Spreadsheets

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Spreadsheets

- Computer application for computation, organization, analysis and storage of data in a tabular form
  - Operates on data entered in cells of a table
  - Multiple sheets can be combined to create an entire workbook
- Useful for data analytics, finance/accounting. Some form of "what-if" analysis
- Commonly used spreadsheet software programs: Microsoft Excel, Google Sheets, OpenOffice/LibreOffice Calc

Structure

- Ribbon: Used to navigate and access commands (menu bar, quick access toolbar, commands etc)
- Sheet: set of rows and columns
  - Rectangle boxes formed by the pattern are called **cells**
  - Each cell has a unique reference (columns and rows intersect)
  - Each cell is identified by its column letter and row number (e.g. F3)
- Can add new sheets at bottom and name them

Entering Info in a Cell

- You enter info by typing it into a cell
- Cell can hold numeric or text data or the results of formulas over other cells
- Any info entered into a cell will appear in the Formula bar (box above the columns and rows)

- Can add headers, freeze rows, insert/delete/resize/hide rows and columns
  - Resize via double-clicking: automatically makes a column wide enough to fit longest entry on any row
- Format Cells: font size, color, background, alignment etc
  - Number formatting: display with some number of significant digits, or format as date or currency etc

Ranges

- Can specify a rectangular array of cells in terms upper left and lower right corners
  - E.g. **A1:A10** (10 cells), **B2:K2** (10 cells) , **A1:J10** (100 cells)
  - Either drag/drop or enter in namebox on the top or shift +arrow keys
- Filling (small square icon): same value or sequence
- Moving cells: control + x, c and v

Formulas

- Formulas start with “=”, help mathematical calculations
- Can add (+), subtract (-), multiply(*) or divide(/) numbers in columns or rows
  - E.g. =(F5-B5)/B5*100 (Use Parentheses () to change the order of an operation)
  - When you type a formula into a cell and then hit enter, the formula will disappear and replaced by result of calculation
  - Can edit it again via
    - Double clicking on the cell to display the formula
    - Or click once on cell and use the Formula bar
- &: Allows you to glue the contents of two or more cells
  - E.g. "=a1&a2"

- Dragging formulas to other cells
  - Cell references in formula updated according to direction of drag
  - Prevent cell references from adjusting via preceding the original references with "$"
- Show formulas via ctrl+`
- Referencing cells in another sheet
  - E.g. =sheet1.a1
- Paste special: inserts the contents of the clipboard in a format that you can specify

http://www1.udel.edu/paulhyde/lnc/student/10_ExcelNinja.pdf

Functions

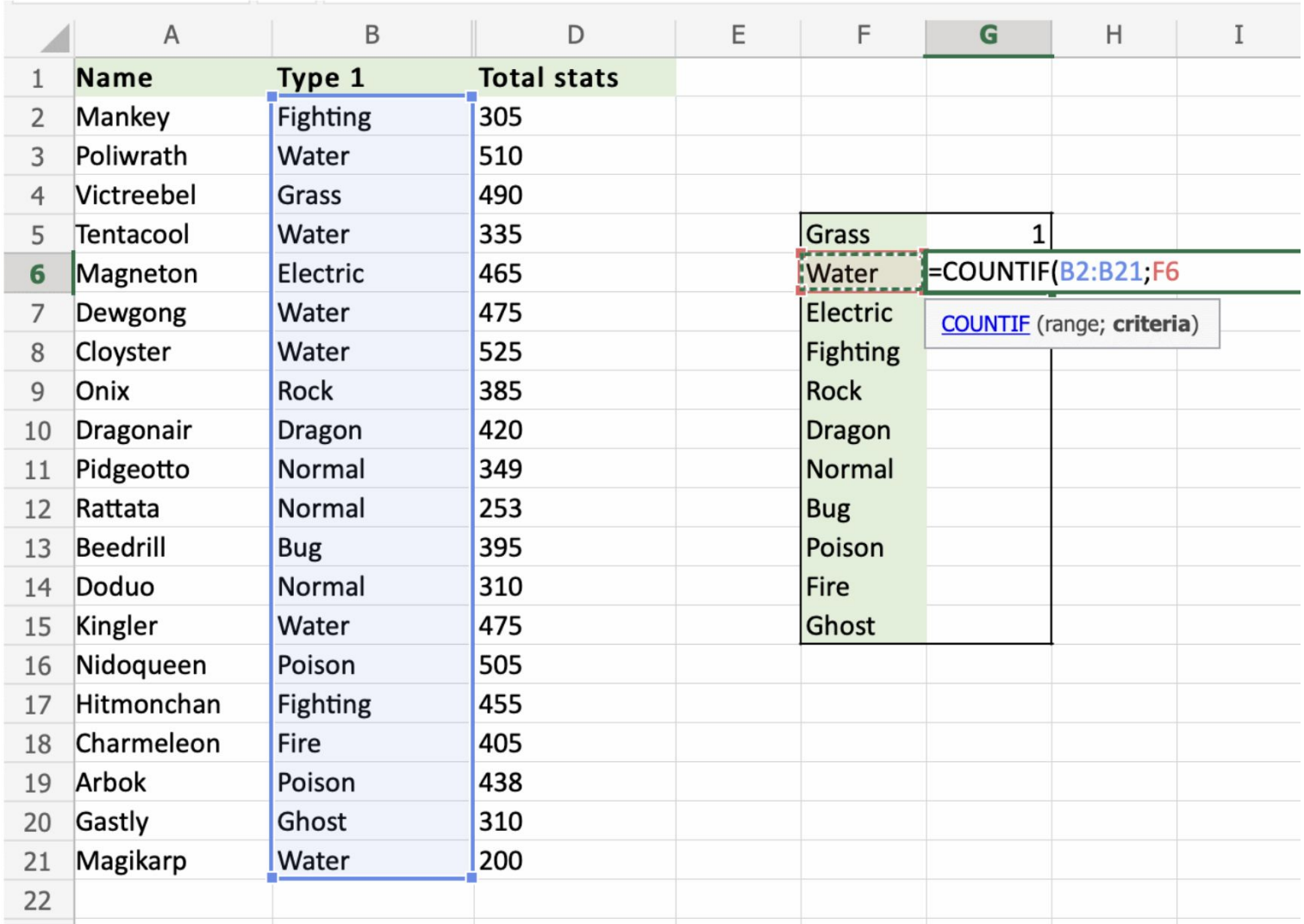
- Many premade formulas are called functions
  - Functions are typed by = followed by the functions name
  - E.g. =SUM(A1:A5)
  - What happens if you need another row or column?
    - *Within* range, will extend the formula
    - At one end of the range, doesn't change the formula
  - Double click to fill

Popular Functions

=AVERAGE	Calculates the average (arithmetic mean)
=MAX	Returns the highest value in a range
=MIN	Returns the lowest value in a range
=MEDIAN	Returns the middle value in the data
=MODE	Finds the number seen most times
=STDEV	Calculates the standard deviation
=COUNT	Counts cells with numbers

IF function

- Syntax: =IF(logical_expression, value_if_true, value_if_false)
  - E.g.
    - =if(a1<3,sum(a1:a3),average(b1:b3))
    - =if(and(a1<3,a2>10),1,"Sorry, the condition is false")
- Syntax: =COUNTIF(range, criterion)
  - E.g. =countif(a1:a10,"<2")
- Syntax: =SUMIF(range, criterion, [sum_range])
  - See image


A
B
D
E
F
G
H
I
1 Name Type 1 Total stats
2 Mankey Fighting 305
3 Poliwrath Water 510
4 Victreebel Grass 490
5 Tentacool Water 335
6 Magneton Electric 465
7 Dewgong Water 475
8 Cloyster Water 525
9 Onix Rock 385
10 Dragonair Dragon 420
11 Pidgeotto Normal 349
12 Rattata Normal 253
13 Beedrill Bug 395
14 Doduo Normal 310
15 Kingler Water 475
16 Nidoqueen Poison 505
17 Hitmonchan Fighting 455
18 Charmeleon Fire 405
19 Arbok Poison 438
20 Gastly Ghost 310
21 Magikarp Water 200
22
Grass 1
Water =COUNTIF(B2:B21;F6
Electric
Fighting
Rock
Dragon
Normal
Bug
Poison
Fire
Ghost
COUNTIF (range; criteria)

	A	B	C	D	E	F	G
1	Name	Type 1	Total				
2	Bulbasaur	Grass	318		Type	Total Sum	
3	Ivysaur	Grass	405		Grass	=SUMIF(B2:B10; E3; C2:C10)	
4	Venusaur	Grass	525		Fire	=SUMIF(B2:B10; E4; C2:C10)	
5	Charmander	Fire	309		Water	=SUMIF(B2:B10; E5; C2:C10)	
6	Charmeleon	Fire	405				
7	Charizard	Fire	534				
8	Squirtle	Water	314				
9	Wartortle	Water	405				
10	Blastoise	Water	530				
11							

SUMIF (range; criteria; [sum_range])

Note: You can use the filling function for the other rows, but make sure to use absolute references for the r

Now, we can see the sum of total stats for the different types of Pokemon:

	A	B	C	D	E	F	G
1	Name	Type 1	Total				
2	Bulbasaur	Grass	318		Type	Total Sum	
3	Ivysaur	Grass	405		Grass	1248	
4	Venusaur	Grass	525		Fire	1248	
5	Charmander	Fire	309		Water	1249	
6	Charmeleon	Fire	405				
7	Charizard	Fire	534				
8	Squirtle	Water	314				
9	Wartortle	Water	405				
10	Blastoise	Water	530				
11							

Sorting/Filters

- Can sort ascending or descending (numeric as well as string)
  - Be careful when selecting the relevant area to sort (may end up changing order of corresponding cells)
  - Can add multiple levels of sorting
- FILTER function allows you to filter a range of data based on criteria you define

Vlookup (vertical lookup)

- Helps you look for a specified value by searching for it vertically across the sheet
- Syntax: =VLOOKUP(lookup_value, table_array, col_index_number,[range_lookup])
  - Lookup_value (key): value that you want to look up in our data
    - key should always be the first column in the table array
  - table_array: location where the values are present
  - col_index_number: column number from where we need to return the value.
  - range_lookup: FALSE: exact match; TRUE: approximate match.

References

- https://www.w3schools.com/googlesheets/
  - It is google sheet, but calc/excel etc are very similar
- https://www.libreofficehelp.com/vlookup-libreoffice-calc/