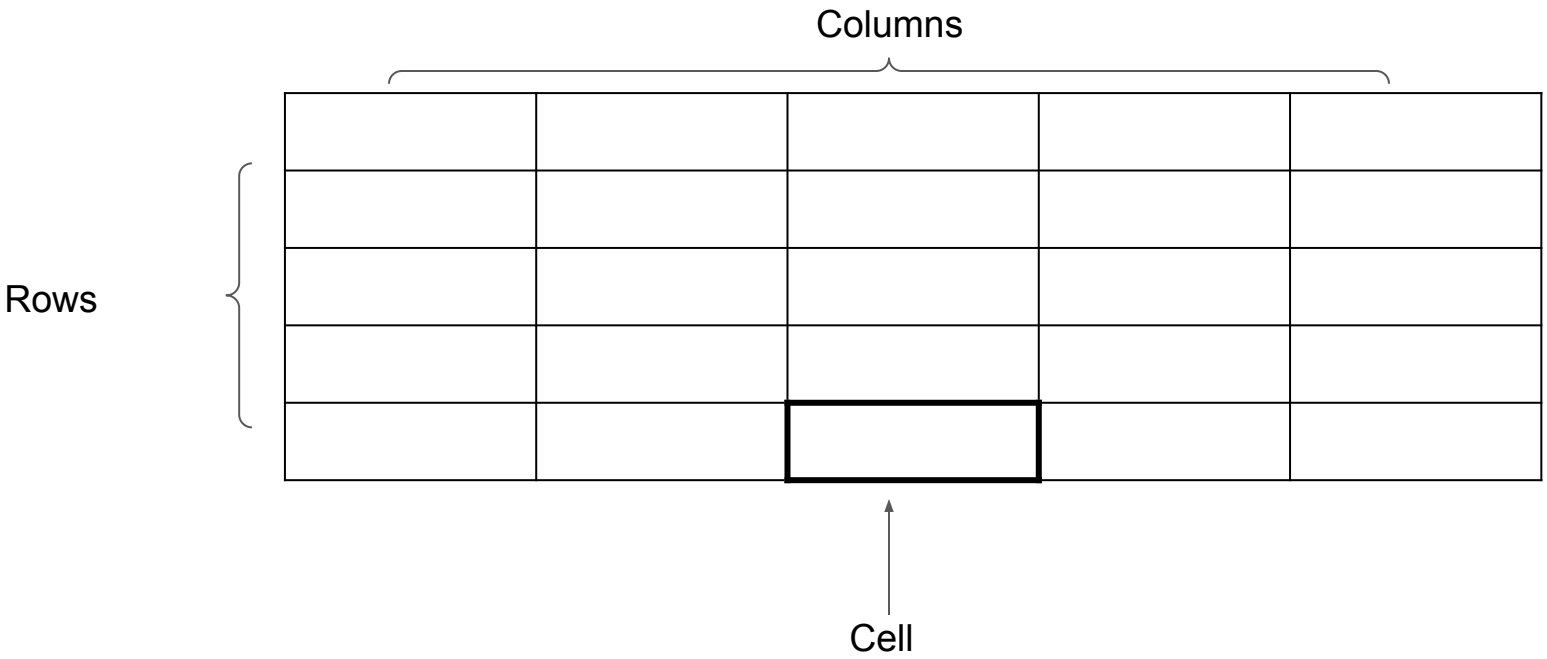
Intro to Spreadsheets

What is a spreadsheet?

A spreadsheet is a way to represent raw data (the actual numbers that are part of a given observation) and/or calculations based on raw data. These data are organized into **rows** and **columns**. An individual block is called a **cell**:



What is a spreadsheet?

Each **row** has a unique identifier, as well as each **column**. The combination of each **row** and **column** identifier gives each **cell** an address, similar to coordinates:

	A	**B**	**C**	**D**
1				
2				
3				
4		**B4**		

What is a spreadsheet?

Spreadsheets start at **row 1** and **column A** (A1) and can have a maximum of 1,048,576 **rows** and 16,384 **columns** (Excel 2019):

	A	**B**	**...**	**ZZZ**	**...**
1					
2					
...					
999999		**B999999**			
...					

What is a spreadsheet?

Rows typically have values belonging to an **observation** and **columns** have values belonging to a **variable:**

	A	B	C	D	E
1	Name	Weight (g)	KCal	Expires on	Price
2	Eggs	121	186	1/21/2018	$0.40
3	Sugar	125	484	1/1/2020	$0.20
4	Butter	65	466	1/20/2018	$2.00
5	Flour	190	692	9/1/2018	$0.30

This tabular data format is one you will see in SQL and Python as well.

Concepts

- Formulas
- Mathematical Symbols
- Comparison Symbols
- Referencing other cells
  - Relative
  - Absolute
- Copying values

Adding Formulas

You can add a formula to a cell. This will perform whatever calculations are specified and display the result in the cell:

	A	B	C	D	E	F
1	Name	Weight (g)	KCal	Expires on	Price	Tax
2	Eggs	121	186	1/21/2018	$0.40	=0.4*0.1
3	Sugar	125	484	1/1/2020	$0.20	
4	Butter	65	466	1/20/2018	$2.00	
5	Flour	190	692	9/1/2018	$0.30	

Mathematical Symbols

Addition	+
Subtraction	-
Multiplication	*
Division	/
Exponent	^
Parentheses	()

Referencing Other Cells

Instead of typing in the same values over again, you can simply reference another cell and use the value there in a calculation:

	A	B	C	D	E	F
1	Name	Weight (g)	KCal	Expires on	Price	Tax
2	Eggs	121	186	1/21/2018	$0.40	=E2*0.1
3	Sugar	125	484	1/1/2020	$0.20	
4	Butter	65	466	1/20/2018	$2.00	
5	Flour	190	692	9/1/2018	$0.30	

Relative vs Absolute referencing

When you enter a cell address as part of formula (like on the previous slide), this is a **Relative** reference. These look at distance between cells (number up and over). This is useful when performing the same function on similar groups of data, where each copy of the formula will reference different cells. If you want to always reference the same cell, you can use **Absolute** referencing by adding **$**s:

	A	B	C	D	E	F
1	Name	Weight (g)	KCal	Expires on	Price	Tax
2	Eggs	121	186	1/21/2018	$0.40	=E2*B7
3	Sugar	125	484	1/1/2020	$0.20	
4	Butter	65	466	1/20/2018	$2.00	
5	Flour	190	692	9/1/2018	$0.30	
6						
7	TAX:	10%				

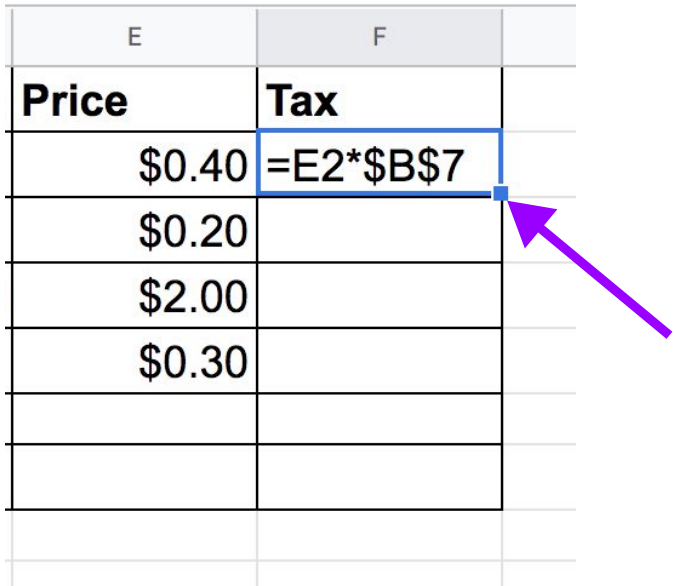
Relative vs Absolute referencing

A keyboard shortcut for making absolute references is **F4**. When entering a formula, enter the cell address, then continue to press **F4** and you will cycle through the different absolute reference options.

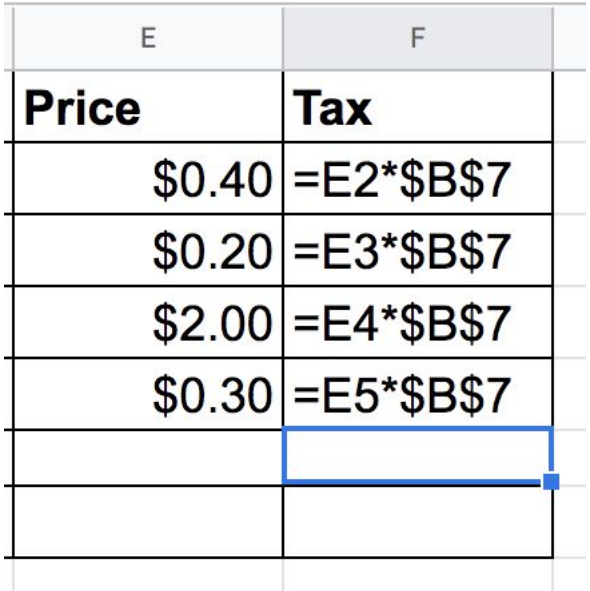
xF4	Absolute reference
0	A1
1	A1
2	A$1
3	$A1
4	A1

Copying Values

Instead of retyping a formula for each calculation you want to make, you can copy it to adjacent by dragging the square in the bottom right corner of the highlighted cell(s):



	E	F
	Price	**Tax**
	$0.40	=E2*B7
	$0.20	
	$2.00	
	$0.30	



	E	F
	Price	**Tax**
	$0.40	=E2*B7
	$0.20	=E3*B7
	$2.00	=E4*B7
	$0.30	=E5*B7

Final Table

	A	B	C	D	E	F
1	Name	Weight (g)	KCal	Expires on	Price	Tax
2	Eggs	121	186	1/21/2018	$0.40	$0.04
3	Sugar	125	484	1/1/2020	$0.20	$0.02
4	Butter	65	466	1/20/2018	$2.00	$0.20
5	Flour	190	692	9/1/2018	$0.30	$0.03
6						
7	TAX:	10%				

Comparison Symbols

Equal to	=
Greater than	>
Less than	<
Greater than or Equal to	>=
Less than or Equal to	<=
Not Equal to	<>

Exercises

Use the Starwars data for the following:

1. What what cell is Biggs Darklighter's age stored?
2. Insert a new column next to the **height** column. Title it **height(m)**.
3. The **height** column has the **height** in cm. Write a formula in **height(m)** to calculate the **height in meters** for **Luke Skywalker** by referencing the value in the **height** column and **dividing by 100**.
4. The formula for **Body Mass Index (BMI)** is kg/m^2. Add a new column **BMI** and write a formula to calculate the **BMI** for **Luke Skywalker** (the **weight** column is in **kg**).
5. Copy the formulas for **height(m)** and **BMI** for the rest of the characters in the spreadsheet.
6. Add a new column called **compare_BMI_DV**, then write a formula to see if a character's **BMI** is **greater than Darth Vader's BMI**. Copy the formula for the whole column.