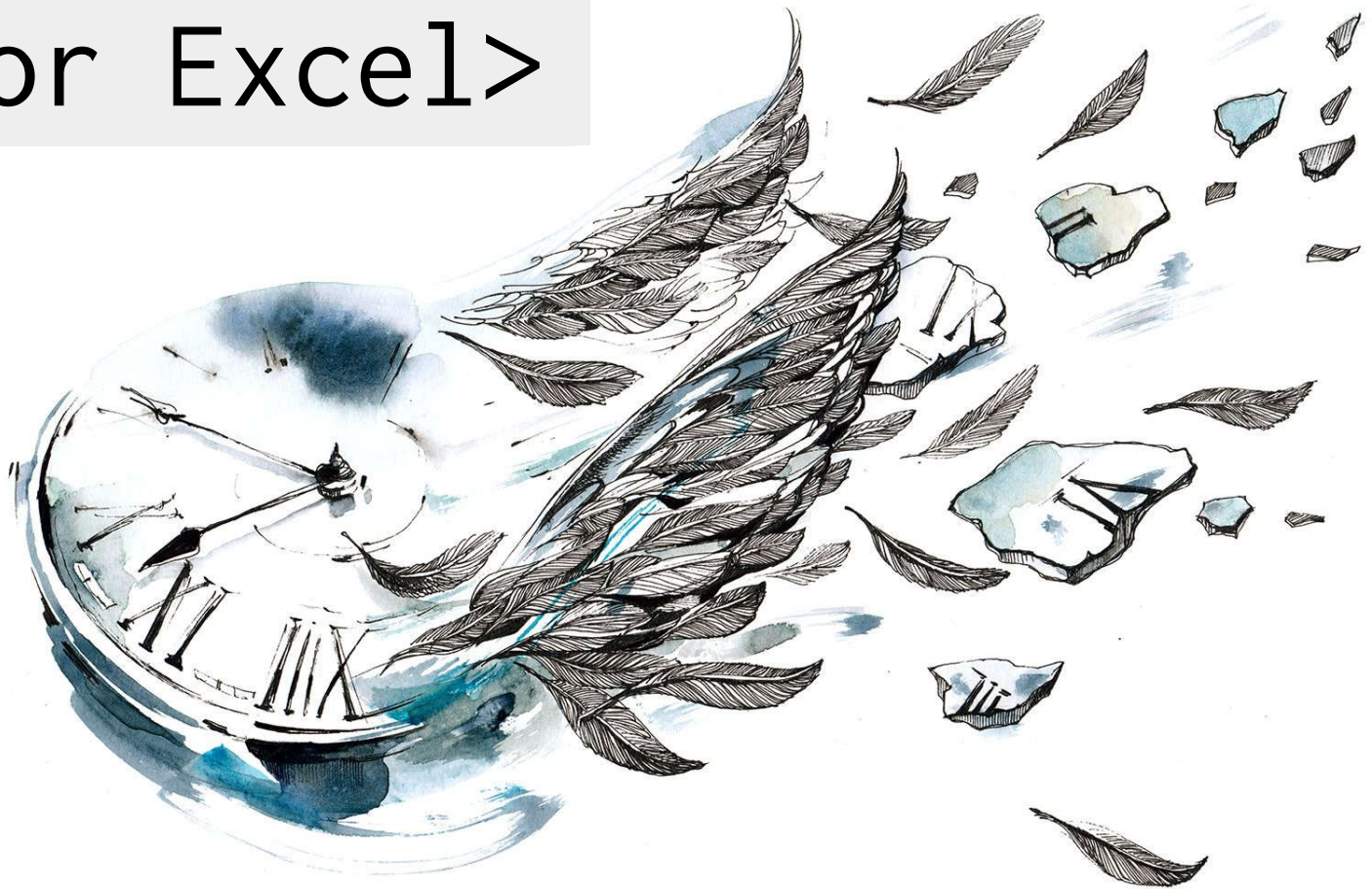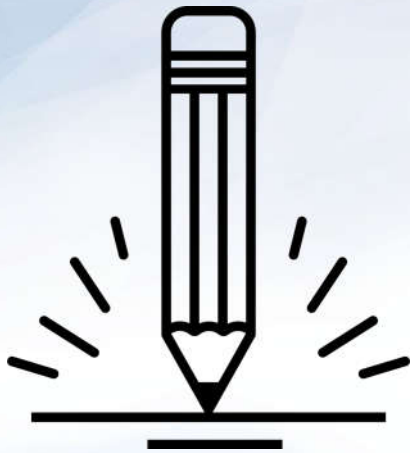
Activity: Top-Songs Pivot Table

In this activity, you will use a 5000 row spreadsheet containing data for the top 5000 songs from 1901 onward. Using pivot tables, you will uncover which artists have the most songs in the top 5000, the song titles, and the year each song was released.

Suggested Time:
17 minutes

Top-Songs Pivot Table Instructions

- Select all of the data in your worksheet, and create a new pivot table.

- Make a pivot table that can be filtered by year and contains two rows: *Artist* and *Name*.

- All of an artist's songs should be listed below their name.

- Update your pivot table to contain values for:

  - How many songs an artist has in the top 5000

  - The sum of the final_score of their songs.

- Sort your pivot table by descending sum of the final_score.

Time's Up! Let's Review.
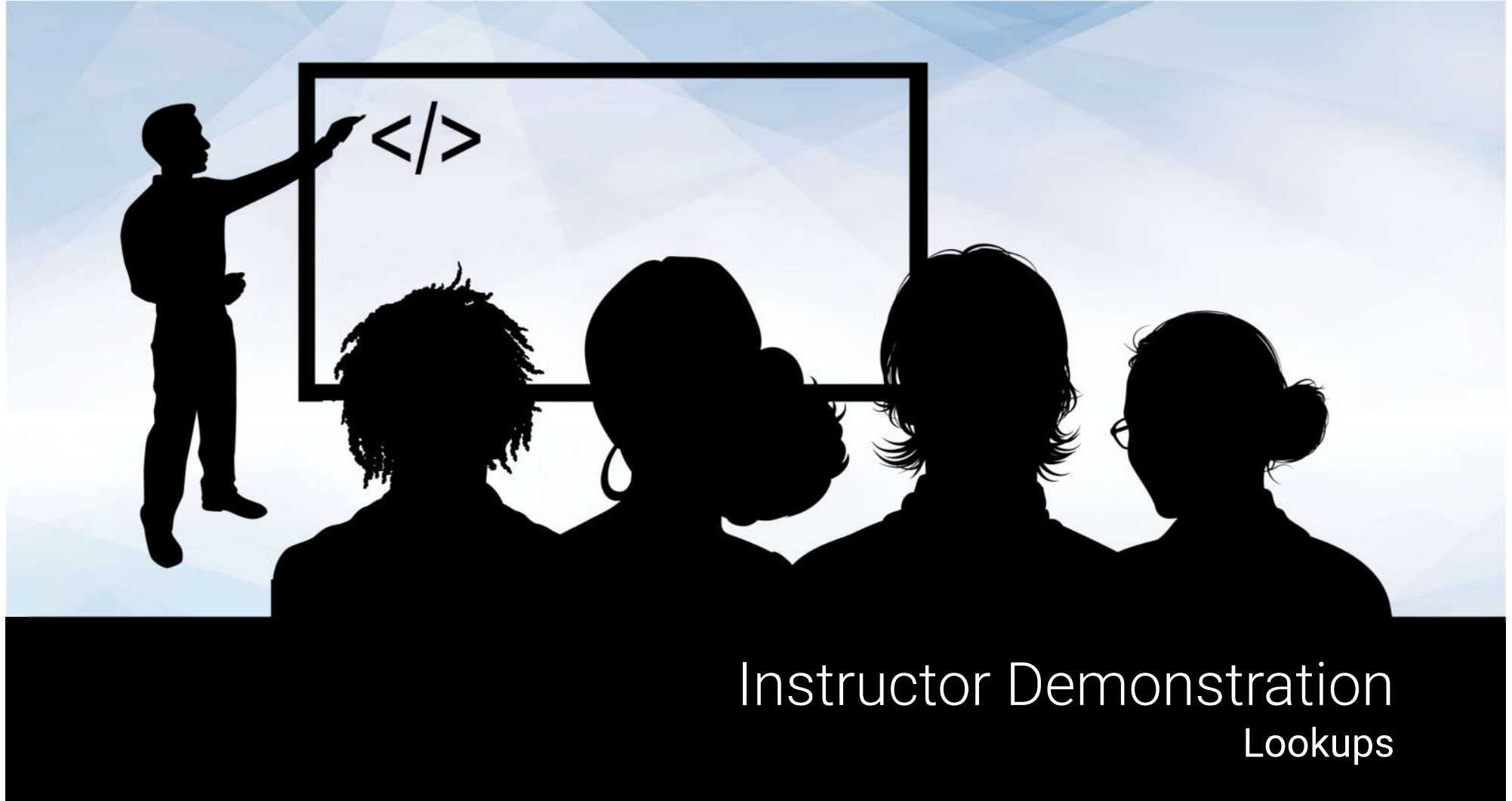
Instructor Demonstration
Lookups

Look it up with Lookups

Assume this table is gigantic. How would we **retrieve** the population of a specific planet for use in another formula?

Planet	Population
Zeelo	5020
Merinoa	380
Cardboard Box	2
…	…
Asteroid 9	95

Look it up with Lookups

Q Assume this table is gigantic. How would we **retrieve** the population of a specific planet for use in another formula?

A
```
=vlookup( <value>, <full table>,
<column to retrieve>,<match parameter>)
```

Planet	Population
Zeelo	5020
Merinoa	380
Cardboard Box	2
…	…
Asteroid 9	95

Look it up with Lookups

Q What will this yield?
`=vlookup( "Asteroid 9", Planets, 3, FALSE)`

Planet	Population	Species
Zeelo	5020	Zoltans
Merinoa	380	Murphies
Cardboard Box	2	Hambones
…	…	
Asteroid 9	95	Asterisks

Look it up with Lookups

Q What will this yield?
```
=vlookup( "Asteroid 9", Planets, 3, FALSE)
```

Planet	Population	Species
Zeelo	5020	Zoltans
Merinoa	380	Murphies
Cardboard Box	2	Hambones
…	…	
Asteroid 9	95	Asterisks

A Asterisks

<Time for Excel>
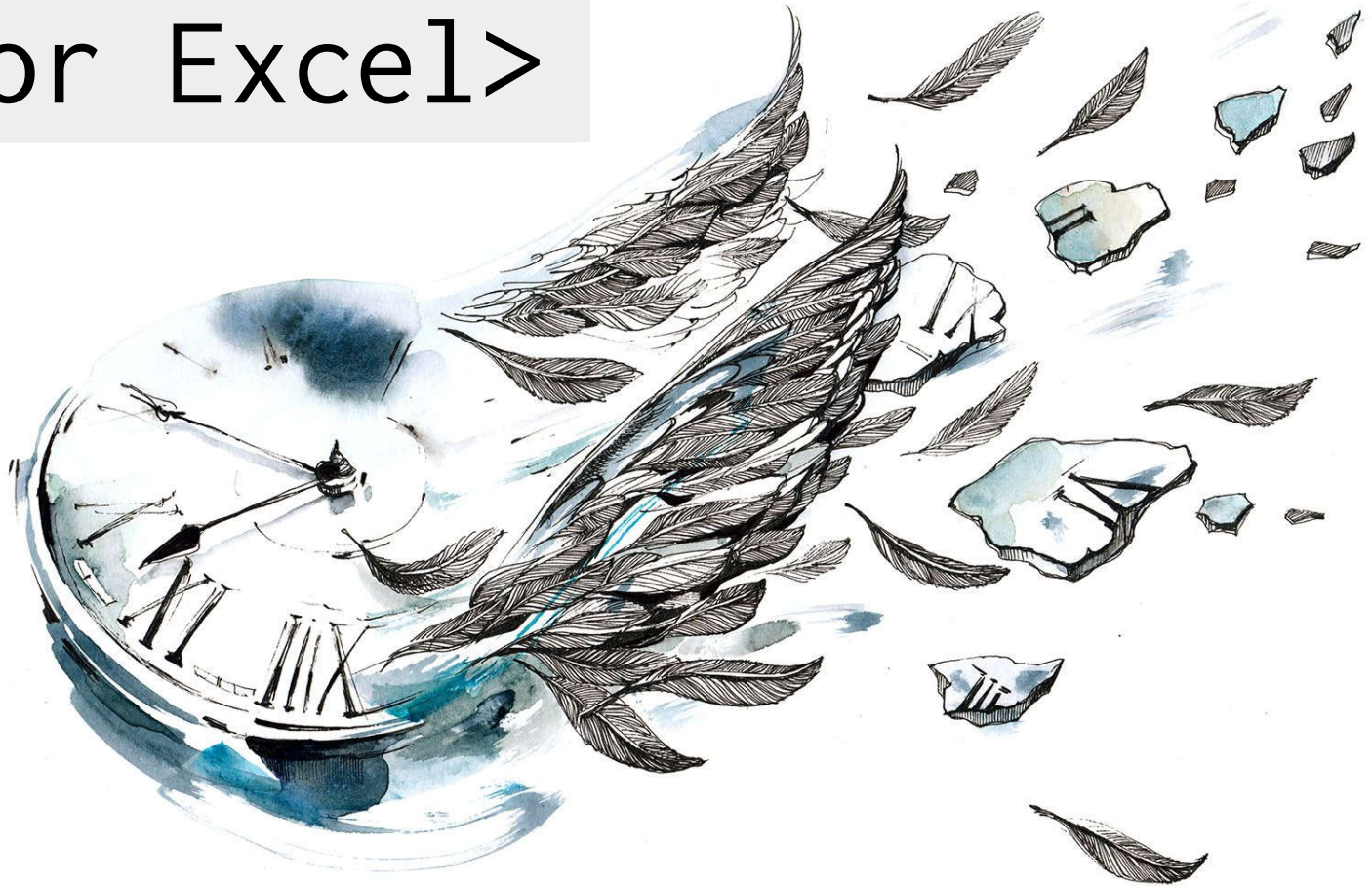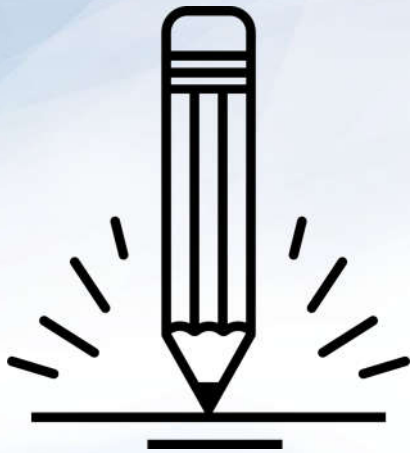
Partner Activity: Product Pivot

A small company selling electronics and electronic media has asked our class to create a table that visualizes the cost of their recent orders. Using lookups, create a pivot table that serves this purpose.

Suggested Time:
15 minutes

Activity: Product Pivot

- Determine the "Product Price" of each row in the "Orders" sheet by using a VLOOKUP() that references each row's "Product ID"
  - The "Product Price" of a row does not include shipping
- Determine the "Shipping Price" of each row in the "Orders" sheet by using a VLOOKUP() that references each row's "Shipping Priority"
- Select all of the data on the "Orders" sheet, and create a new pivot table that calculates the sum of "Product Price" and "Shipping Price" for each "Order Number" and "Product ID"
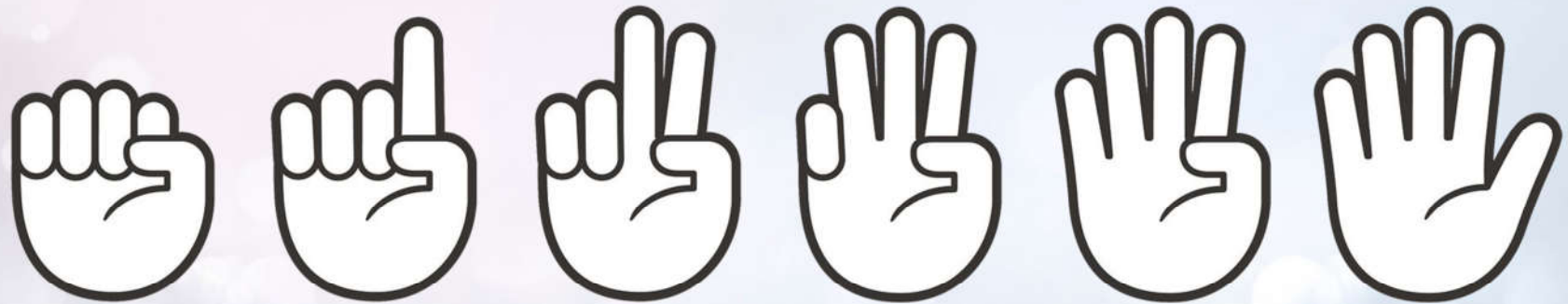
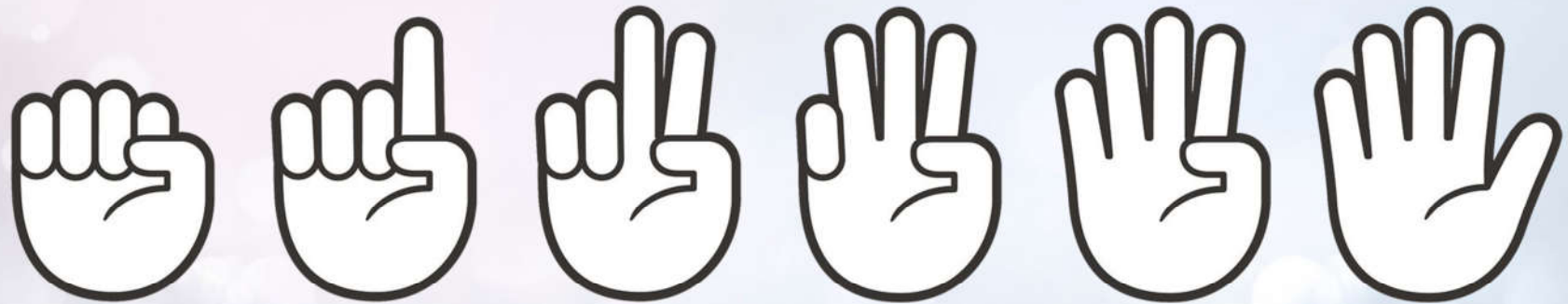Suggested Time: 15 minutes

Time's Up! Let's Review.

Questions?

FIST TO FIVE:

Who feels comfortable
with pivot tables in Excel?

FIST TO FIVE:

Who feels comfortable
with the measures of central tendency?