



Egad! It's Excel

Data Boot Camp
Lesson 1.2



Quick Refresher



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



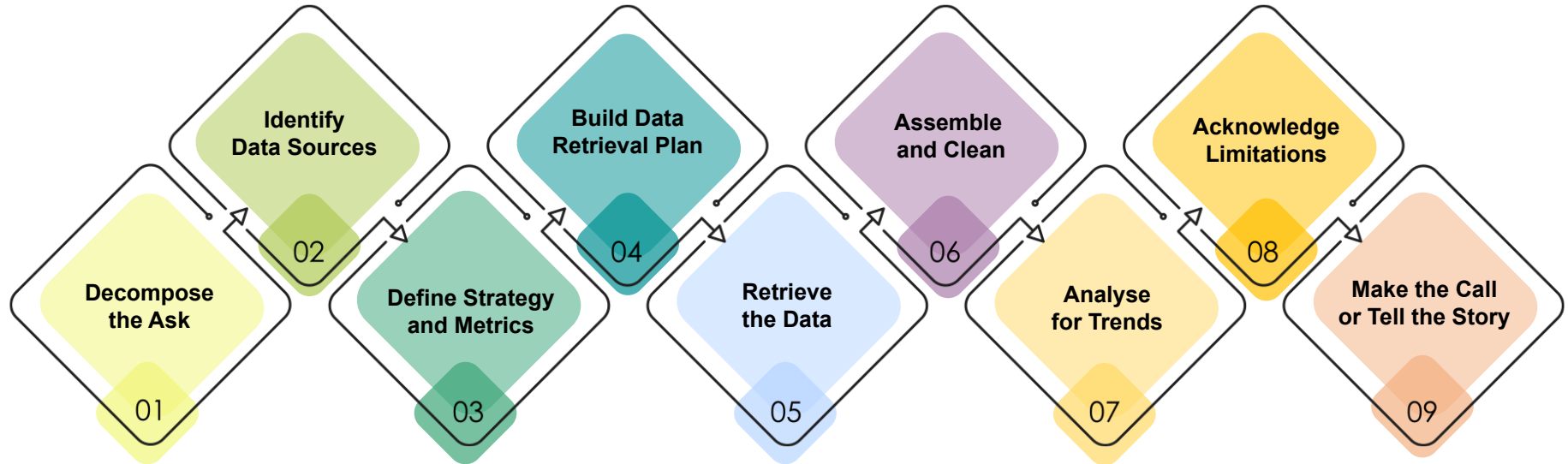
Fundamentally, data analytics
is about **storytelling** and **truth
telling.**



What are the steps in
the **Analytics Paradigm**?

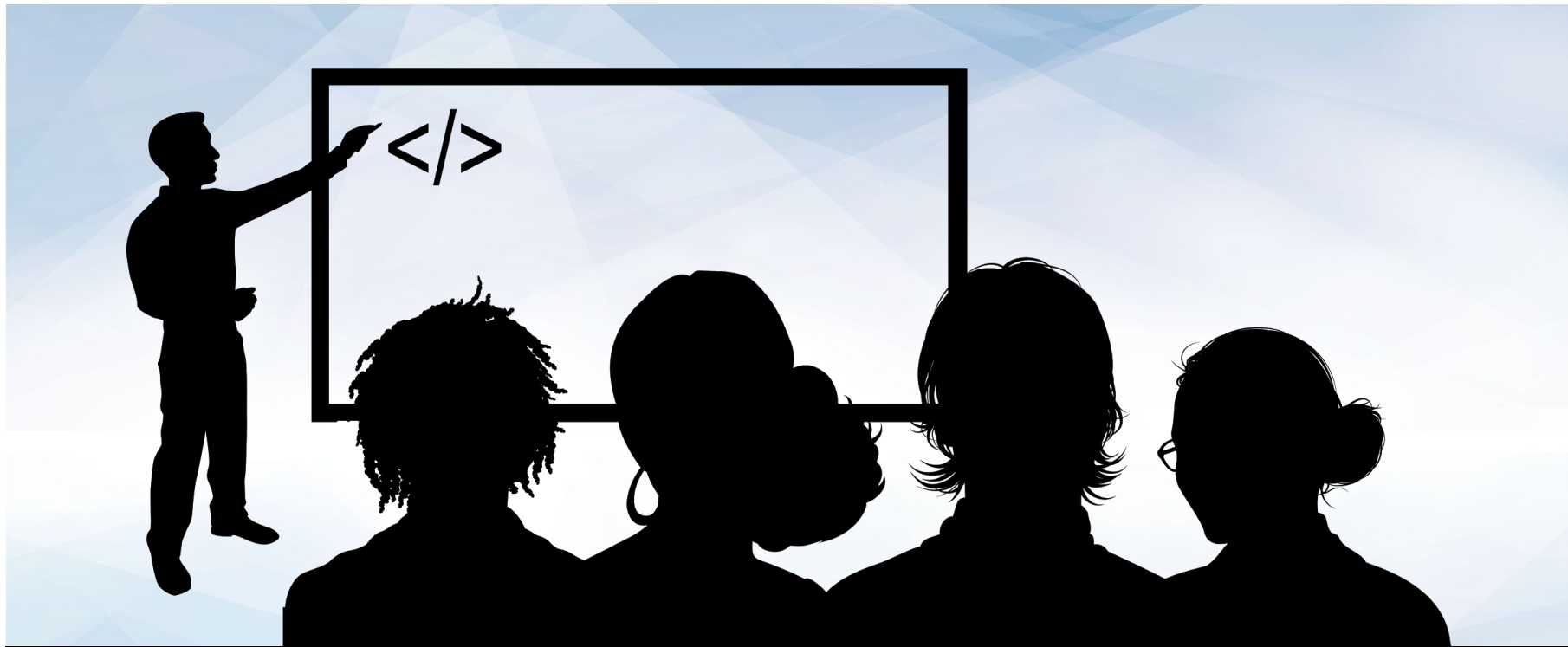
Analytics Paradigm

Regardless of type or industry, this paradigm provides a repeatable pathway for effective data problem solving.



Let's Start with the Basics





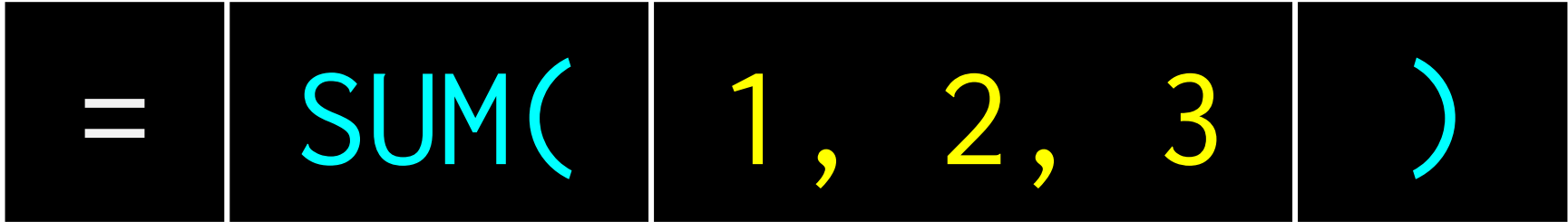
Instructor Demonstration

Excel Playground

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 do something to, 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**?

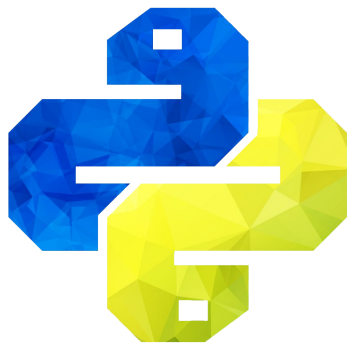


This is a **nested function**.
We'll be doing plenty
of complex nests in
this class.

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

You Can Code, Too!

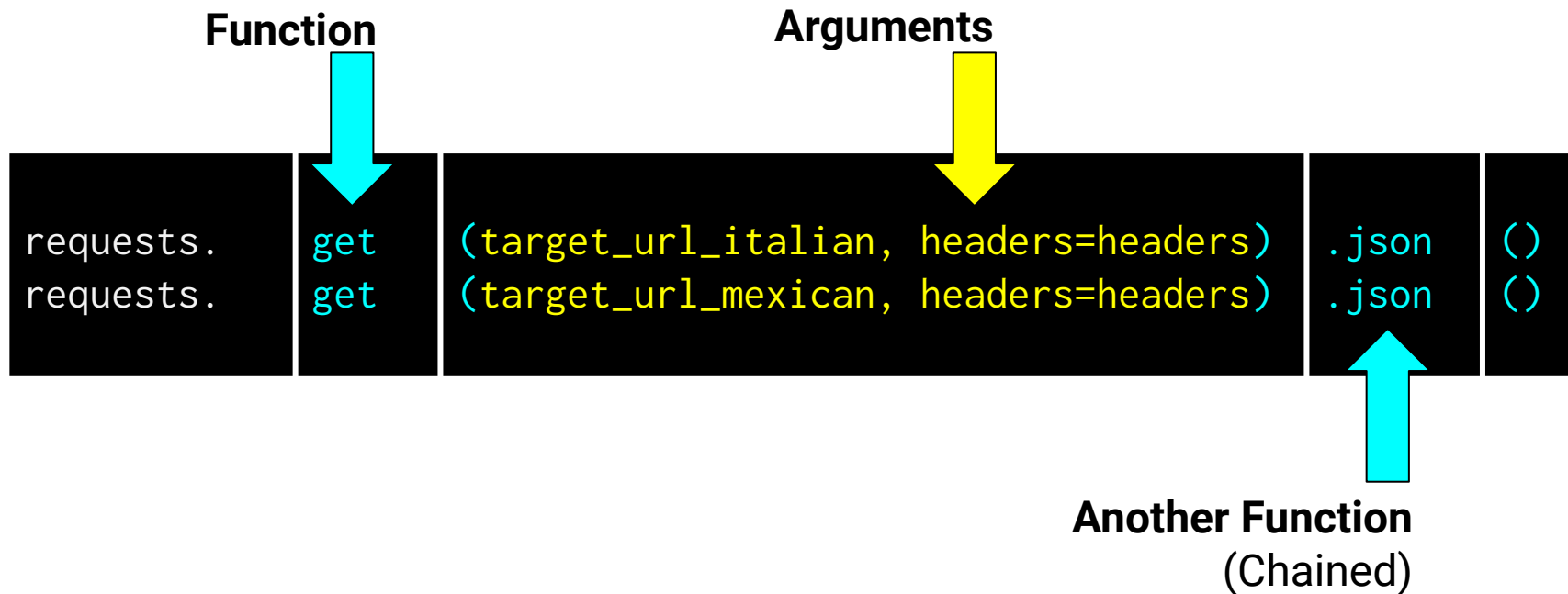
Here's a Python snippet from the last class.



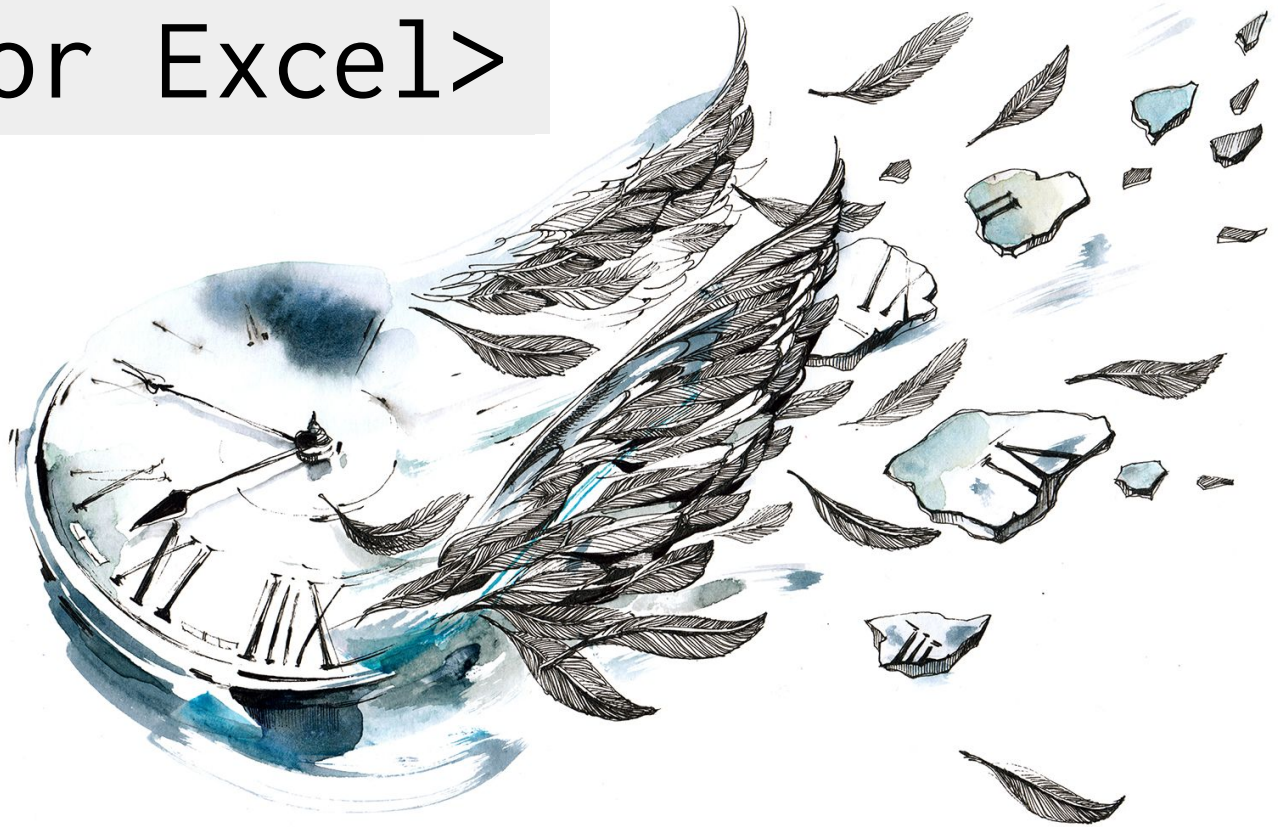
```
requests.get(target_url_italian, headers=headers).json()  
requests.get(target_url_mexican, headers=headers).json()
```

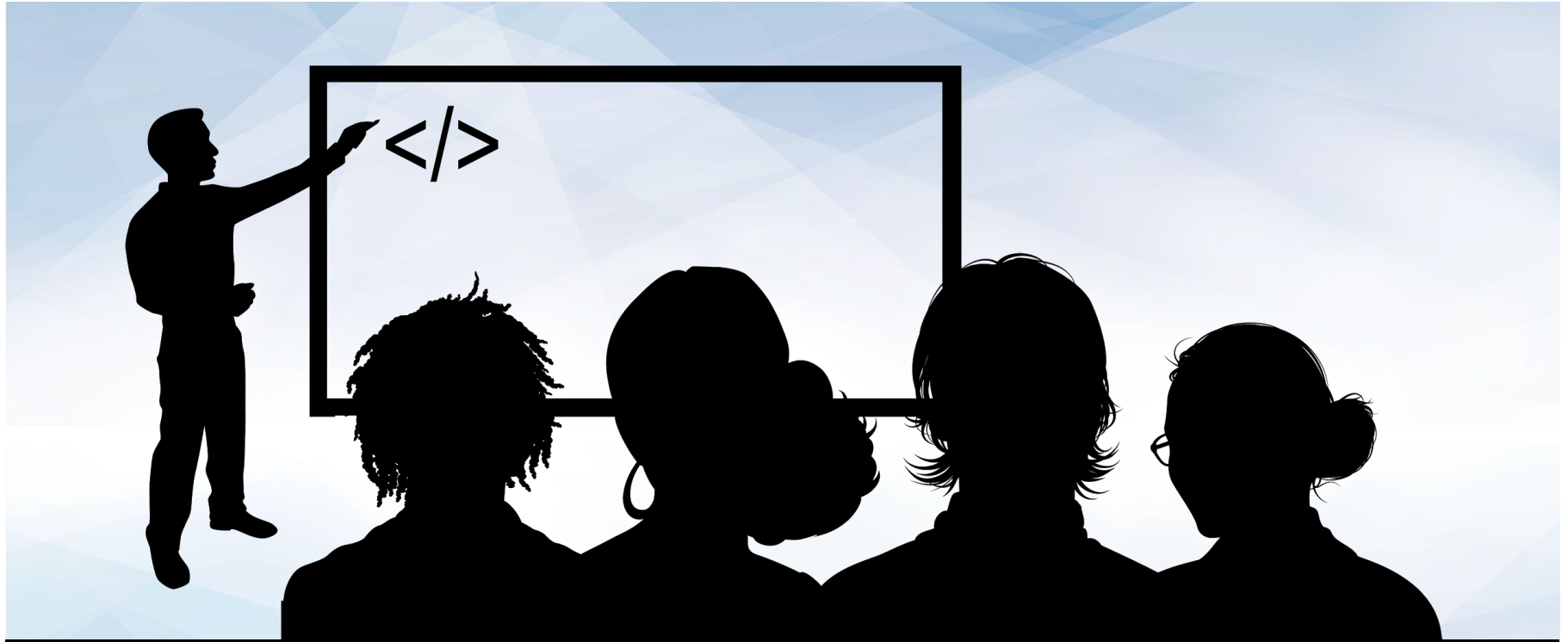
You Can Code, Too!

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 into a function.

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

There Are Multiple Ways to Select Data in a Formula

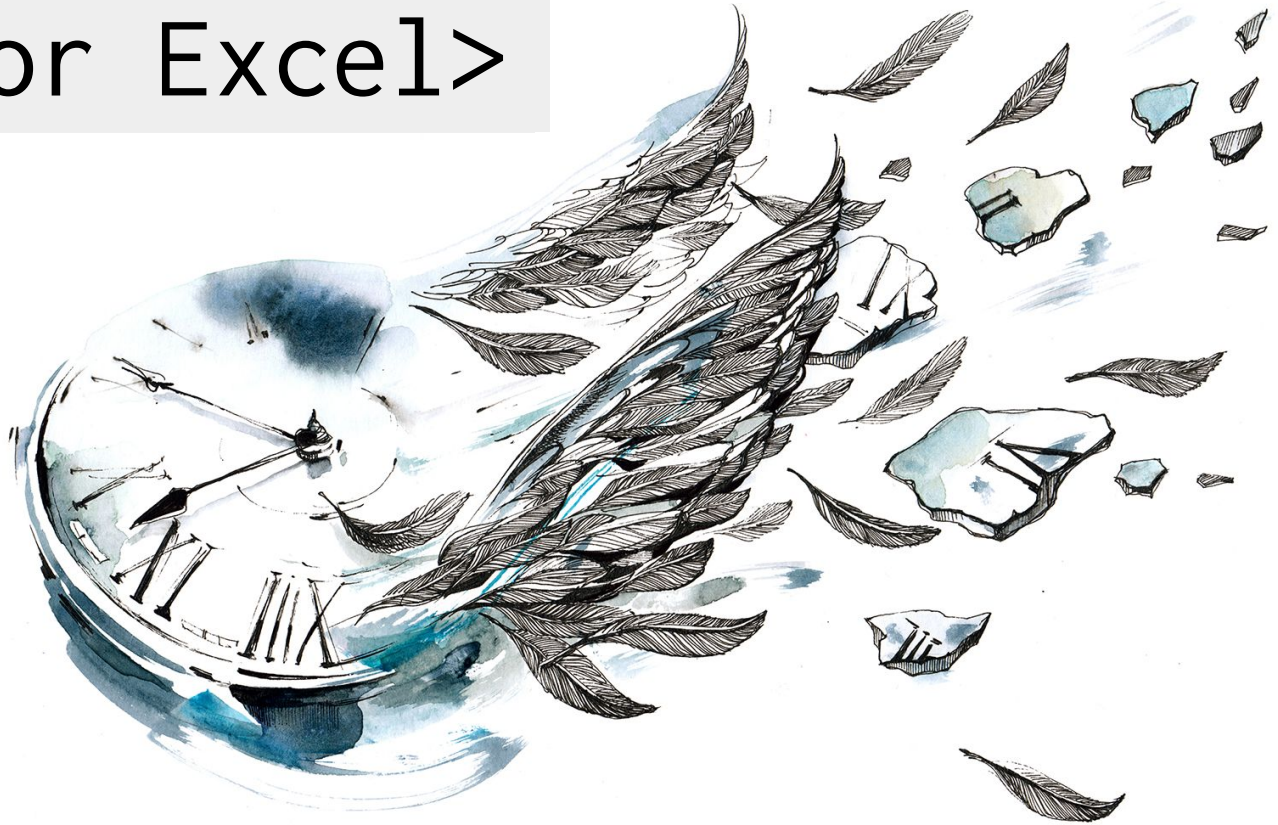
But we can name a range of values to make interpreting formulas easier!

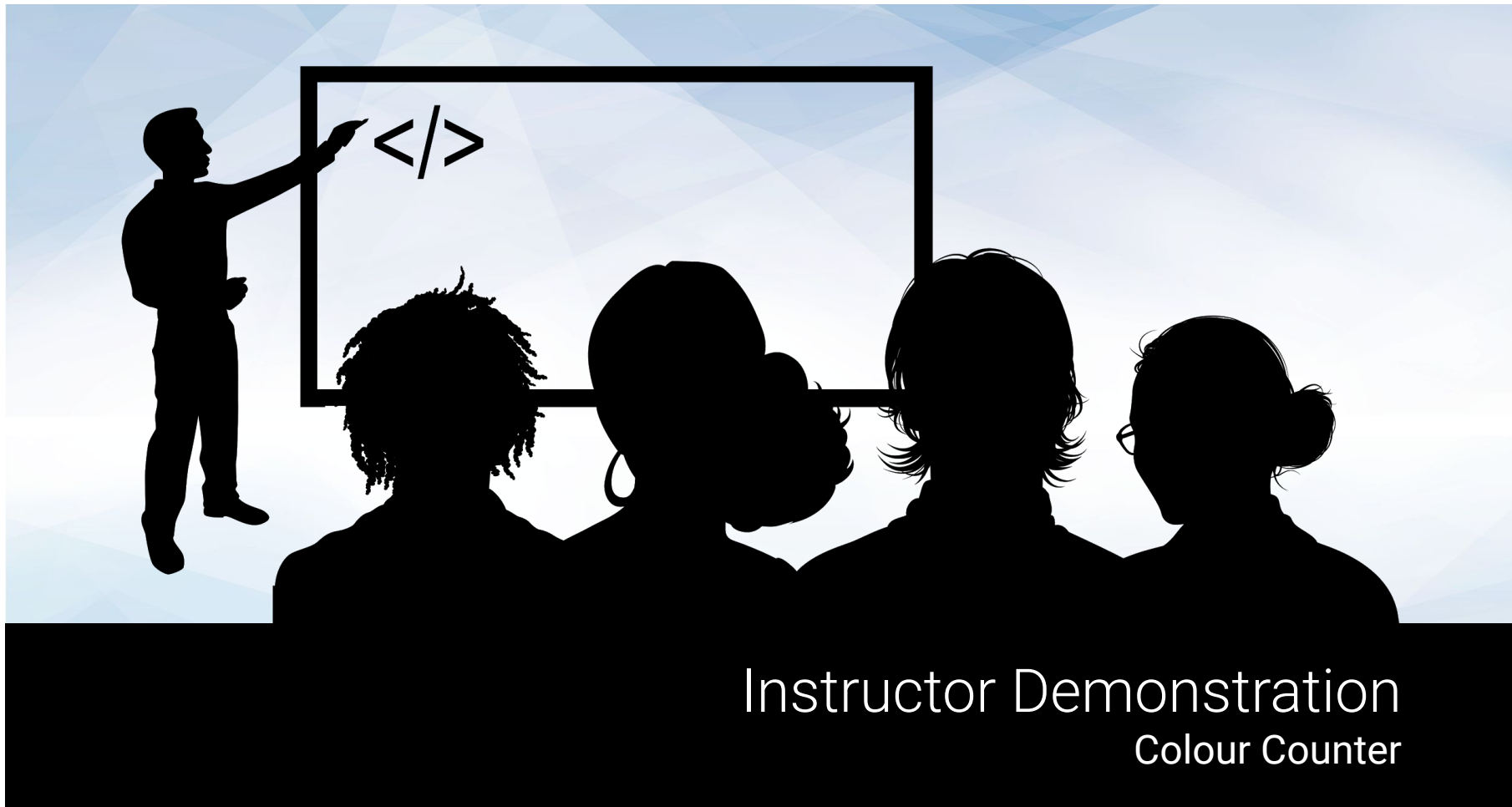
`=AVG(A1:A10)`



`=AVG(prices)`

<Time for Excel>



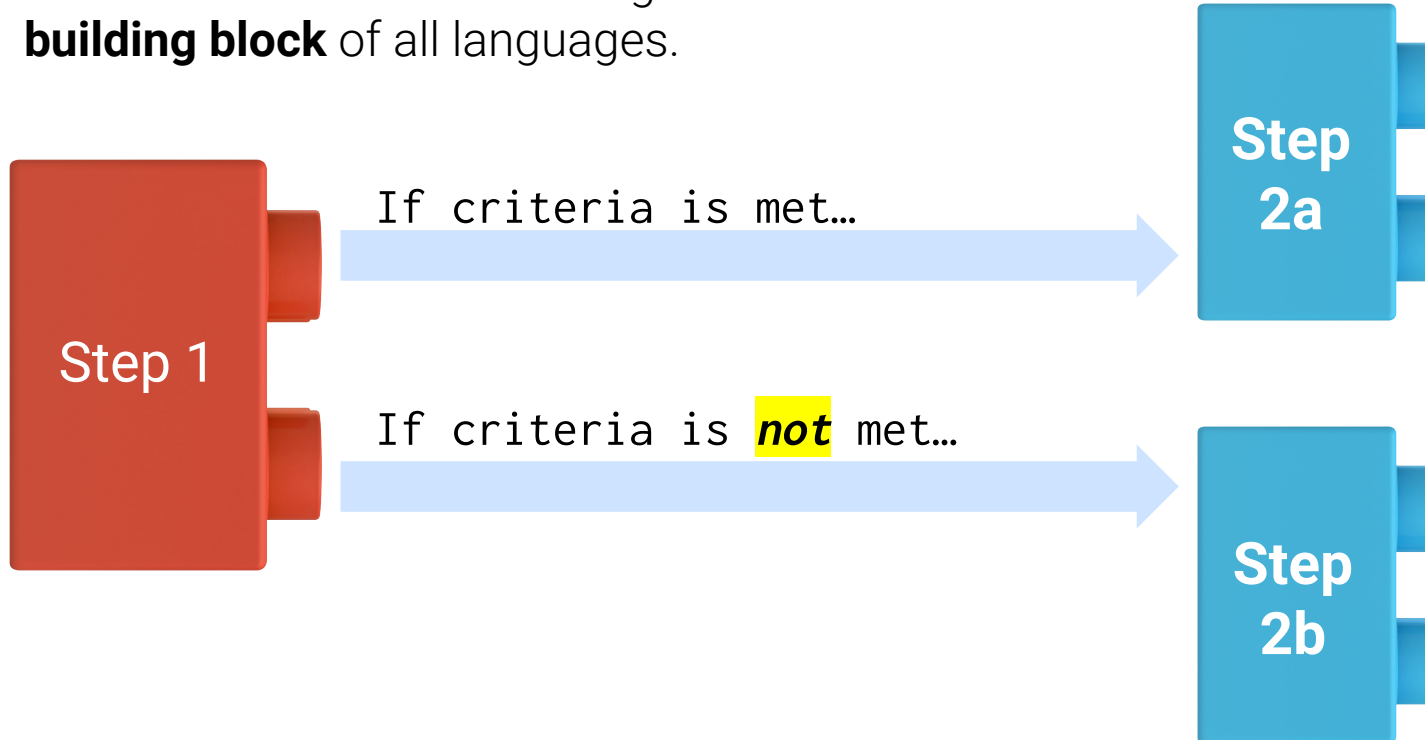


Instructor Demonstration

Colour Counter

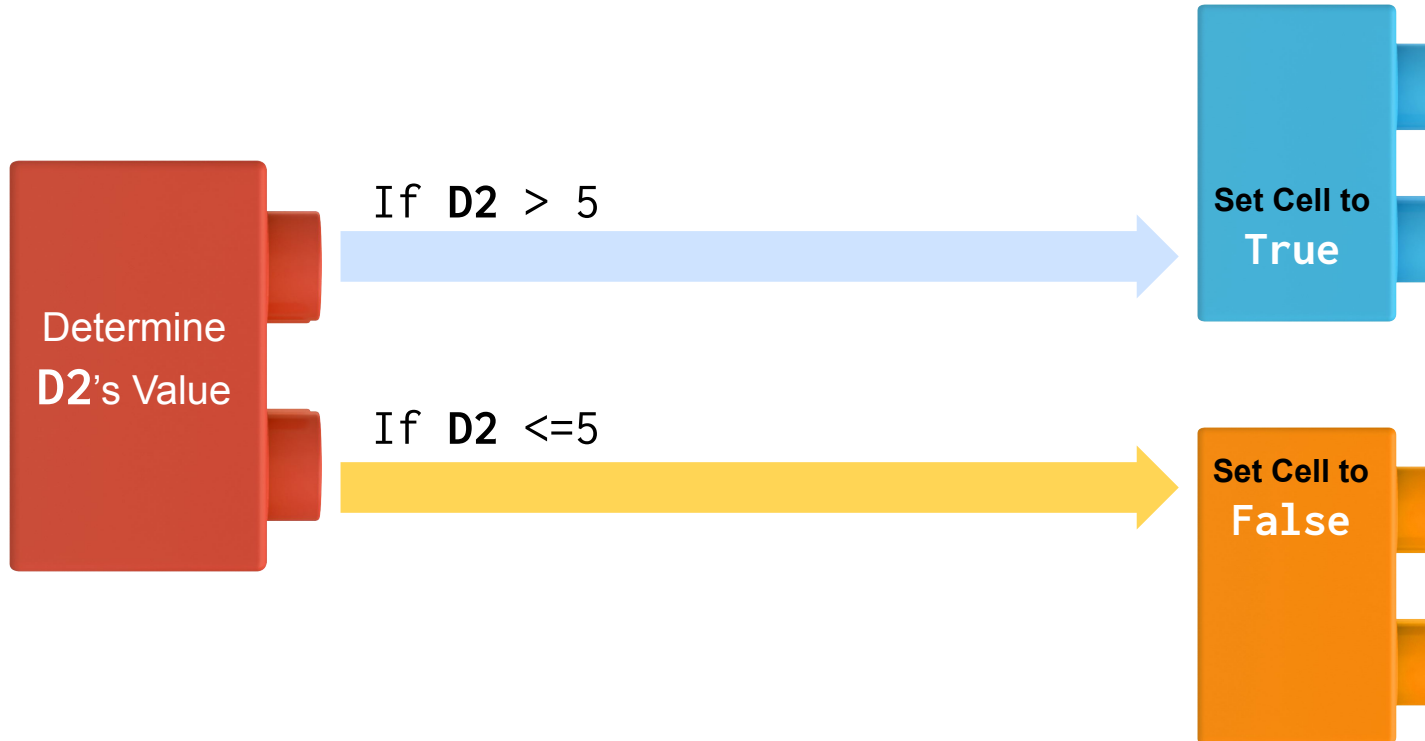
Conditionals: If This, Then That

Conditionals present a way to control the flow of logic based on certain criteria being 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?

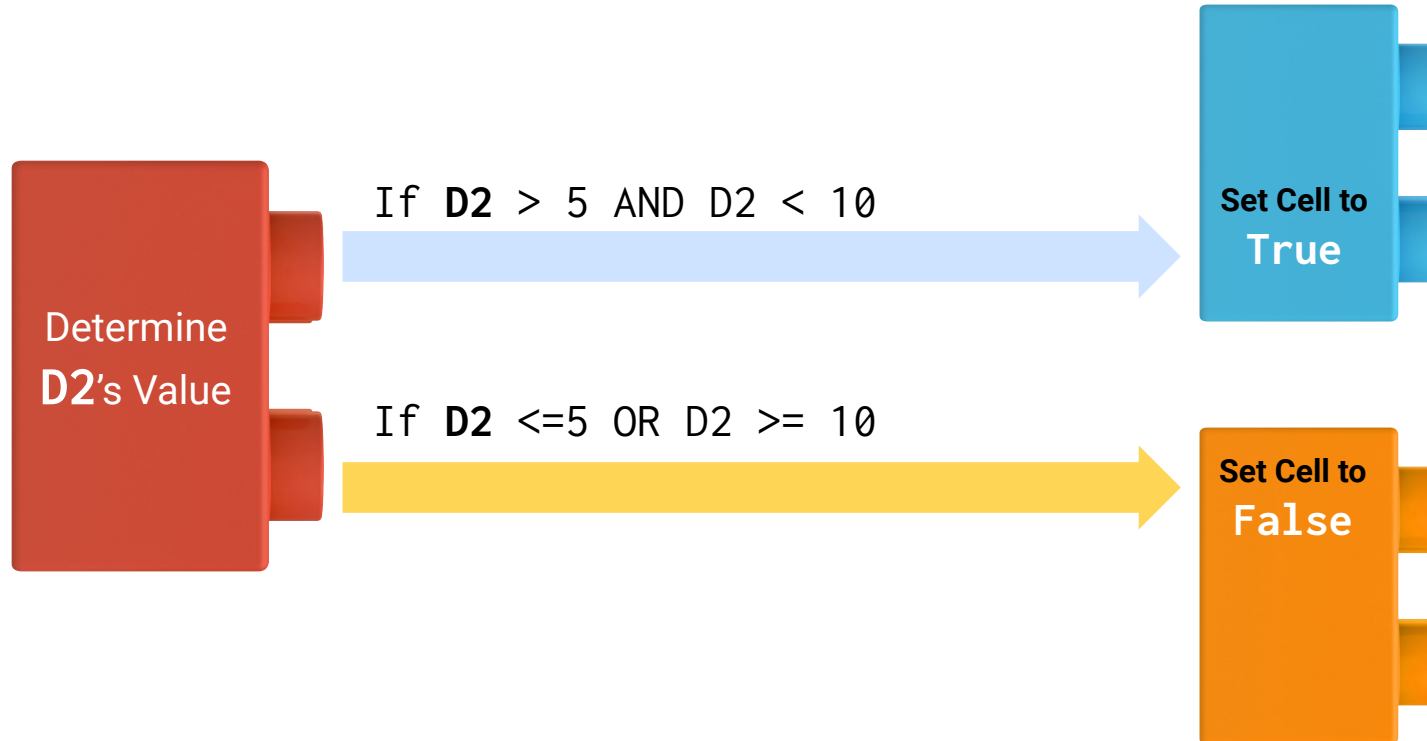


AND, NOT, OR

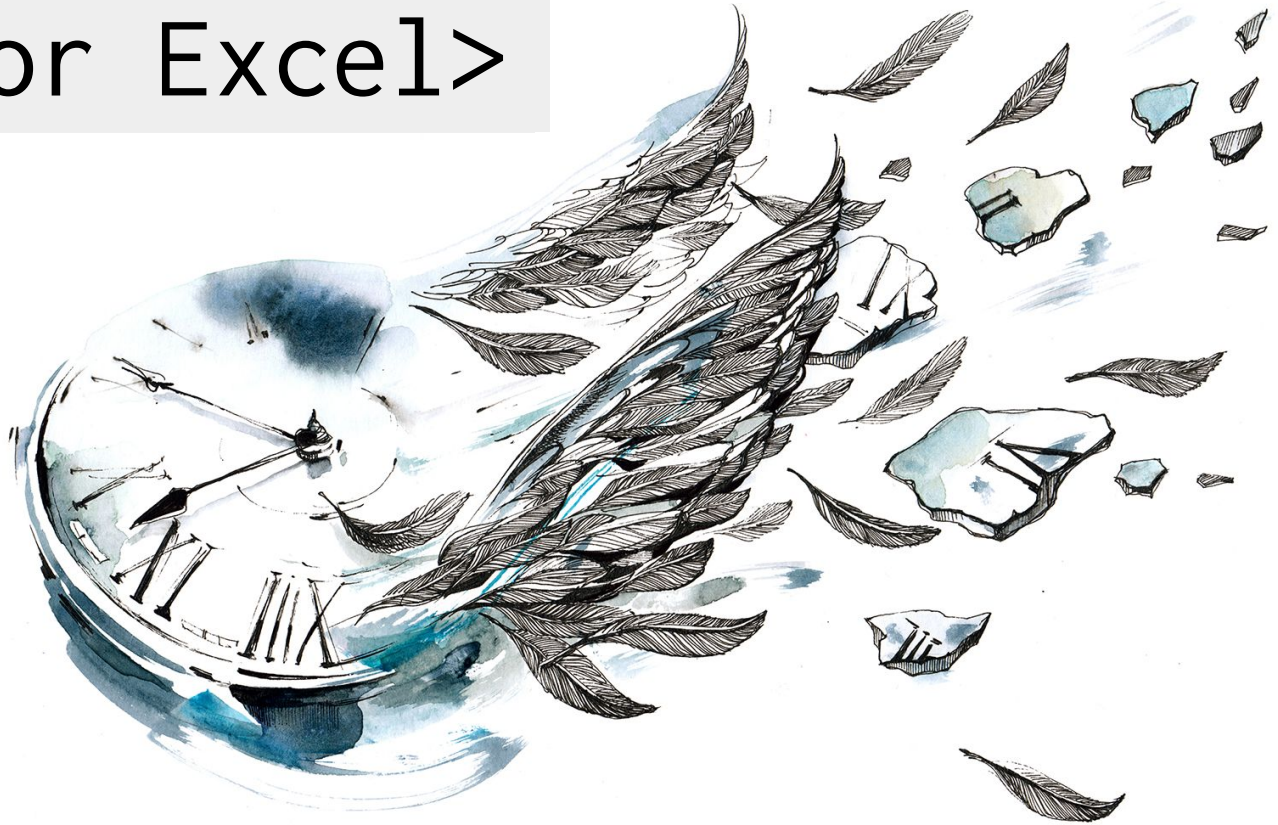
```
=IF(AND(D2>5, D2<10),TRUE,FALSE)
```

Conditionals: If This, Then That

Nesting conditionals are powerful, but can become convoluted very quickly!



<Time for Excel>





Activity: Gradebook

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

Suggested Time:
15 minutes



Activity: Gradebook

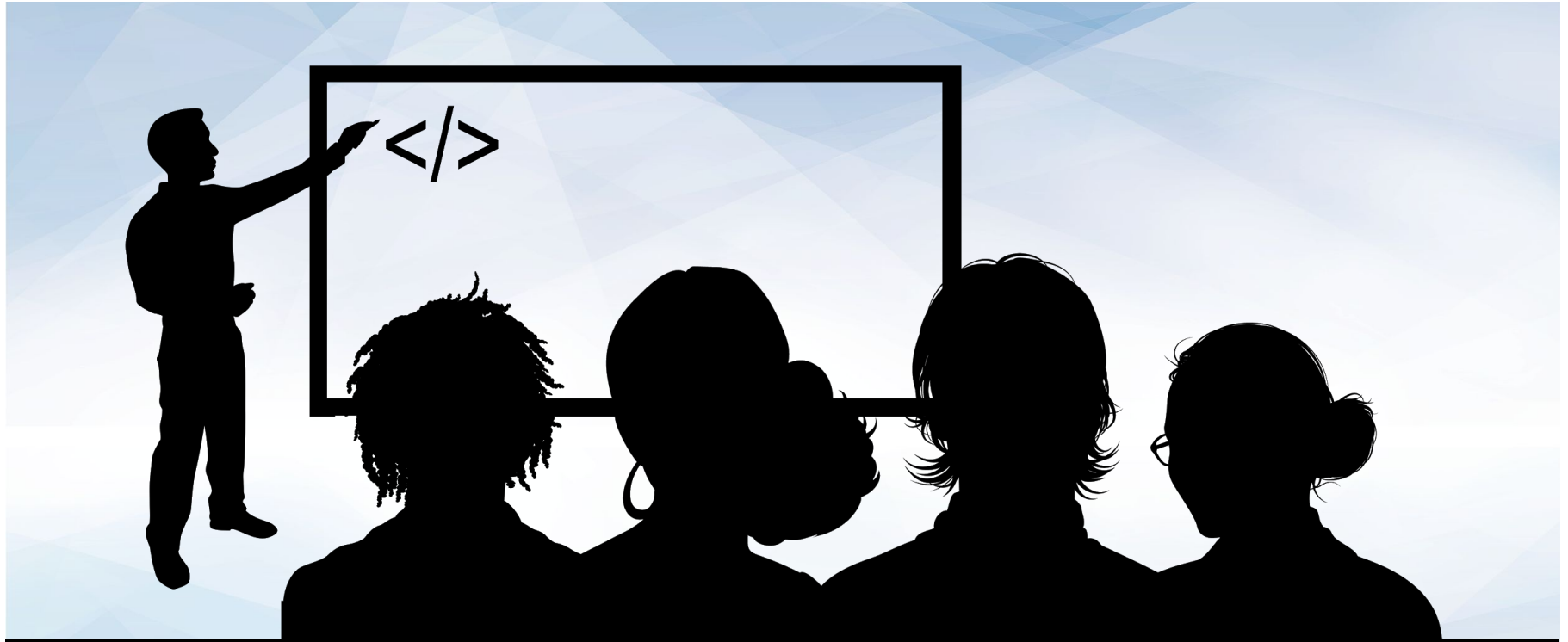
To do:	When making this calculation:	Bonus:
Create a formula which calculates the final grade for a student based upon their previous exams and assignments.	<ul style="list-style-type: none">Consider every assignment and exam to be equal in weight; each should comprise one-fourth of the overall grade.Round 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.	<p>Create a nested IF() formula that returns a letter grade based on a student's final grade.</p> <ul style="list-style-type: none">Greater than or equal to 90 = AGreater than or equal to 80 and less than 90 = BGreater than or equal to 70 and less than 80 = CGreater than or equal to 60 and less than 70 = DAnything 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 centre 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

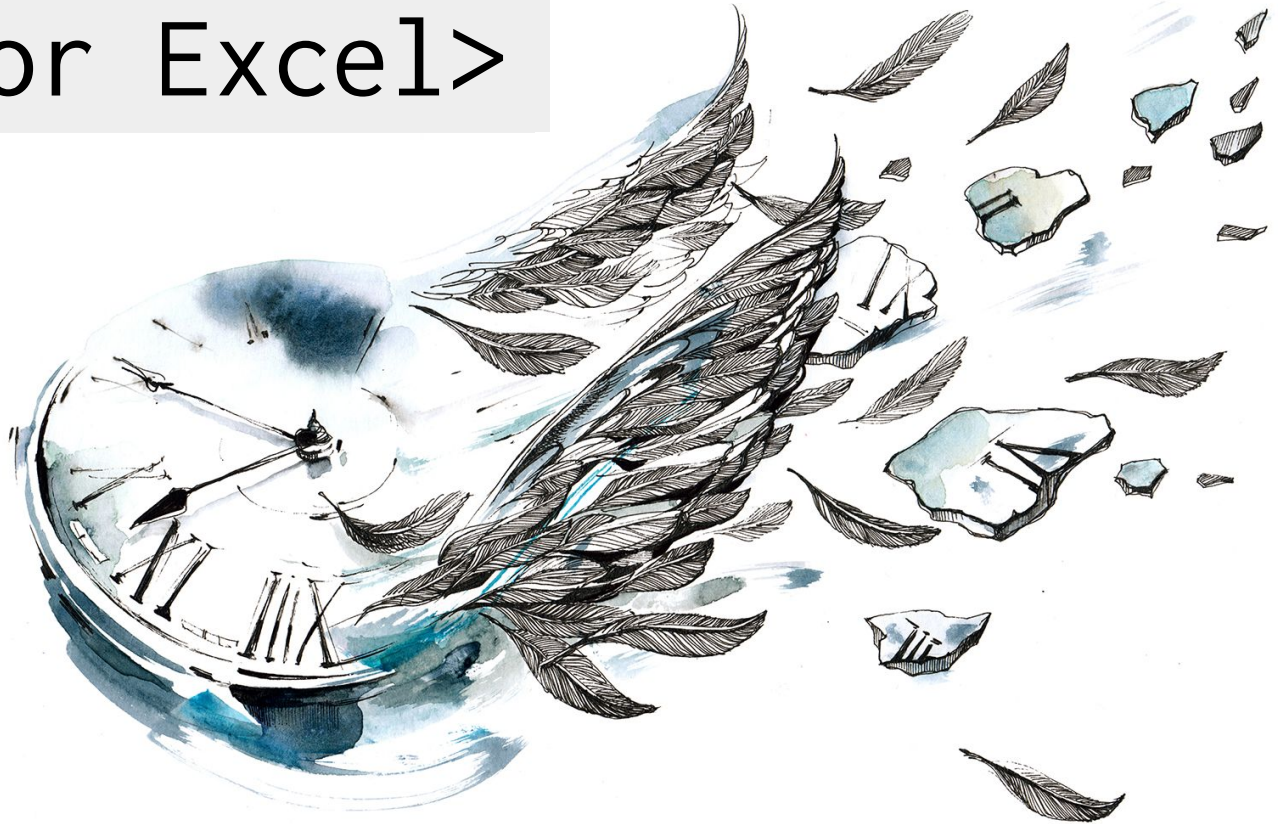
- The middle value of a data set
- **To calculate:** sort the data set and find the centre

03

Mode

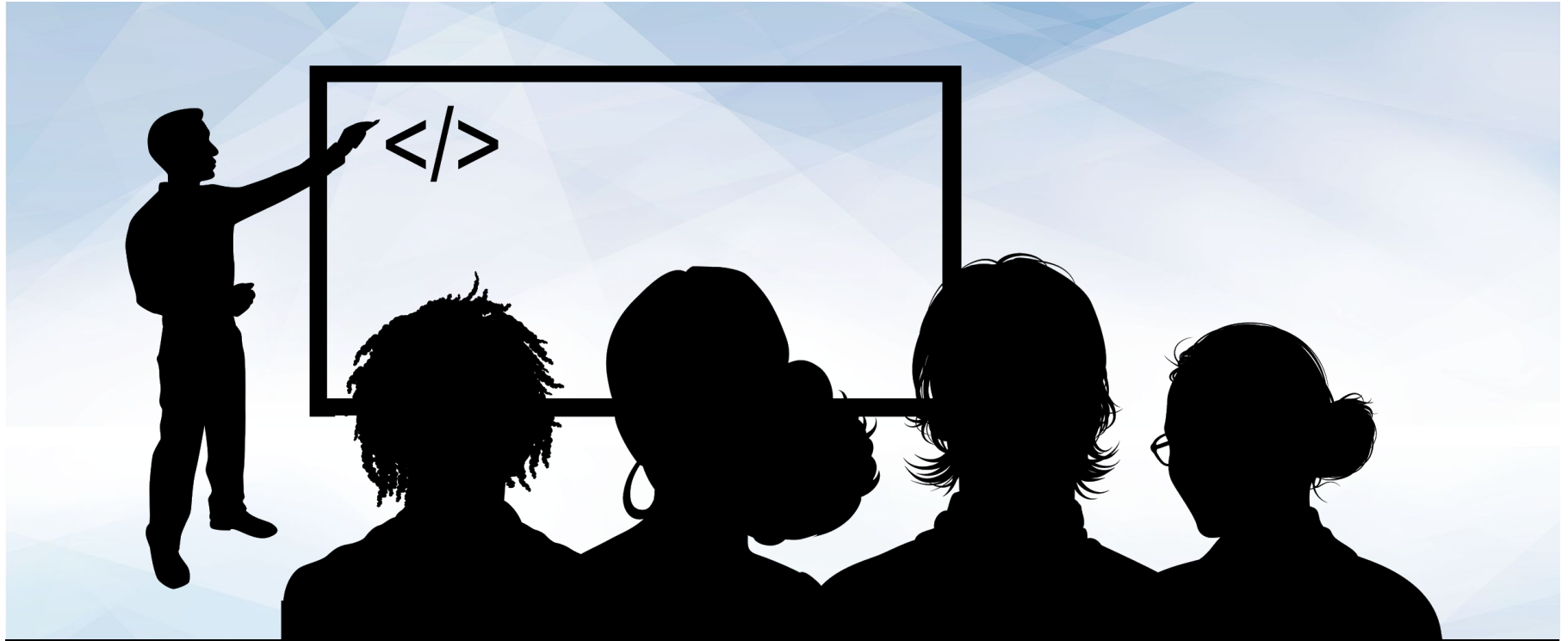
- The most frequent value of a data set
- **To calculate:** count the frequency of each value in a data set, then determine the most frequent value

<Time for Excel>





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:

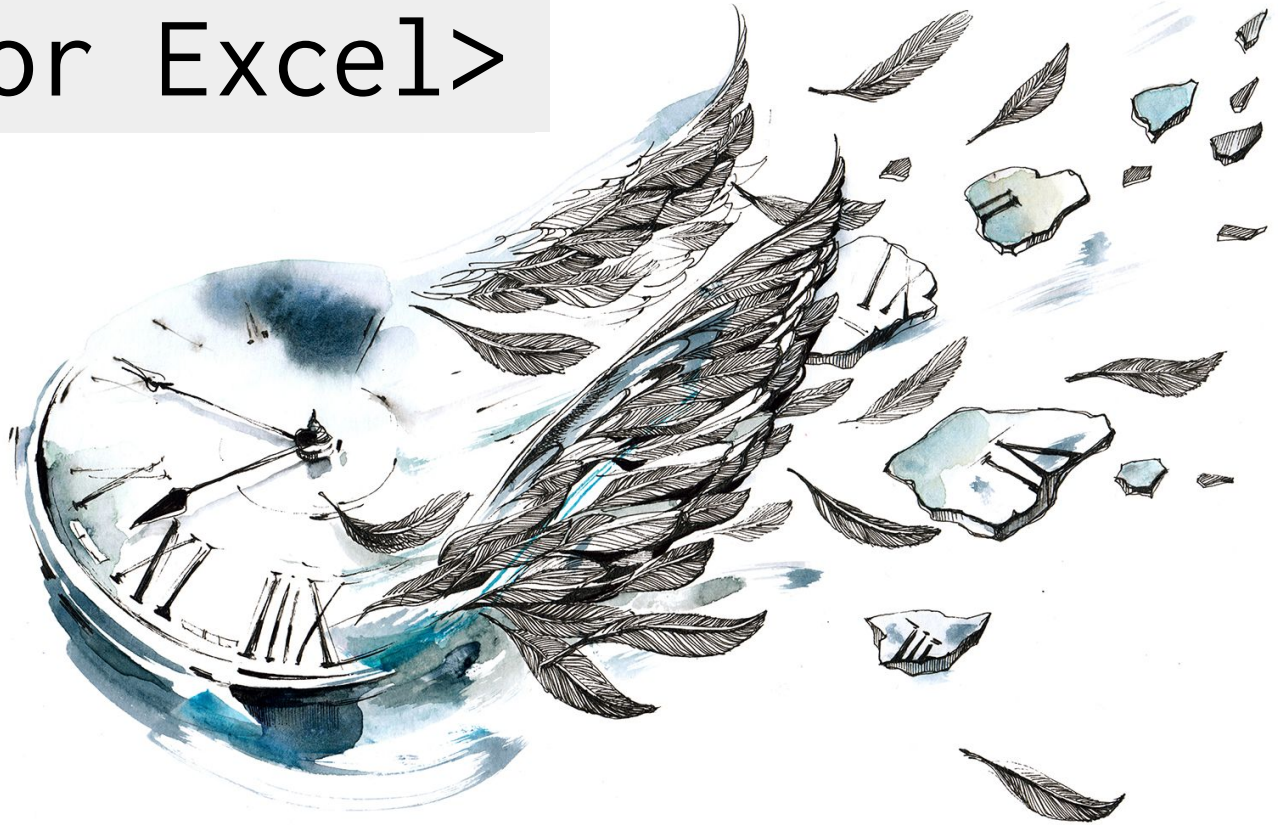
- Date and Time
- Currency
- Percentage
- Scientific Notation

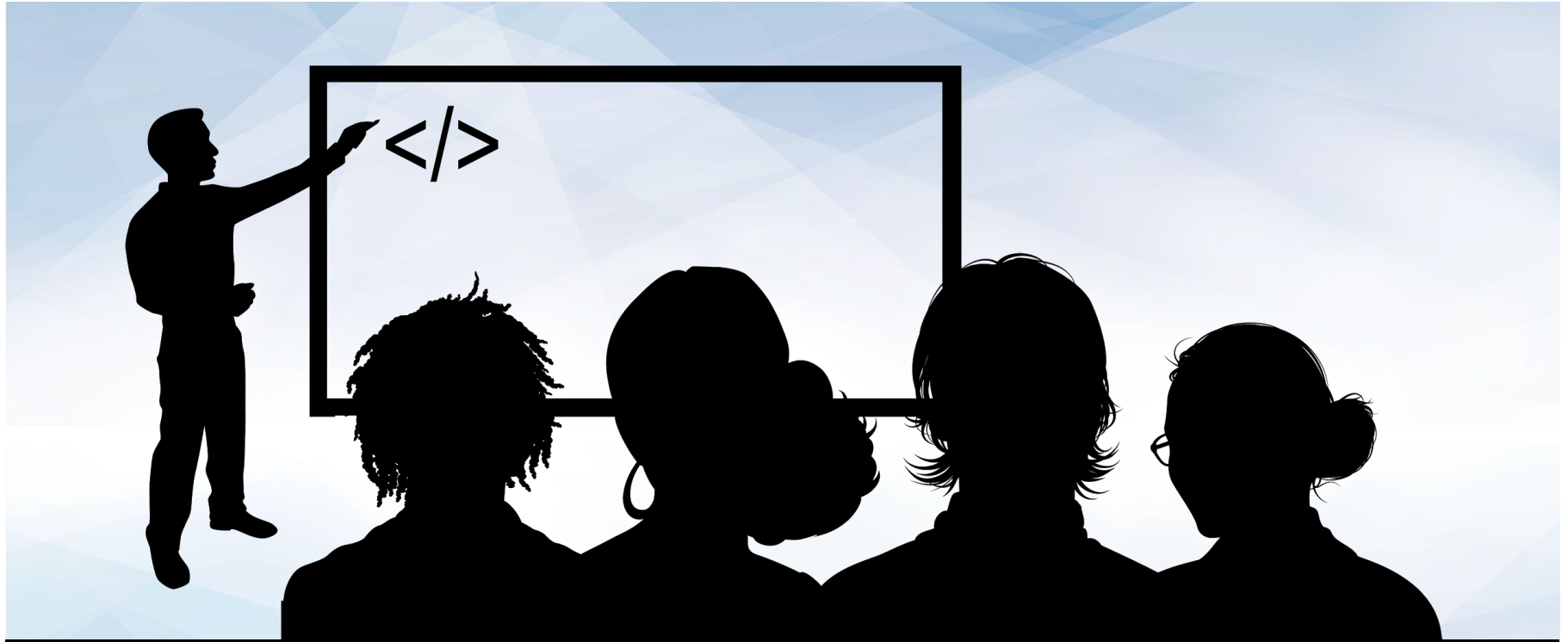
02

Style Formatting

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

<Time for Excel>





Instructor Demonstration

Pivot Tables

Get Pivot with It

Pivot tables are one of the most important data visualisation concepts to master in this class. (Don't worry, they are a cinch to deal with.)

The screenshot displays a spreadsheet with a pivot table summarizing revenue by month and location. The pivot table is structured with 'Row Labels' (Month) and 'Column Labels' (Location). The data is as follows:

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

The 'Insert Calculated Field' dialog box is open, showing the following details:

- Name: AverageRevenue
- Formula: = Revenue/ Reservations
- Fields: Year, Quarter, Month, RoomType, Revenue, Reservations

The 'PivotTable Builder' window is also visible, showing the following configuration:

- Field Name: Search fields
- Filters: None
- Columns: RoomType
- Rows: Year, Month
- Values: Sum of Revenue

Get Pivot with It

In essence, 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	Quantity Sold	Date
James	\$42.50	1/1/17
Jordan	\$65.00	3/1/17
Jordan	\$5.25	6/1/17
James	\$125.00	6/1/17
Jordan	\$3.50	7/1/17
Michelle	\$32.00	9/1/17

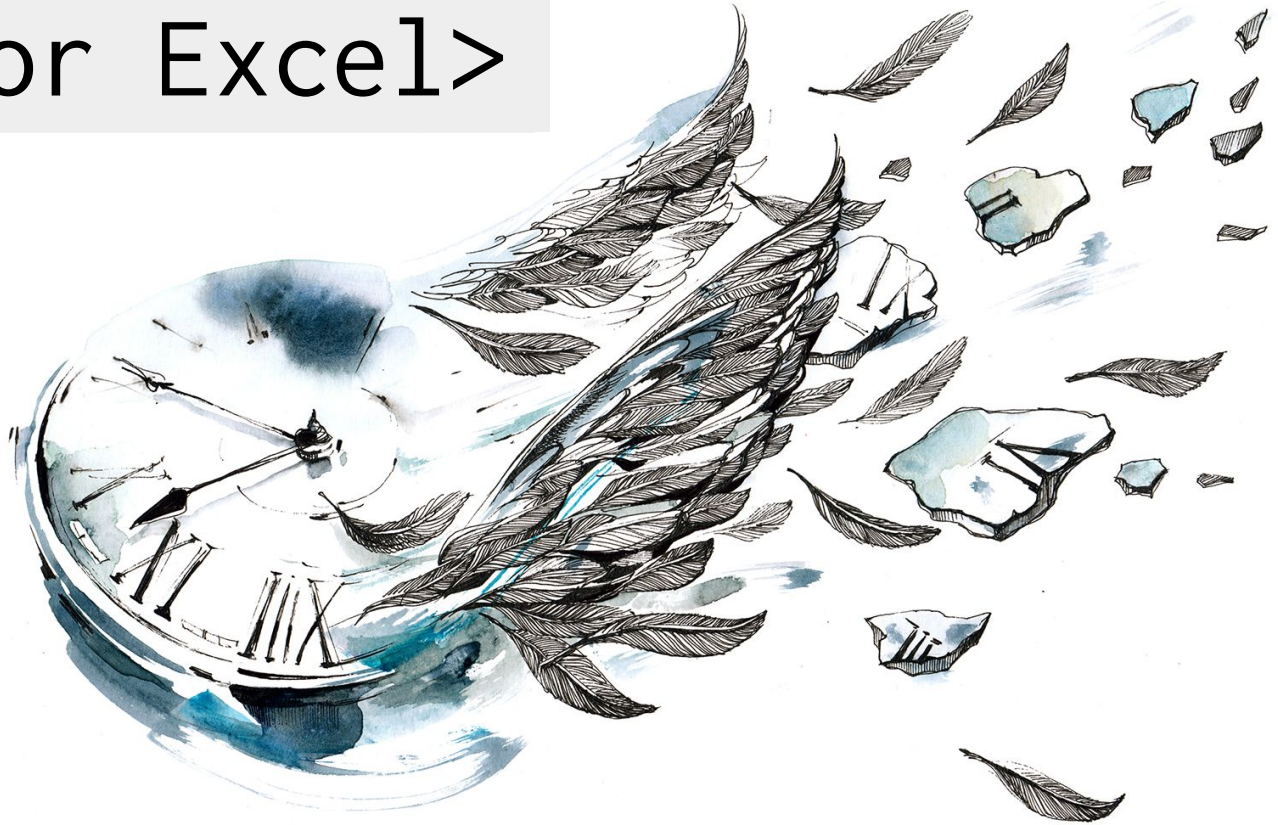
Seller	Total Sold
James	\$167.50
Jordan	\$73.75
Michelle	\$32.00

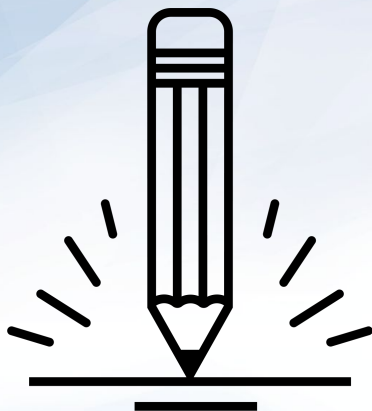
Word to the Wise: Keep It Flat!

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 utilise pivot tables as a tool for their visualisations. **Don't try to confuse this simplicity. 'Spreadsheet magic' is a nightmare to analyse.**

B	C	D	E	F	G	H
DateTime	Week #	Section?	Pace	Academic Support	Self-Mastery	Instructor Eval
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

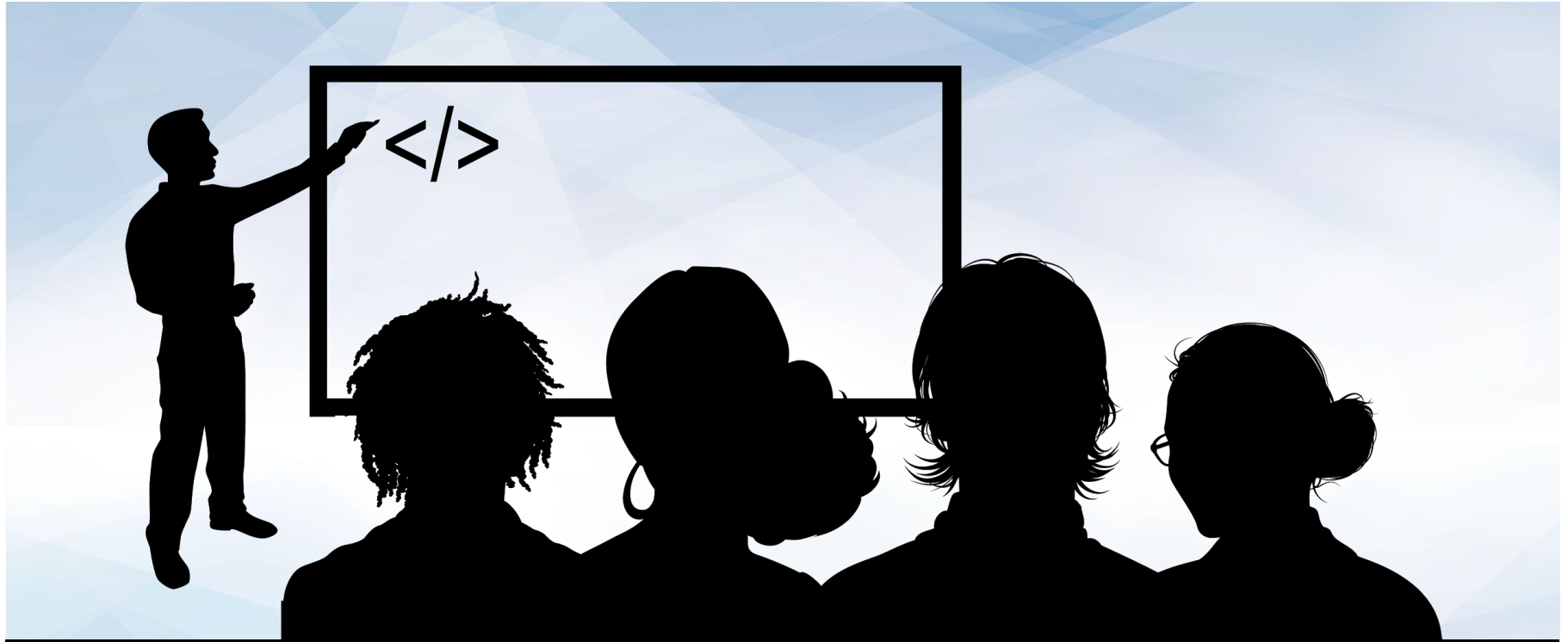
- Select all of the data in your worksheet and create a new pivot table.
- Make a pivot table that can be filtered by year and contains two rows: *Artist* and *Name*.
- All of an artist's songs should be listed below their name.
- Update your pivot table to contain values for:
 - How many songs an artist 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.

Suggested Time: 17 minutes





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?

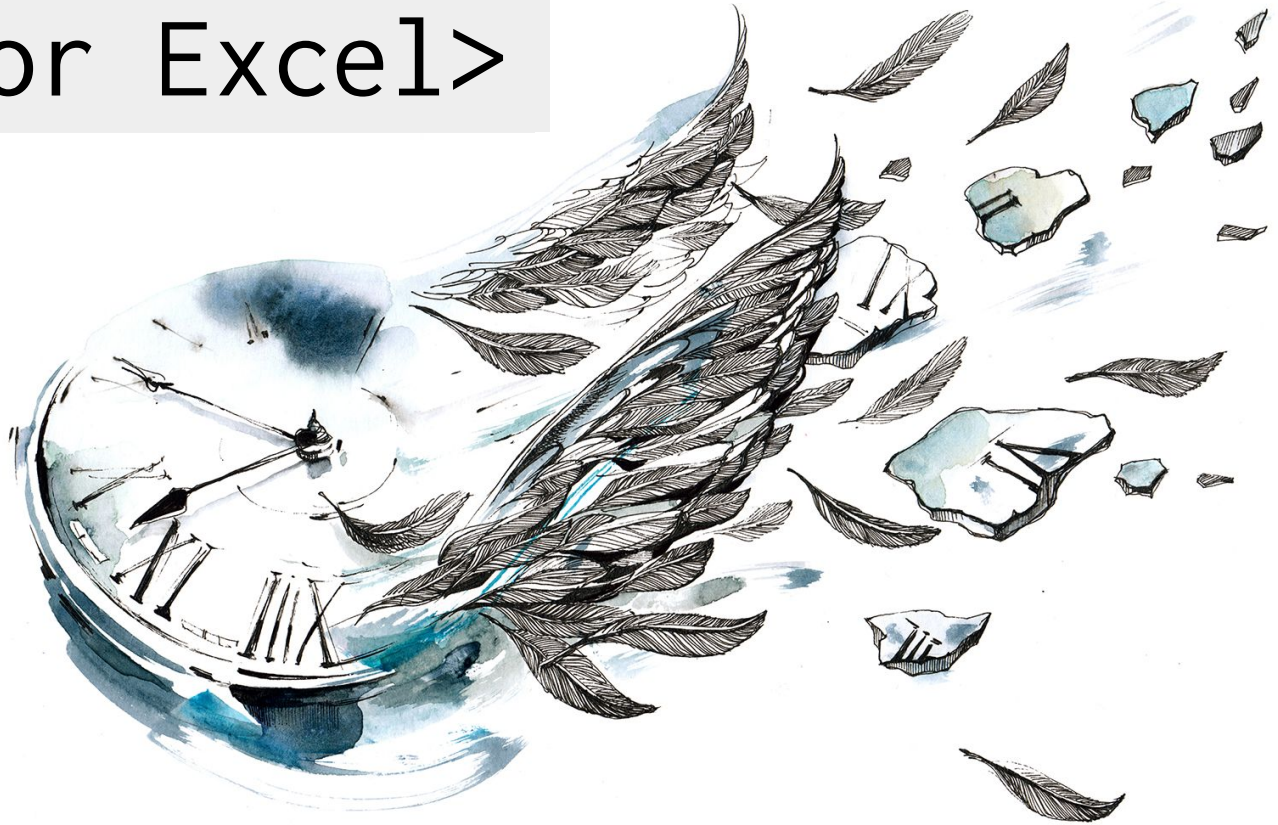
`=vlookup("Asteroid 9", Planets, 3, FALSE)`

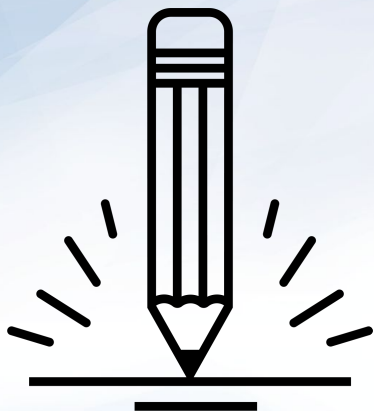
Planet	Population	Species
Zeelo	5020	Zoltans
Merinoa	380	Murphies
Cardboard Box	2	Hambones
...	...	
Asteroid 9	95	Asterisks



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 visualises 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 both 'Product Price' and 'Shipping Price' for each 'Order Number' and 'Product ID'.

Suggested Time: 15 minutes





Time's Up! Let's Review.