

Spreadsheets in Practice

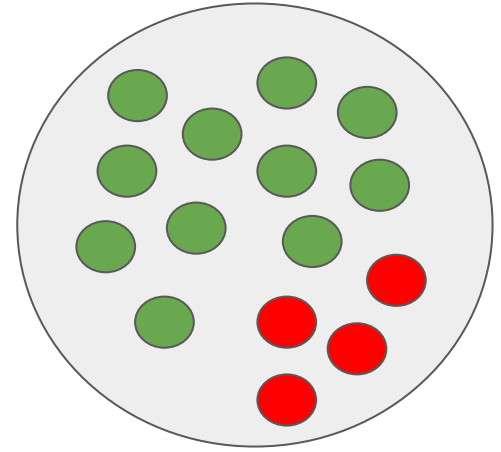
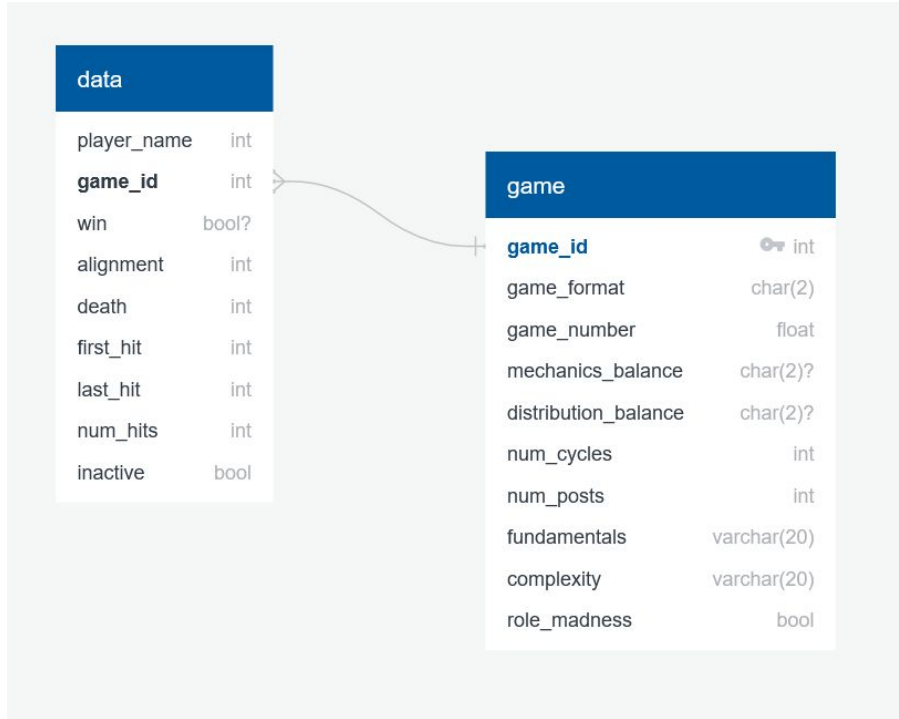
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Overview

- Filtering & basic functions
- Pivot tables
- Macros
- VBA

(and maybe other stuff)

The data: mafia/werewolves



Considerations: use case

	Simple	Complex
Presentation	Spreadsheet	Macros / VBA
Exploration	Pivot Table	SQL

Sample questions

- Make a list of my games. How many have I won?
- How often does the average player win? Who has the best win ratio?
- How often does the evil team win a game, vs the good team?
 - Does that change with how long the game is?

1. Filtering / formulae

Consider structure: you likely don't want to go all the way to 3rd normal form. Having summary statistics calculated from other data you have is often helpful, and joins will be trickier so don't make people swap tabs constantly.

2. Pivot Tables

- Great for (numerical) exploration!
- [Insert > PivotTable](#) (can be from your sheet or an external data source)
- Visual exploratory equivalent is Tableau, which is very cool
- I recommend styling (esp banded rows) in the [Design](#) tab (or [Format > Alternating Colors](#) in Sheets)

3. Macros

Setup - enable Developer tab

- Windows: [File > Options > Customize Ribbon](#)
- Mac: [Excel > Preferences > Ribbon & Toolbar](#)

Then, [Customize the Ribbon > Main Tabs > Developer checkbox](#)

Using macros (or VBA) means sheet MUST be .xlsm.

(Warning: don't play with strange macros! Excel warns you they're not safe for a reason!)

Inserting Buttons & Recording Macros

- [Developer Tab > Insert > form controls](#) (buttons, dropdowns, etc)
- Click “record macro” and then perform the series of actions you want a shortcut for (and then “stop recording”)
- Macros can be run from [Macros](#) on the developer tab, or attached to a trigger like a button
- Great for shortcuts, or for giving less technical people the ability to do complex things by clicking a button

4. VBA (Visual BASIC)

- Equivalent in Google Sheets is Google Scripts
 - But don't if you value your sanity. (It's based on JS and has virtually no documentation.)
- Based on BASIC (and exactly as annoying as that implies)

The IDE:

- Does in fact look at least a decade old
- On the left sidebar, [left click > Insert Module](#) to make a new function

Basically: write a function, then attach its execution to a specific trigger (like a button, or on opening the sheet)

Basic Syntax

```
Sub HelloWorld():  
    MsgBox ("Hello World")  
End Sub
```

```
Cells(2, 1).Value = "Cat"
```

```
Range("F1").Font.Bold = True
```

```
Range("F5:F7").Interior.ColorIndex = 3
```

```
Range("A1, H1").ColumnWidth = 20 ' (or RowHeight)
```

'Variables

```
Dim i As Integer ' String, Boolean ...
```

```
i = 1 ' declaration must be on a separate line
```

Loops / conditions

```
For i = 1 To 8:  
    If i Mod 2 = 0 Then  
        MsgBox(Str(i) + " is even!")  
    ElseIf (i Mod 2 = 1 And i Mod 3 <> 0) Then  
        MsgBox("That's not divisible by 2 or 3!")  
    Else  
        MsgBox("Is it 6? It's six.")  
    End If  
Next i
```

Other Syntax Notes

- Starts indexing at 1
- Equality is just =
- Inequality is <>
- Comments are single quotes `
- Refer to a sheet with `Worksheets("WorksheetName")` (which is type `Worksheet`), or loop through e.g. `For Each ws in Worksheets`
- Use built-in spreadsheet functions via eg `WorksheetFunction.Max()`

Resource: [learnXinYminutes](#)

Key to excel colors: <http://dmcritchie.mvps.org/excel/colors.htm>

(If anyone wants to dive way deeper into this, I have a much more extensive set of examples that I learned from that I'm happy to send)

(5.) Similar Queries In SQL

List of games I've won:

```
SELECT * FROM data
      WHERE player_name LIKE 'Elbereth'
      AND win
```

How many games each player has won:

```
WITH pw AS (
SELECT player, COUNT(player) AS num, win
FROM data
GROUP BY player, win)

SELECT player, SUM(num), SUM(n_wins)
FROM pw NATURAL JOIN (
  SELECT player, COUNT(player) AS n_wins
  FROM pw WHERE win GROUP BY player
) AS wins_only
GROUP BY player;
```

Avg game length by winning team

```
-- all factions that won for each game and how many ppl
WITH by_game AS (
    SELECT game, alignment, count(player_id) as num_won
    FROM playergame
    WHERE win
    GROUP BY game, alignment
),
-- above with cycle length for each game
with_nums AS (
    SELECT * FROM by_game
    NATURAL JOIN (select game_id, num_cycles from game) AS
cycle_nums
),
-- grouped by alignment
SELECT alignment, avg(num_cycles), count(num_cycles) AS num_games
FROM with_nums
GROUP BY alignment;
```

Review

- **Summary statistics / filters:** visual, accessible to non-technical people, fine for getting 1-D / fairly static data
- **Pivot tables:** flexible, not accessible, great for exploration of questions with multiple dimensions
- **Macros / VBA:** flexible, very accessible to laypeople, good for doing complex-ish queries, annoying to set up
- **SQL / Mongo:** very flexible, not accessible, great for very complex queries

Other Miscellanea

- **Google Forms** are great for e.g. getting data entry from laypeople
- **Freezing rows!** (that's when you can scroll down and still see the top row / first col, it's in [View](#))
- **Named ranges** let you refer to a cell or set of cells with a name rather than having to remember lots of random letters and numbers
- Learn by example!
 - Stats sheet under discussion today: [here](#)
 - Lookup / scripts example in Google Sheets: [here](#)
 - Most complicated google sheet I've ever seen, from a professional: [here](#)

(also I love spreadsheets and if you ever want to ask me a spreadsheet question about anything whatsoever I would be delighted to help)

Early version of our stats sheet (do not do this)

Players	LG1	LG2	LG3	LG4	QF1	LG5	MR1	LG6	QF2
Meta			GWZZZZ00S	GW060601F		GW01ZZ02S			
Cracknut	GL010101E	GL030301L							
Edgedancer	GL020201L	GL040401L	GW07ZZ01S	GW070701F					
Maill	GL040401L	GL050501E	GWZZZZ00S	GW03ZZ01S	GL010101E		FL030301N	GW030301E	GL050501E
Aether	EW040401V	GLZZZZ00S							
Claincy	EWZZZZ00S	GL010101F	EL050501L		EWZZZZ00S	GW030301E	FL070701L		
Gamma	GLZZZZ00S	BW090901V	GW02ZZ01S	GW070701F	GL020201E		FWZZZZ00S		
Kurkistan	GL040401E	GL080801E							
bartbug	EWZZZZ00S	GL090901E	GW030301E	GWZZZZ00S					
dyring	GL030302L	GL060601E	GW010101E	GW030301L					
Quiver	GL030302E	BWZZZZ00S		GW080801L					
Little Wilson	GLZZZZ00S	BWZZZZ00S		EL090901L				GWZZZZ00S	
Oudeis/Damam	GLZZZZ00S								
loganmathewjohnson	EWZZZZ00S	GL101001E							
Grayv	GL010101L	GL090901E	GW020702E						
Peng	GL020201E	GL050703E		EL040401V			FL030301N		GL010702L
PorridgeBrick	GL040401E	GL070701E	GW030301F	GWZZZZ00S					
Windy		GL11ZZ01S							
Weiry		GL010101E					FL020201N		
Wes		GL101001E		GW080801E		EL040703V	FL030301L	GW010502E	
Swimmingly		GL020201L	GWZZZZ00S	GW020201L					
Alvan		GL111101E	GW050501F	GW020201E	EWZZZZ00S	EL050602V	FL040401L	GW040401E	GL020201E
Serendipity/Scriptorian		GL101102E	EL010101L						
Aonar		BW101001V		GW080801F	GL020201L	GW030301L	FW050501F	GW070701E	GL010101E
RainbowRose/Cessie		EW040703L					FL040501N		
Hero		GL080801E		GWZZZZ00S					EWZZZZ00S
RobotAztec		GL090901L							
Shiv		GL050501L						EL070701L	
Leonardus		GL010101F						GW040401E	
Luckat		GL030301E			GLZZZZ00S	GW05ZZ01S	FWZZZZ00S		GL090901E
Aspren		GL080801L	EL020201L	EL050501V	GL030301E	GWZZZZ00S		GW030301F	
Joe			EL070701L	EL030301V	GL010101L	GW040401E		GW020201E	GL04ZZ01S
elwarko			GW060601L	EL050501L	GLZZZZ00S				
SirVarrock			GWZZZZ00S	GW010101E					
18thShard			GW030301L			GW020201L			
Maceo			GW040401L	GWZZZZ00S		GW06ZZ01S	FL020201N		

But if you do have data like this, Split Text-To-Columns is your friend (in [Data](#) tab/dropdown)