



Egad! It's Excel

Data Boot Camp
Lesson 1.2



A Few Admin Things

Class Repository and Zoom Video Feed

01

Class Git Repository

Classroom content,
homework assignments

02

Class Videos

Automatically uploaded,
on-demand videos

Quick Refresher



Data analytics is about
what **two** things ...



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



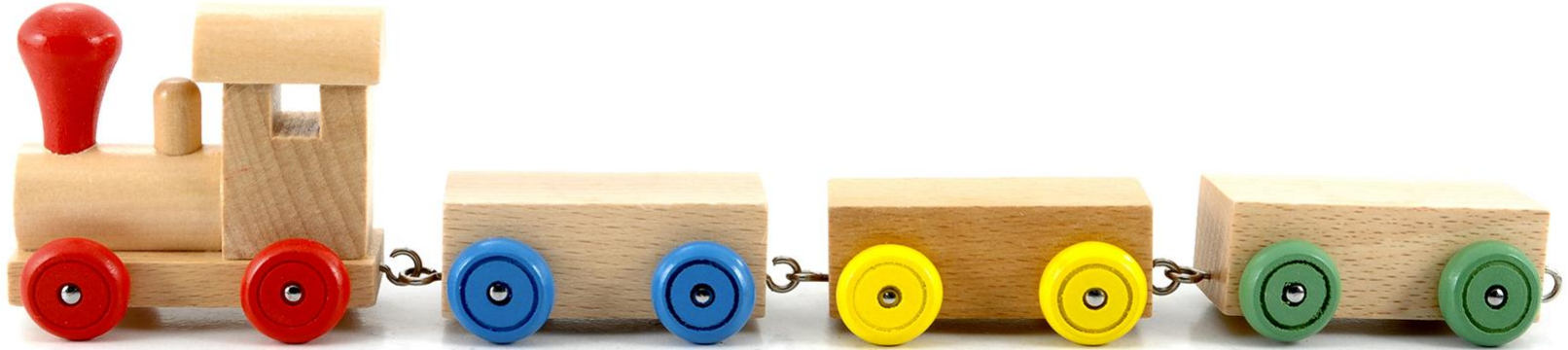
What are the steps in
the **analytics paradigm**?

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

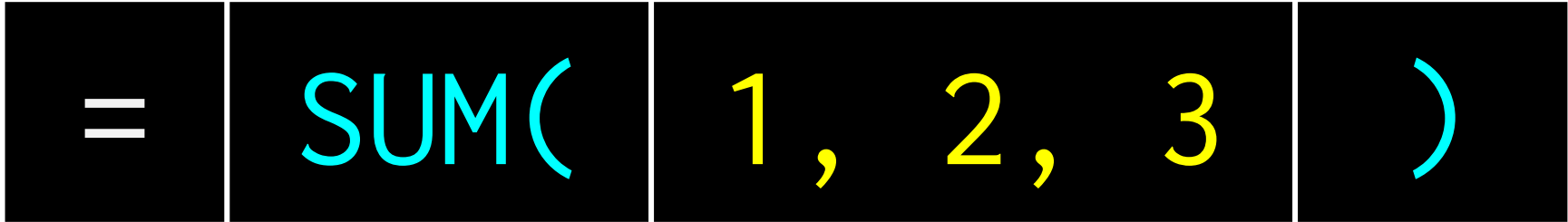
Excited to get started?!



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**.



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)



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



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

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


Ooh...Coding! (Sort Of)



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



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!

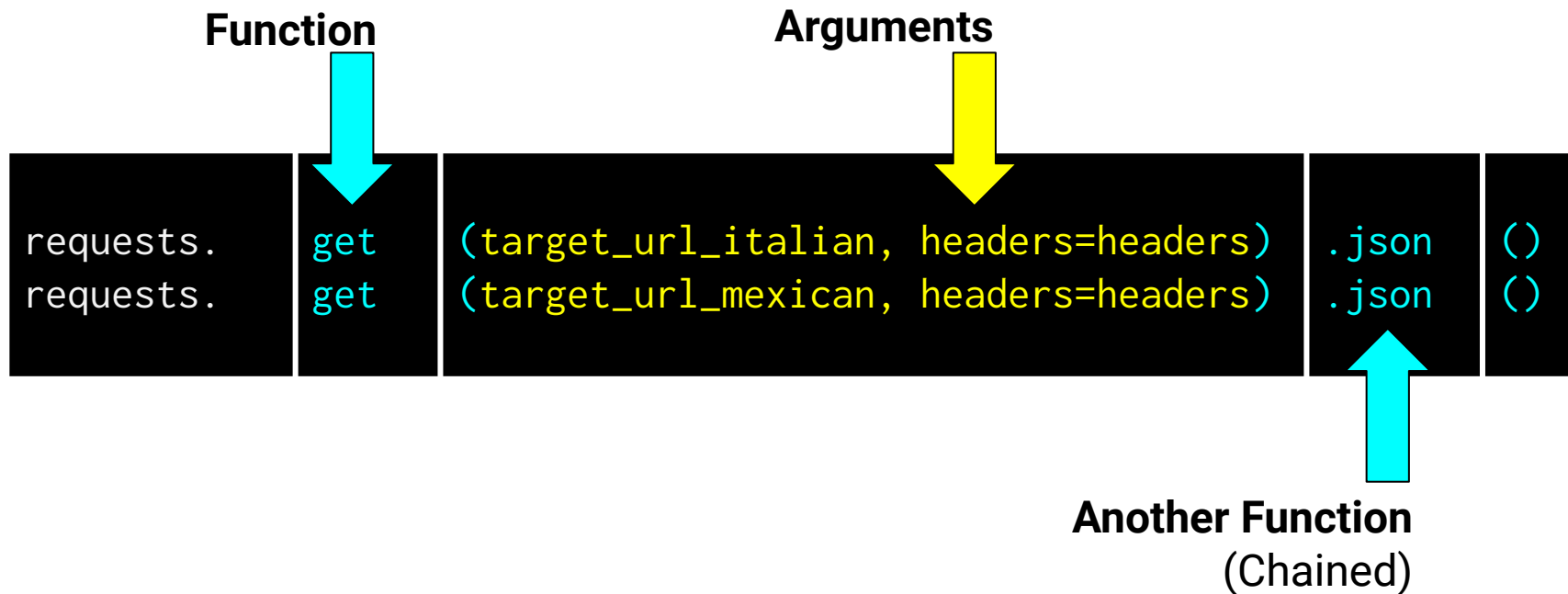
Here's a Python snippet from the previous class.



```
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.



<Time for Excel>





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

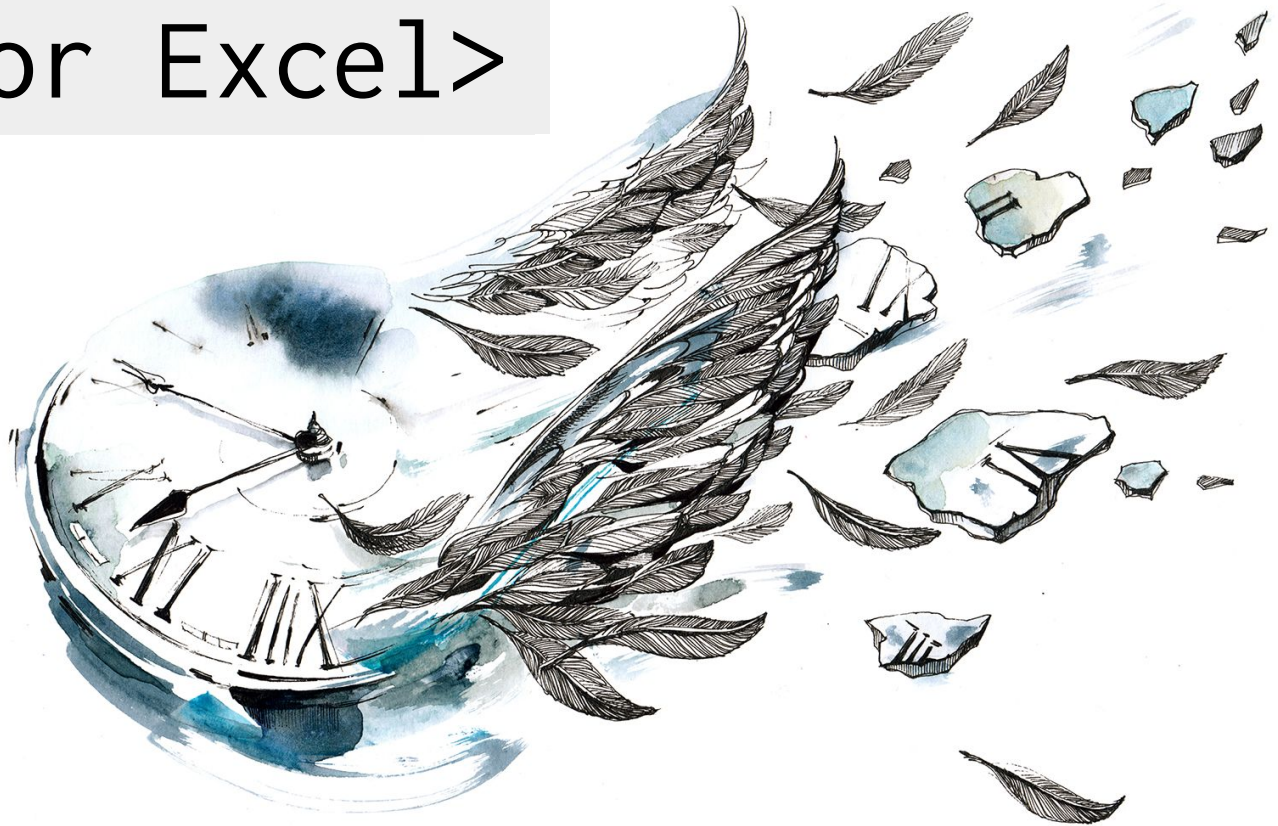
But we can also name a range of values to make interpreting formulas easier!

```
=AVG(A1:A10)
```



```
=AVG(prices)
```

<Time for Excel>



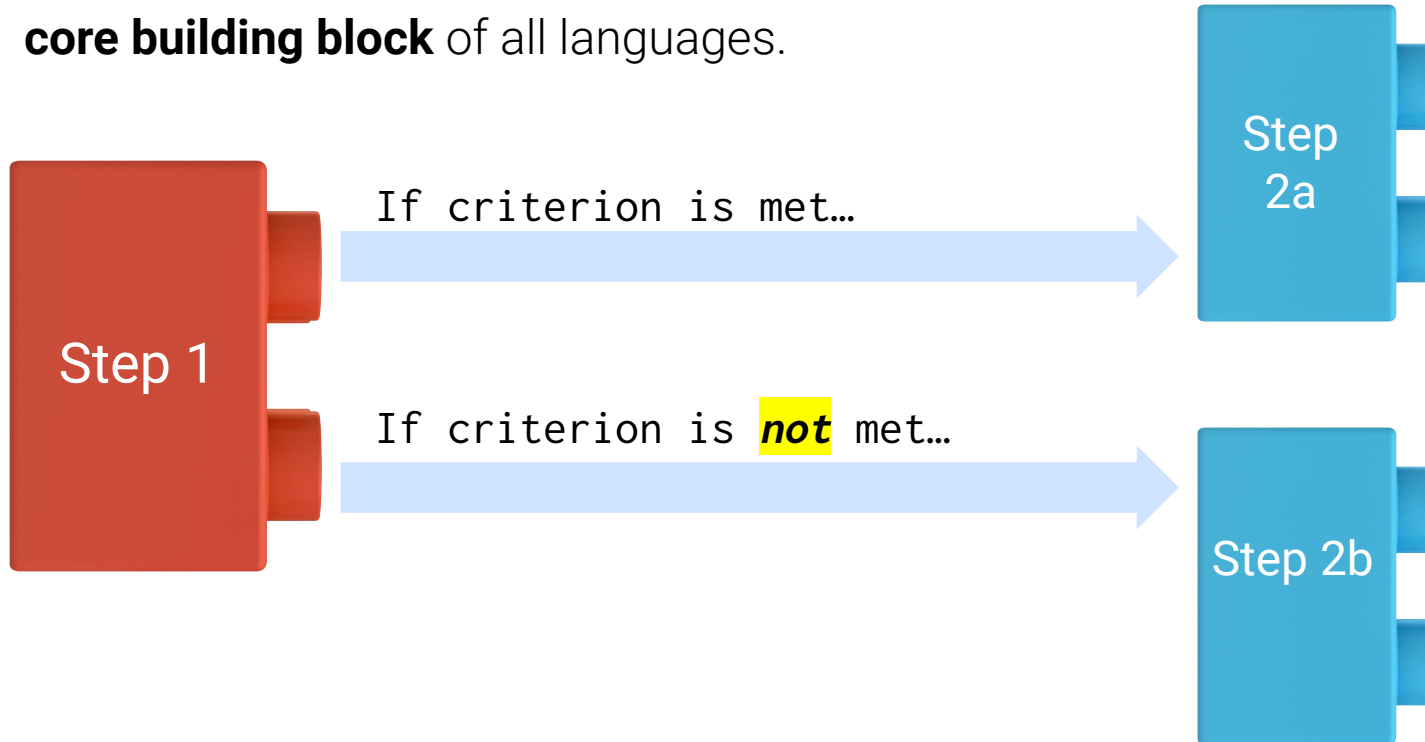


Instructor Demonstration

Color Counter

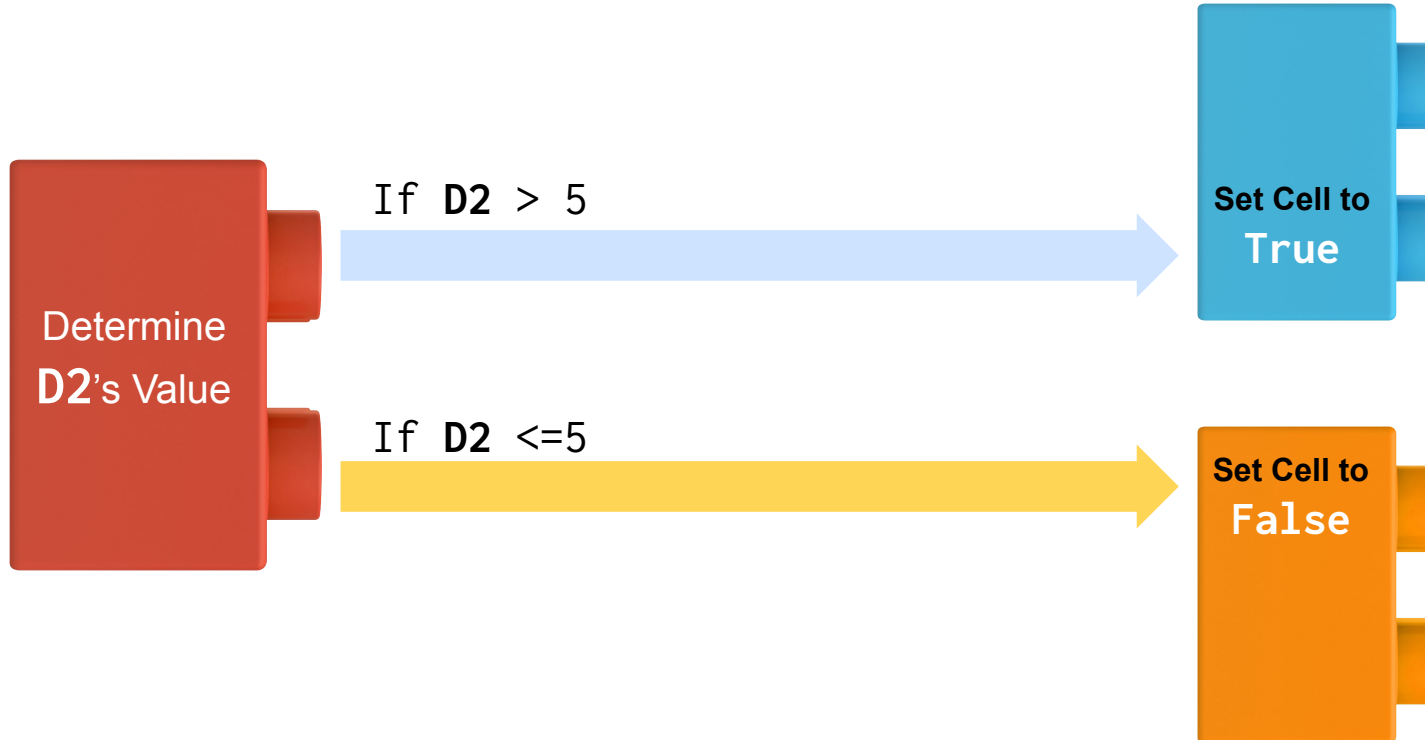
Conditionals: If This, Then That

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.



Conditionals: If This, Then That

=IF(D2>5, TRUE, FALSE)





But what if we want to
combine conditions?



AND, NOT, OR

Ooh...Coding! (Sort Of)



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

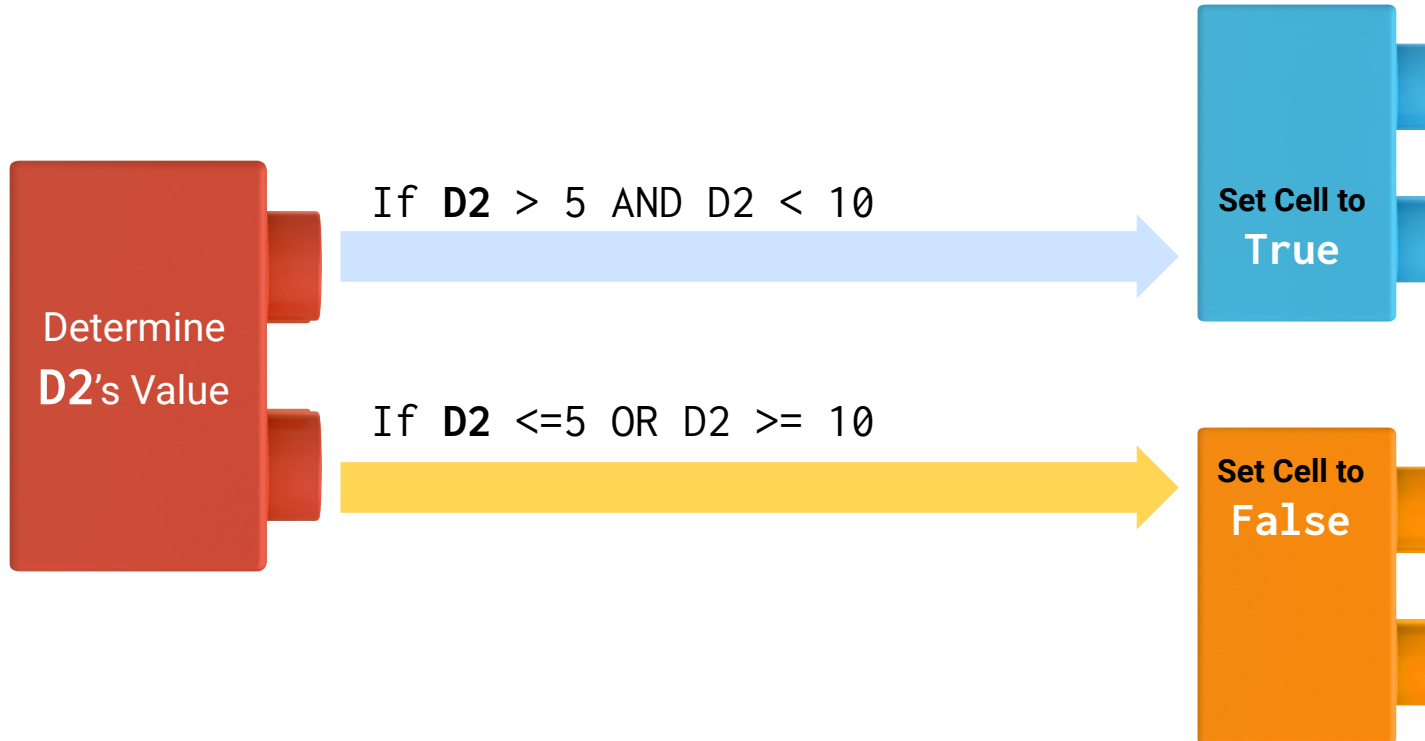


AND, NOT, OR

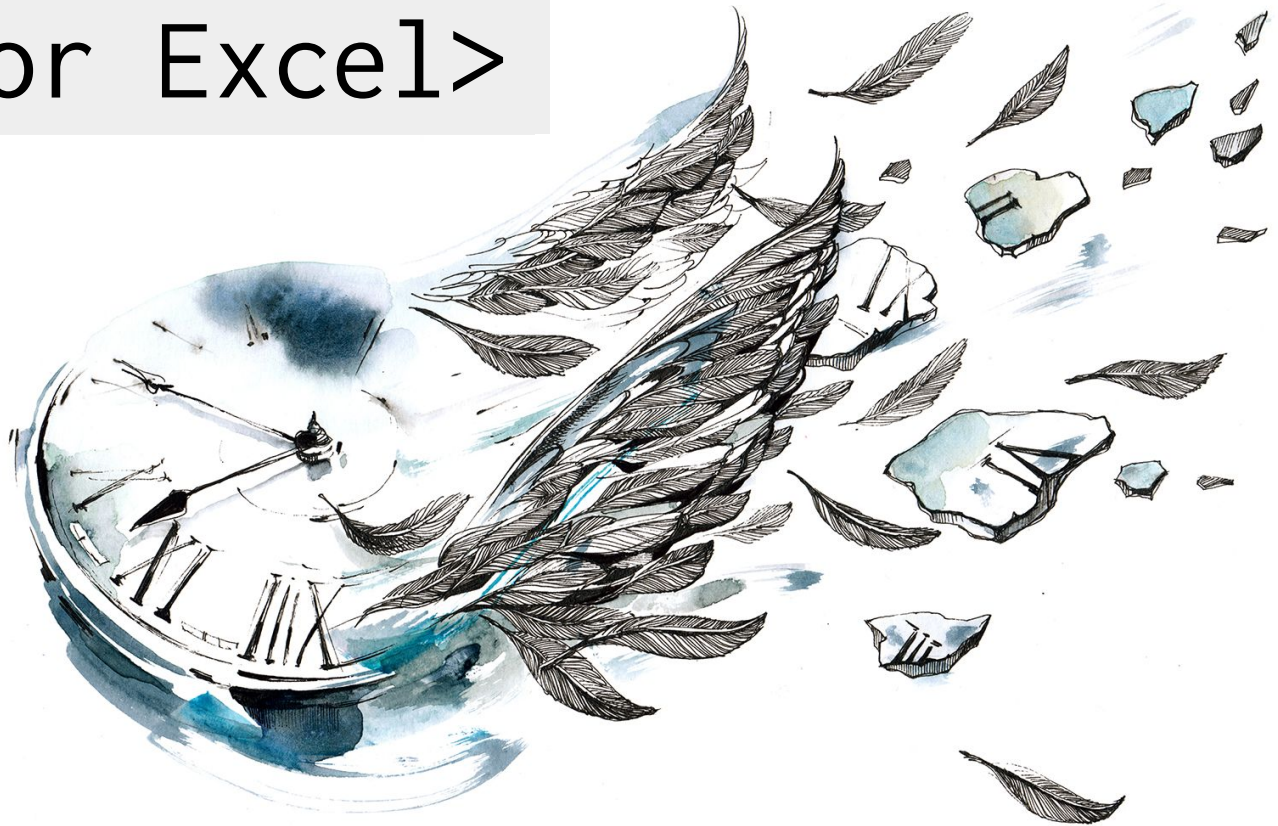
```
=IF(AND(D2>5, D2<10),TRUE,FALSE)
```

Conditionals: If This, Then That

Nested conditionals are powerful but can become convoluted very quickly!



<Time for Excel>





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:

Create a nested **IF()** formula that returns a letter grade based on a student's final grade.

- 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

Suggested Time: 15 minutes





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

Three most common measures of central tendency

01

Mean

- The “arithmetic” average
- **To calculate:** The sum of all values, divided by the number of values

02

Median

- The middle value of a data set
- **To calculate:** Sort the data set and find the center

03

Mode

- 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 for Excel>



Take a 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.)

The screenshot displays an Excel spreadsheet with a PivotTable summarizing revenue by month and location. The PivotTable is structured with 'Row Labels' (months) and 'Column Labels' (locations: Cambridge, Piccadilly, Grand Total). The data is for the years 2014 and 2015. Overlaid on the spreadsheet is the 'Insert Calculated Field' dialog box, which is used to create a new calculated field named 'AverageRevenue' with the formula '= Revenue/ Reservations'. To the right of the dialog is the 'PivotTable Builder' task pane, which shows the current PivotTable configuration: 'RoomType' is in the Columns area, and 'Year' and 'Month' are in the Rows area. The Values area shows 'Sum of Revenue'.

Row Labels	Cambridge	Piccadilly	Grand Total
2014	\$ 1,111,886	\$ 1,214,733	\$ 2,326,619
January	\$ 90,005	\$ 94,910	\$ 184,915
February	\$ 104,397	\$ 133,914	\$ 238,311
March	\$ 53,546	\$ 80,115	\$ 133,661
April	\$ 103,543	\$ 98,960	\$ 202,503
May	\$ 111,353	\$ 93,664	\$ 205,017
June	\$ 94,292	\$ 98,108	\$ 192,400
July	\$ 112,334	\$ 73,953	\$ 186,287
August	\$ 68,446	\$ 76,590	\$ 145,036
September	\$ 82,581	\$ 152,078	\$ 234,659
October	\$ 103,366	\$ 78,984	\$ 182,350
November	\$ 82,564	\$ 134,740	\$ 217,304
December	\$ 105,459	\$ 98,717	\$ 204,176
2015	\$ 1,286,966	\$ 1,523,054	\$ 2,810,020
January	\$ 134,521	\$ 96,206	\$ 230,727
February	\$ 85,955	\$ 140,144	\$ 226,099
March	\$ 129,781	\$ 151,357	\$ 281,138

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

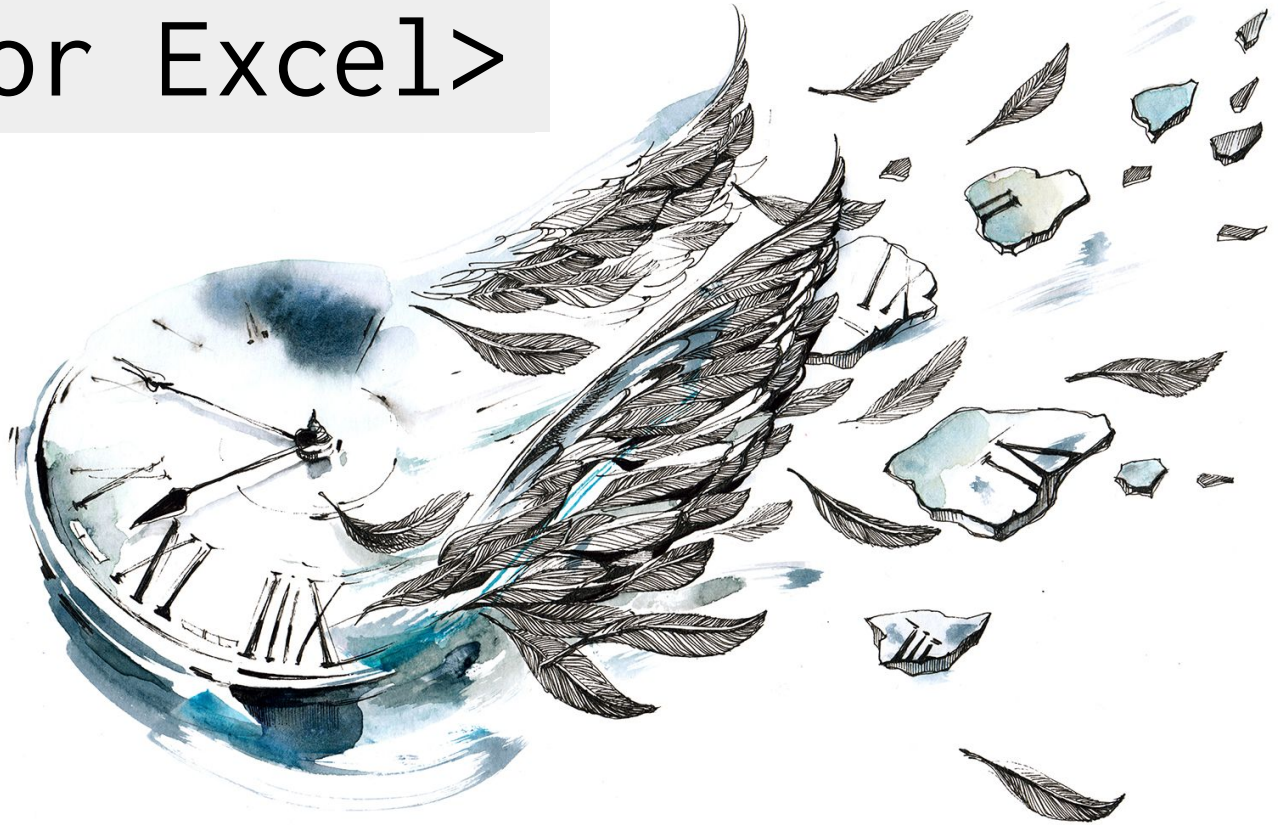
Seller	Total Sold
Joseph	\$167.50
Jacob	\$73.75
Matt	\$32.00

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 Error
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



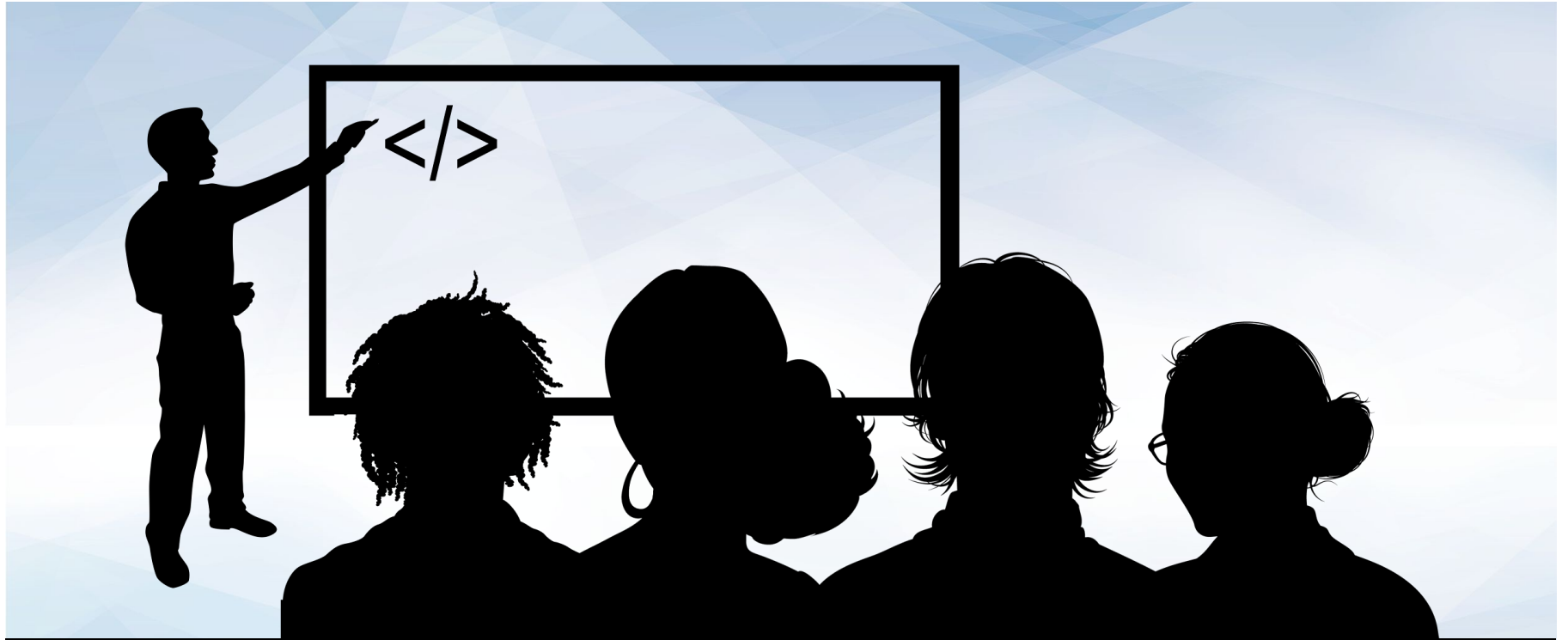
Top-Songs Pivot Table Instructions

- 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



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



`=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



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



What will this yield?

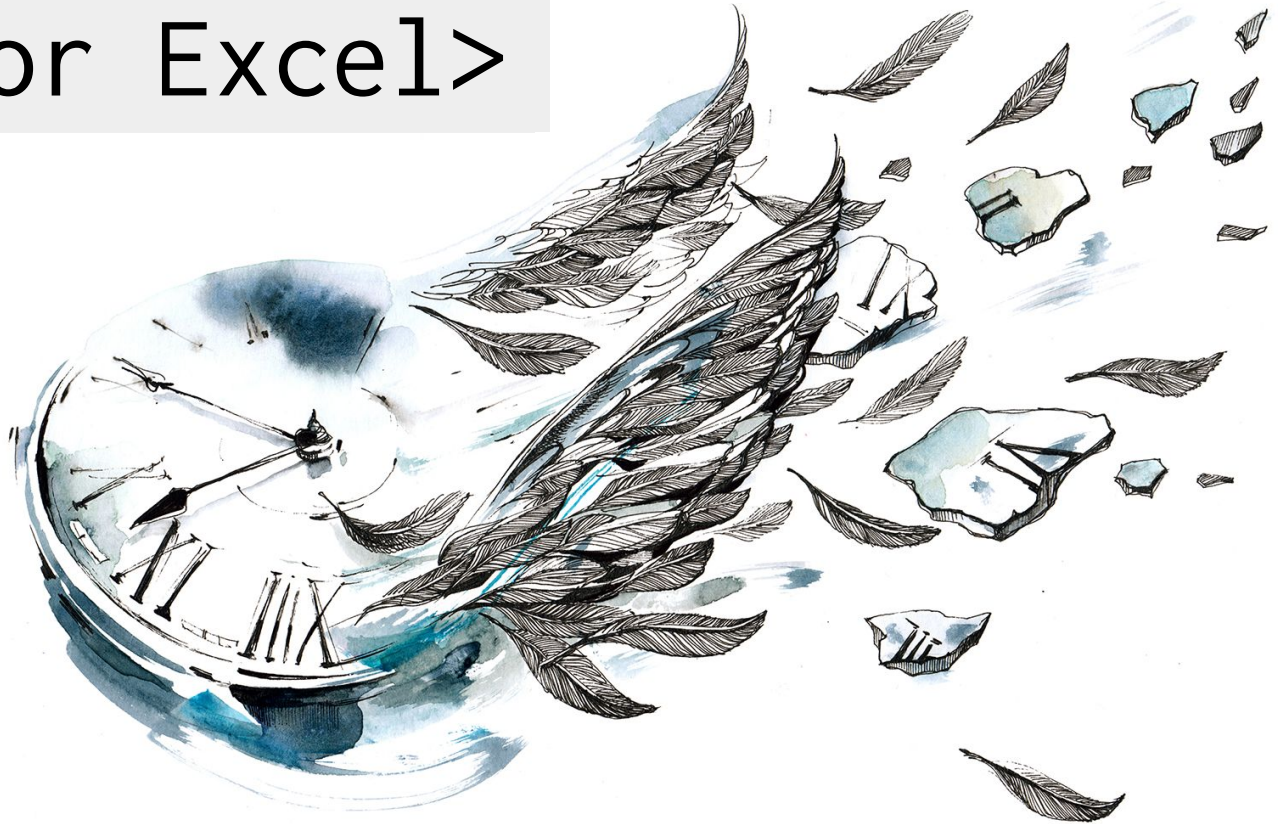
`=vlookup("Asteroid 9", Planets, 3, FALSE)`

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



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

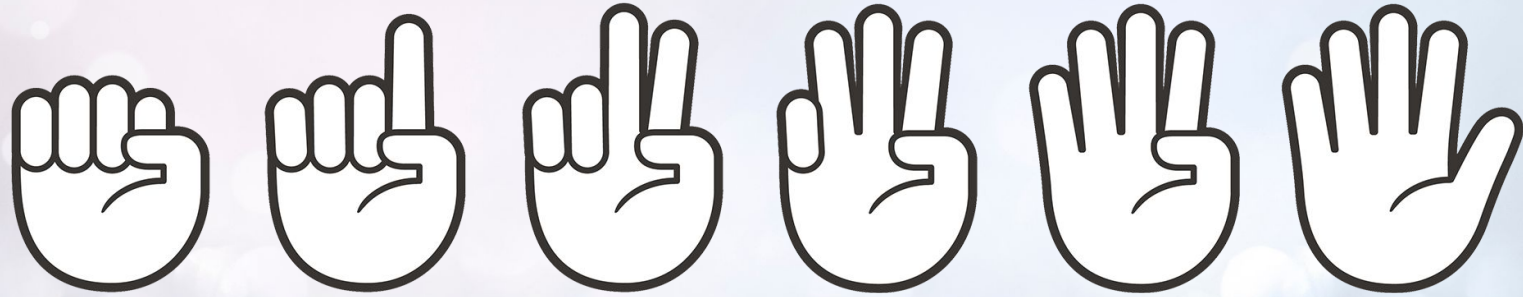




Time's Up! Let's Review.

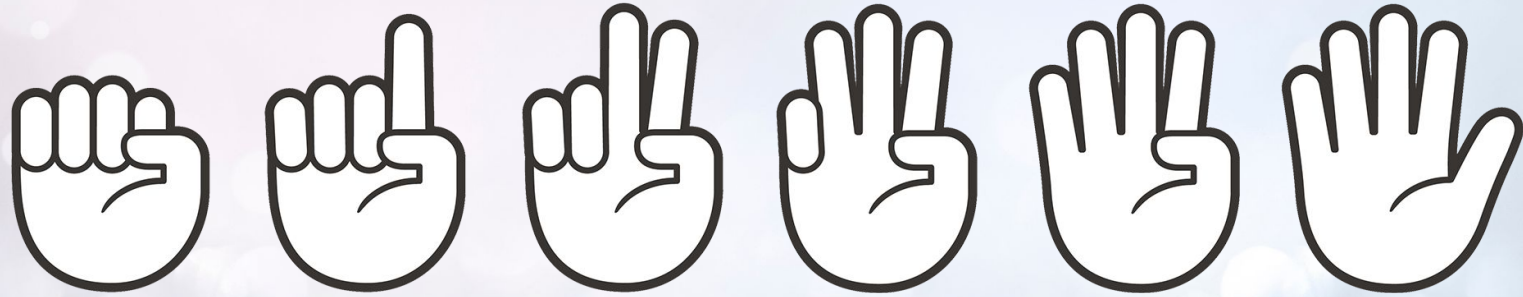


Questions?



FIST TO FIVE:

Who feels comfortable
with pivot tables in Excel?



FIST TO FIVE:

Who feels comfortable
with the measures of central tendency?