

# How to be Awesome With Spreadsheets

## A Tutorial For Awesome Computer Skills

I get a lot of pleasure from my spreadsheet skills. It's good for doing practical things like managing my personal finances. And it also gives me a nice temporary feeling of control in an otherwise terrifying and chaotic world. 😓

In this tutorial I am going to build a personal budgeting tool so I can get a better sense of where I'm spending my money. I want to look at my recent transactions, sort all the expenses into categories, and then get a view of how much I'm spending each month on Food, Rent, Utilities, etc.

Here's a preview to give you a quick sense of what I'm trying to achieve

<https://youtu.be/DhJ2a0fVMil>

On the way through, I'll explain some of the more advanced features of Sheets (the spreadsheeting tool in the Google Docs suite), and I'll call out some of the underlying principles. This will apply to any decent spreadsheet tool, Sheets is just what I'm familiar with.

We're going to look at: importing data, array formulas, data validation, lookups, conditional statements, filters and pivot tables. In the end we'll have a sweet interactive tool that gives clear insight into your spending.

If you want to learn how to be awesome, follow along with my steps. You can play around with my spreadsheet: [make a copy of this one](#) and edit it however you like. If you get confused along the way: congratulations, you are learning! Stop and search the web, read the help docs, or ask questions here. By the end of this tutorial, you will be familiar with a powerful set of tools for working with data.

## Part 1: Import data

First thing I want to do is get the data from my bank.

My bank is Transferwise, but just about any online banking site should give you the option to download all your transactions as a “CSV” export. CSV just means comma-separated values; it’s a simple format for storing tables of data.

Then I go to <http://sheets.new> to start a new spreadsheet, and click File > Import to upload the file I got from the bank.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	TransferWise	Date	Amount	Currency	Description	Payment Ref	Running Bal	Exchange Fr	Exchange To	Exchange R	Payer Name	Payee Name	Payee Accou	Merchant	Total fees
2	CARD-3763	22-11-2019	-€11.51	EUR	Card transaction of 11.51		1395.6							Unicoop Tirr	0
3	CARD-3762	22-11-2019	-€22.00	EUR	Card transaction of 22.00		1407.11							C.ro.m. Serv	0
4	CARD-3721	19-11-2019	-€203.92	EUR	Card transaction of 200.00		1429.11							Poste Italian	0
5	CARD-3706	18-11-2019	-€499.60	EUR	Card transaction of 499.60		1633.03							Obb*536000	0
6	CARD-3683	16-11-2019	-€10.99	EUR	Card transaction of 10.99		2132.63							Fs *Daisydis	0
7	CARD-3680	16-11-2019	-€18.55	EUR	Card transaction of 18.55		2143.62							Unicoop Tirr	0
8	TRANSFER	11-11-2019	€98.35	EUR	Received mc SVWZ+STR		2162.17				Stripe Payments UK Ltd				0
9	TRANSFER	11-11-2019	€98.35	EUR	Received mc SVWZ+STR		2063.82				Stripe Payments UK Ltd				0
10	CARD-3612	11-11-2019	-€39.40	EUR	Card transaction of 39.40		1965.47							Unicoop Tirr	0
11	CARD-3601	10-11-2019	-€9.00	EUR	Card transaction of 9.00		2004.87							Mercato Cen	0
12	CARD-3578	08-11-2019	-€40.75	EUR	Card transaction of 40.75		2013.87							O Lote LISB	0
13	TRANSFER	06-11-2019	€146.14	EUR	Received mc SVWZ+STR		2054.62				Stripe Payments UK Ltd				0

*Note: if the data formatting looks broken, check that the Locale in the Spreadsheet settings matches your bank. The first time I tried this, the sheet was looking for U.S. date formats but my bank uses European dates.*

Most of this data is not useful to me, I just care about the Date, Amount and Merchant (Columns B, C, and N). I’ll leave this imported sheet as it is, and then create a new sheet to focus in on the information I want.

I make a new sheet called Categorized. Then I use a function called [ARRAY-FORMULA](#) to pull in the columns I want. You can see the formula that I've used in C1: =ARRAYFORMULA('Imported data'!N:N). That populates the whole C column, pulling from the Imported Data sheet.

The screenshot shows a Google Sheet interface. At the top, the formula bar contains the formula: `=ARRAYFORMULA('Imported data'!N:N)`. Below the formula bar is a table with three columns: A, B, and C. The table contains the following data:

	A	B	C
1	<b>Date</b>	<b>Amount</b>	<b>Merchant</b>
2	22-11-2019	-€11.51	Unicoop Tirreno S.c. ROSIGNANO S
3	22-11-2019	-€22.00	C.ro.m. Servizi S.r.l. ROSIGNANO M
4	19-11-2019	-€203.92	Poste Italiane ROSIGNANO MAR
5	18-11-2019	-€499.60	Obb*536000000045540068 oebb.at
6	16-11-2019	-€10.99	Fs *Daisydisk Amsterdam
7	16-11-2019	-€18.55	Unicoop Tirreno S.c. ROSIGNANO S
8	11-11-2019	€98.35	
9	11-11-2019	€98.35	

At the bottom of the screenshot, the sheet tabs are visible. The active sheet is 'Imported data' and the next sheet is 'Categorized'.

I'll explain more about ARRAYFORMULA later, but for now all you need to know is that I've told it to go to the sheet called 'Imported data' and pull in everything in column N.

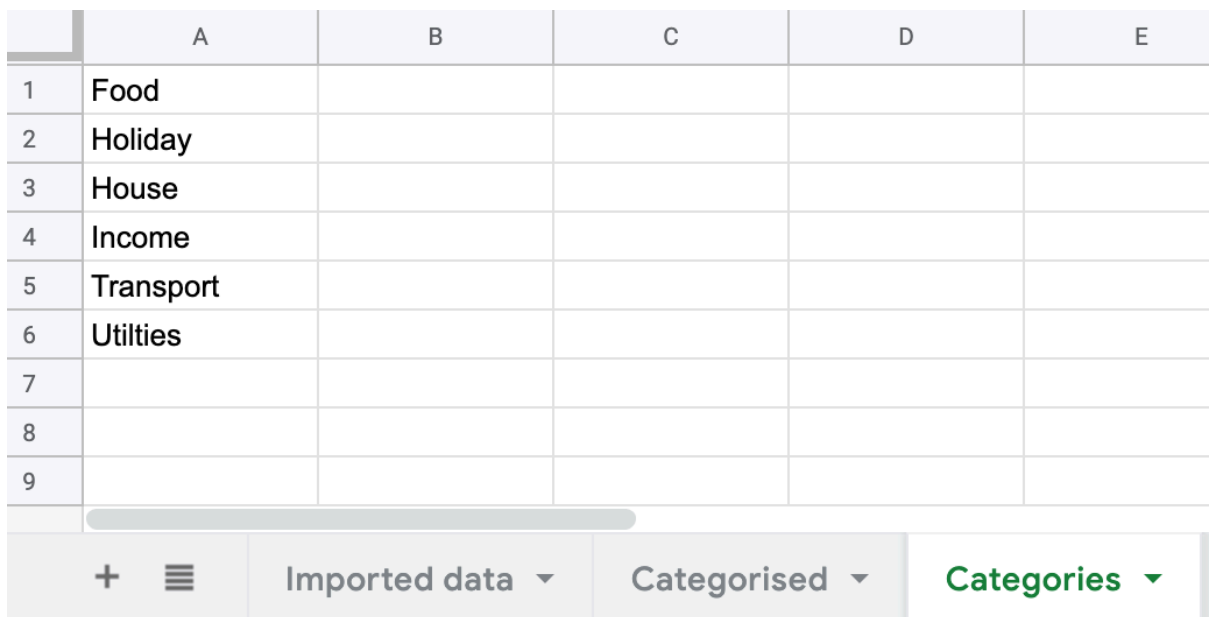
Notice the **design principle** here: in the future, I want to be able to replace the imported data with new transactions. So I'm going to design this sheet so that all the formulas "just work" even when the data changes. In this instance, I've told it to grab **everything** in Column B, regardless of the length. When I import new data, that column will grow or shrink, but the formulas will keep working.

## Part 2: Categorising the transactions

The file I imported has about a hundred Transactions. I want to categorise all of them into a short list of maybe 5 or 10 Categories.

I have a lot of Transactions from the same Merchant. So rather than going through them all manually, I want to use some computer magic to recognise that, for example, all Transactions from the Merchant "Train Italia" should have the Category "Transport".

The first step is to make a list of Categories that I can refer back to in different places throughout the spreadsheet. So I make a new sheet called Categories, and start writing a list:



The image shows a spreadsheet interface with a grid of cells. The first column (A) contains a list of categories: Food, Holiday, House, Income, Transport, and Utilities. The rows are numbered 1 through 9. The spreadsheet has a tab bar at the bottom with three tabs: "Imported data", "Categorised", and "Categories". The "Categories" tab is currently selected and highlighted in green.

	A	B	C	D	E
1	Food				
2	Holiday				
3	House				
4	Income				
5	Transport				
6	Utilities				
7					
8					
9					

Then I create some Category matching rules. If the Merchant is "Unicoop Tirreno" (a supermarket nearby), that should be categorised as "Food". "Pisa Mover" is

a train, so I want to automatically categorise that as "Transport". So I manually write this list of Merchants and Category Matches:

	A	B	C	D	E
1	<b>Category</b>		<b>Merchant</b>	<b>Category Match</b>	
2	Food		Unicoop Tirreno	Food	
3	Holiday		Pisa Mover PISA	Transport	
4	House		Naturasi' ROSIG	Food	
5	Income		Tfl Travel Ch TFL	Transport	
6	Transport				
7	Utilities				
8					
9					

Now, over on the Categorised sheet, I add a new column called Auto Category. I want it to look up my Category Match table, and automatically populate a Category here if it finds a match. To do this I use the [VLOOKUP](#) function:

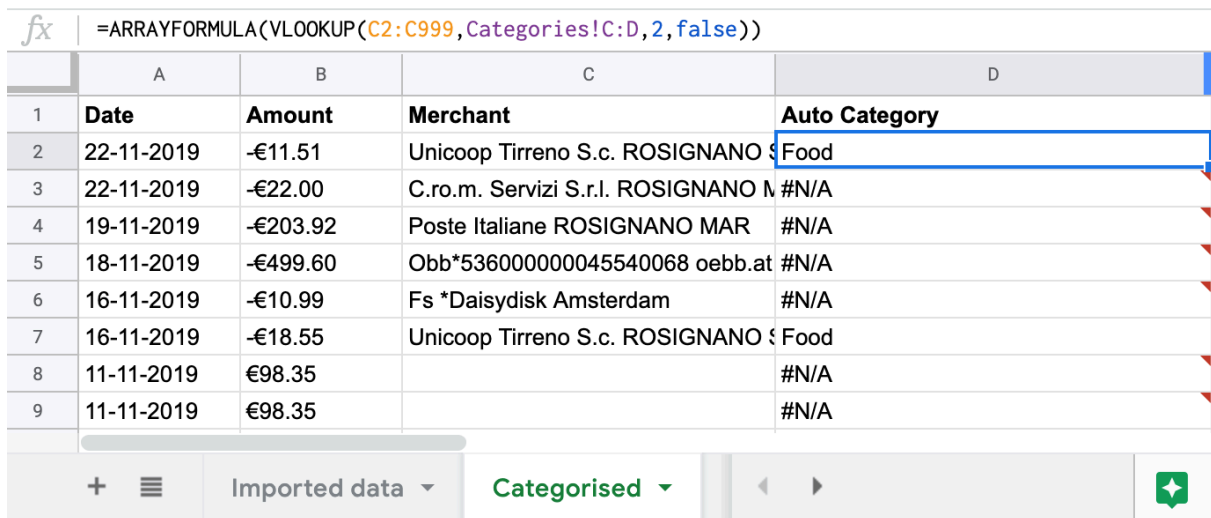
fx =VLOOKUP(C2,Categories!C:D,2,false)

	A	B	C	D
1	<b>Date</b>	<b>Amount</b>	<b>Merchant</b>	<b>Auto Category</b>
2	22-11-2019	-€11.51	Unicoop Tirreno S.c. ROSIGNANO S	Food
3	22-11-2019	-€22.00	C.ro.m. Servizi S.r.l. ROSIGNANO M	
4	19-11-2019	-€203.92	Poste Italiane ROSIGNANO MAR	
5	18-11-2019	-€499.60	Obb*536000000045540068 oebb.at	
6	16-11-2019	-€10.99	Fs *Daisydisk Amsterdam	
7	16-11-2019	-€18.55	Unicoop Tirreno S.c. ROSIGNANO S	
8	11-11-2019	€98.35		
9	11-11-2019	€98.35		

The formula in D3 is =VLOOKUP(C2,Categories!C:D,2,false). In English, that means "Look for "Unicoop Tirreno..." in the Category Match table. If you find it, re-

turn what you find in the 2nd column". It found a match, so it returns the "Food" Category. So far, so good!

Now I want to repeat this for the whole column. To do this, I use our old friend **ARRAYFORMULA**. I think of it as a function to stretch other functions. **VLOOKUP** can only find one cell at a time. But if we wrap it in an **ARRAYFORMULA**, it will stretch and look at the whole column. Notice in Row 7 it has found another match:



The screenshot shows a Google Sheet with a formula bar at the top containing the formula: `=ARRAYFORMULA(VLOOKUP(C2:C999, Categories!C:D, 2, false))`. Below the formula bar is a table with the following data:

	A	B	C	D
1	<b>Date</b>	<b>Amount</b>	<b>Merchant</b>	<b>Auto Category</b>
2	22-11-2019	-€11.51	Unicoop Tirreno S.c. ROSIGNANO S	Food
3	22-11-2019	-€22.00	C.ro.m. Servizi S.r.l. ROSIGNANO M	#N/A
4	19-11-2019	-€203.92	Poste Italiane ROSIGNANO MAR	#N/A
5	18-11-2019	-€499.60	Obb*536000000045540068 oebb.at	#N/A
6	16-11-2019	-€10.99	Fs *Daisydisk Amsterdam	#N/A
7	16-11-2019	-€18.55	Unicoop Tirreno S.c. ROSIGNANO S	Food
8	11-11-2019	€98.35		#N/A
9	11-11-2019	€98.35		#N/A

At the bottom of the sheet, there is a navigation bar with a plus sign, a menu icon, a dropdown menu labeled "Imported data", a dropdown menu labeled "Categorised", and a green plus icon.

Unfortunately, it leaves an ugly **#N/A** error whenever it searches for a Merchant that it can't find in the Category Match table.

*There's another design principle here: if you hit a problem and you can imagine that a lot of other people have had that problem before you, there's probably a good solution out there!*

So I searched the web, "google sheets hide formula errors", and I learned about a function called [IFERROR](#). You can use that to tell the formula what to do if it hits an error. In this case, I want it to do nothing, just leave the cell blank. So I update the formula once more, and aaaah that's better, no ugly error messages:

fx =ARRAYFORMULA(IFERROR(VLOOKUP(C2:C999,Categories!C:D,2,false)))

	A	B	C	D
1	<b>Date</b>	<b>Amount</b>	<b>Merchant</b>	<b>Auto Category</b>
2	22-11-2019	-€11.51	Unicoop Tirreno S.c. ROSIGNANO S	Food
3	22-11-2019	-€22.00	C.ro.m. Servizi S.r.l. ROSIGNANO M	
4	19-11-2019	-€203.92	Poste Italiane ROSIGNANO MAR	
5	18-11-2019	-€499.60	Obb*536000000045540068 oebb.at	
6	16-11-2019	-€10.99	Fs *Daisydisk Amsterdam	
7	16-11-2019	-€18.55	Unicoop Tirreno S.c. ROSIGNANO S	Food
8	11-11-2019	€98.35		
9	11-11-2019	€98.35		

Imported data Categorized

The Auto Category column is only used for the Merchants that I frequently buy from. For the rest, I need to add the category manually.

I create a new column, Manual Categories. But I don't want to just type out all the categories by hand, I want to [select them from a pre-defined list](#). To do this, I used Data Validation (in the Data menu).

With these Data Validation settings...

## Data validation

Cell range: Categorized!E1:E

Criteria: List from a range Categories!A:A

Show dropdown list in cell

On invalid data:  Show warning  Reject input

Appearance:  Show validation help text:

Cancel

Remove validation

Save

...all of the cells in column E get this sweet dropdown menu, which is populated by the list I wrote on the Categories sheet.

	B	C	D	E
1	<b>Amount</b>	<b>Merchant</b>	<b>Auto Category</b>	<b>Manual Category</b> ▼
2	-€11.51	Unicoop Tirreno S.c. ROSIGNANO S	Food	▼
3	-€22.00	C.ro.m. Servizi S.r.l. ROSIGNANO M		House ▼
4	-€203.92	Poste Italiane ROSIGNANO MAR		
5	-€499.60	Obb*536000000045540068 oebb.at		Category
6	-€10.99	Fs *Daisydisk Amsterdam		Food
7	-€18.55	Unicoop Tirreno S.c. ROSIGNANO S	Food	Holiday
8	€98.35			House
9	€98.35			Income
10	-€39.40	Unicoop Tirreno S.c. ROSIGNANO S	Food	Transport
11	-€9.00	Mercato Centrale Roma ROMA		Utilities
12	-€40.75	O Lote LISBOA		

If I decide later to add new Categories to the list, they'll show up on the dropdown menu automagically. If I manually type in a Manual Category that is not on the list, it will warn me with a little red triangle. I know, it's pretty sick, right?

So now I'll go thru all my transactions, and categorise them. If I notice the same Merchant keeps showing up in the list, I'll add a new entry to the CategoryMatch table, and the Auto Category column will update.

It's annoying having these Categories in two different columns "Auto" and "Manual" though, I want to combine them. So I make a new column called "Category", and use a couple of cute little functions: [IF](#) and [ISBLANK](#). Here's how it works: "IF((this statement is true), (do this thing), (otherwise do this other thing))".

So I tell it: if the Manual Category is blank, give me the Auto Category, otherwise use the Manual Category:



fx =if(isblank(E2),D2,E2)

	B	C	D	E	F
1	<b>Amount</b>	<b>Merchant</b>	<b>Auto Category</b>	<b>Manual Category</b> ▼	<b>Category</b>
2	-€11.51	Unicoop Tirreno S.c. ROSIGNANO S	Food		Food
3	-€22.00	C.ro.m. Servizi S.r.l. ROSIGNANO M		House	
4	-€203.92	Poste Italiane ROSIGNANO MAR		House	
5	-€499.60	Obb*536000000045540068 oebb.at		Transport	
6	-€10.99	Fs *Daisydisk Amsterdam		Utilties	
7	-€18.55	Unicoop Tirreno S.c. ROSIGNANO S	Food		
8	€98.35			Income	
9	€98.35			Income	
10	-€39.40	Unicoop Tirreno S.c. ROSIGNANO S	Food		
11	-€9.00	Mercato Centrale Roma ROMA		Food	
12	-€40.75	O Lote LISBOA		Food	

+ ☰ sorted data ▼ Categorized ▼ Categor ▹ ▸

And then I want to stretch that formula to cover the whole column, so it's time for another ARRAYFORMULA.

fx =ARRAYFORMULA(IF(ISBLANK(E2:E999),D2:D999,E2:E999))

	B	C	D	E	F
1	<b>Amount</b>	<b>Merchant</b>	<b>Auto Category</b>	<b>Manual Category</b> ▼	<b>Category</b>
2	-€11.51	Unicoop Tirreno S.c. ROSIGNANO S	Food		Food
3	-€22.00	C.ro.m. Servizi S.r.l. ROSIGNANO M		House	House
4	-€203.92	Poste Italiane ROSIGNANO MAR		House	House
5	-€499.60	Obb*536000000045540068 oebb.at		Transport	Transport
6	-€10.99	Fs *Daisydisk Amsterdam		Utilties	Utilties
7	-€18.55	Unicoop Tirreno S.c. ROSIGNANO S	Food		Food
8	€98.35			Income	Income
9	€98.35			Income	Income
10	-€39.40	Unicoop Tirreno S.c. ROSIGNANO S	Food		Food
11	-€9.00	Mercato Centrale Roma ROMA		Food	Food
12	-€40.75	O Lote LISBOA		Food	Food

Muhahahah! Can you feel the raw power!!!

## Part 3: Monthly Summary

Hokay, so now all the transactions are categorised, I want to see a monthly summary: where am I spending my money?

Enter: [pivot tables](#).

A pivot table is a powerful way to cut different slices thru your data. In this case, I want a table that has a column for each month, and a row for each transaction category.

To do this, I select all Columns A thru F on the Categorised sheet, and then click Data > Pivot Table. This opens a new sheet, with the Pivot Table Editor. I set Rows: Category, Columns: Date, and Values: Amount.

SUM of Amount	Date			
Category	01-07-2019	04-07-2019	05-07-2019	
	€0.00			
Food			-€523.44	
Holiday		-€6.35		
House		-€1,000.00		
Income		-€703.35		
Transport				
Utilities				€10,460.00
<b>Grand Total</b>	<b>€0.00</b>	<b>-€1,709.70</b>	<b>-€523.44</b>	<b>€10,460.00</b>

This is nearly there, but I want one column per month, instead of one column per day like it is currently showing. Easy fixed: right click on one of the dates, and select "Create pivot date group > Month". Hey presto:

SUM of Amount	Date - Month							
Category	Jul	Aug	Sep	Oct	Nov		Grand Total	
						€0.00	€0.00	
Food	-€542.95	€759.21	-€1,246.30	-€434.77	-€119.21		-€1,584.02	
Holiday	€623.78	€10,125.82	-€800.00	-€121.95			€9,827.65	
House	€50.64	-€541.13	-€5,274.70	-€221.43	-€225.92		-€6,212.54	
Income	-€100.07	€764.01	-€11,083.59	€768.21	€342.84		-€9,308.60	
Transport	-€5,136.86	-€413.63	-€4.35	-€320.23	-€499.60		-€6,374.67	
Utilities	€10,419.30	€2,030.00	-€4.40	-€119.97	-€10.99		€12,313.94	
<b>Grand Total</b>	<b>€5,313.84</b>	<b>€12,724.28</b>	<b>-€18,413.34</b>	<b>-€450.14</b>	<b>-€512.88</b>	<b>€0.00</b>	<b>-€1,338.24</b>	

So now I can clearly see how much I'm spending on Food every month, which is very useful for my budget. This will help me make more accurate predictions about future spending.



## Part 4: Category browser

One last thing: I want a view that shows me all the transactions for a given Category.

I'll make another sheet called "Category Browser". I want another one of those sweet dropdown menus, so I can select a Category, and then see all the transactions that match. I use the Data Validation again to get the dropdown.

Then I need the [FILTER](#) function, which takes a table, and a condition, and returns all the rows that match the condition.

fx =FILTER(Categorised!A:F,Categorised!F:F=A2)

	A	B	C	D	E	F
1	<b>Browse category</b>					
2	Food					
3						
4	22-11-2019	-€11.51	Unicoop Tirreno	Food		Food
5	16-11-2019	-€18.55	Unicoop Tirreno	Food		Food
6	11-11-2019	-€39.40	Unicoop Tirreno	Food		Food
7	10-11-2019	-€9.00	Mercato Centrale Roma ROMA	Food		Food
8	08-11-2019	-€40.75	O Lote LISBOA		Food	Food
9	27-10-2019	-€85.46	Unicoop Tirreno	Food		Food
10	26-10-2019	-€9.90	Kasanova Cecina CECINA		Food	Food
11	24-10-2019	-€18.22	Unicoop Tirreno	Food		Food
12	23-10-2019	-€8.10	Conad ROSIGNANO MAR		Food	Food
13	22-10-2019	-€11.44	Unicoop Tirreno	Food		Food
14	21-10-2019	-€34.34	Naturasì ROSIG	Food		Food
15	15-10-2019	-€12.26	Unicoop Tirreno	Food		Food
16	14-10-2019	-€41.05	Unicoop Tirreno	Food		Food
17	14-10-2019	-€14.00	Naturasì ROSIG	Food		Food
18	07-10-2019	-€200.00	Mps Rosignano Marittim ROSIGNANO	Food		Food
19	27-09-2019	-€45.22	Unicoop Tirreno	Food		Food
20	25-09-2019	-€10.96	Unicoop Tirreno	Food		Food
21	24-09-2019	-€59.48	Naturasì ROSIG	Food		Food
22	24-09-2019	-€41.58	Unicoop Tirreno	Food		Food
23	23-09-2019	-€11.55	Unicoop Tirreno	Food		Food

+ ☰ Monthly Summary Categories Category browser

The formula is =FILTER(Categorised!A:F,Categorised!F:F=A2), that means, get all the data from the Categorised sheet (Columns A:F), and show me the rows that match the Category in A2 ("Food").

When I change the Category in A2 to "House", the Browser updates to show me all the Transactions that match "House"

fx		House				
	A	B	C	D	E	F
1	<b>Browse category</b>					
2	House					
3						
4	22-11-2019	-€22.00	C.ro.m. Servizi S.r.l. ROSIGNANO		House	House
5	19-11-2019	-€203.92	Poste Italiane ROSIGNANO MAR		House	House
6	30-10-2019	-€152.93	Ovs 2 CECINA		House	House
7	26-10-2019	-€59.00	Marsili Roberto Calzat CECINA		House	House
8	05-10-2019	-€9.50	Chips & Food PISA		House	House
9	18-09-2019	-€390.00			House	House
10	16-09-2019	-€4,884.70			House	House
11	29-08-2019	-€40.50	Naturasi' ROSIG Food		House	House
12	21-08-2019	-€1,000.63			House	House
13	12-08-2019	€500.00			House	House
14	31-07-2019	€1,090.00			House	House
15	30-07-2019	-€18.21	Tfl Travel Charge TFL.gov.uk/CP		House	House
16	28-07-2019	-€15.75	Z Hotels City Ltd LONDON		House	House
17	16-07-2019	-€5.40	Pisa Mover PISA Transport		House	House
18	01-07-2019	-€1,000.00			House	House
19						
20						

That's it! If you made it this far, you are now officially Awesome With Spreadsheets.  
Life is basically plain sailing from here on out.



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