

VLOOKUP Tutorial



**7 Handy Principles to Implement a
Vlookup Successfully**

John Franco

Vlookup Tutorial: 7 handy principles to implement a Vlookup successfully

by John Franco

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INTRODUCTION

Dear Excel User,
If you want to implement a VLOOKUP successfully, I can show you how to do it in 7 easy steps.

Now, I am able to implement a VLOOKUP like child play. Yes; I am not afraid anymore of potential hidden #N/A explosions.

Things were not so good at the beginning...

I experienced countless days in the office, going in circles about what VLOOKUP argument to change, to get rid of the #N/A errors. The worst part with these error messages was that they suddenly entered my reports close to the deadline.

And you know what's next...desperation!

Well...

I was resolved to not being in a #N/A trap anymore, so I developed 7 principles or steps that have guided me in the last years, since then, I can tell you that I haven't experienced a #N/A dead end anymore.

Sincerely; from time to time, I get very few unexpected #N/A errors; no problem here...**When #N/As appear; I am confident, because I know how to interpret them and how to get rid of them.**

My intention is that you won't be in a #N/A trap anymore...

Why do I say this?

I have developed and followed the 7 steps outlined here. They work for me; they will work for you too.

Once you grasp these fundamentals you can take your "Extracting Information from Excel Tables" to the next level. My hope is that with consistency, your career as well.

You will increase your confidence and even be prepared to write INDEX and MATCH, SUMPRODUCT and other advanced lookup formulas.

I want you to enjoy conversing with tables, as I do.

John Franco

www.ExcelCream.com

WHY THE VLOOKUP FUNCTION IS SO USEFUL?

When was the last time you ordered some food at a restaurant? Remember you had the menu in your hands; did you use your index finger to find the dish you were looking for? Or maybe you did the match mentally?



Fajitas

All our fajitas are served with sizzling peppers and onions on a cast iron skillet. They are accompanied by Mexican-style rice, refried beans, fresh guacamole and your choice of corn or flour tortillas.

Skirt Beef	\$198
Tender strips of grilled steak	
Chicken	\$178
Tender strips of grilled chicken	
Chicken & Beef	\$189
Tender strips of grilled chicken breast and steak	
Shrimp	\$199
Juicy sautéed shrimp	
El Patrón Mixed Fajitas	\$210
Grilled chicken breast, steak and shrimp	
Vegetables	\$159
Sautéed fresh vegetables	

SEAFOOD

Chipotle Shrimp	\$265
Six jumbo shrimp marinated in chipotle chile sauce, served with Mexican-style rice and a corn and black bean relish.	
Tikinixic Mayan-style Fish	\$205

FROM THE GRILL

All grilled dishes are served with your choice of soup or salad.

Grilled Steak	\$325
Choice center cut 12 oz New York steak grilled to order and served on a bed of onion and poblano chile slices. Served with a cheese chile relleno, rice and black beans.	
Caribbean Lobster & Angus Beef Fillet	\$399
Six-ounce Caribbean lobster tail accompanied by a six-ounce charbroiled Angus tenderloin steak.	
Grilled Chicken	\$185
Half-pound fresh grilled chicken breast cooked to perfection. Served with a chile relleno, Mexican-style rice and black beans.	

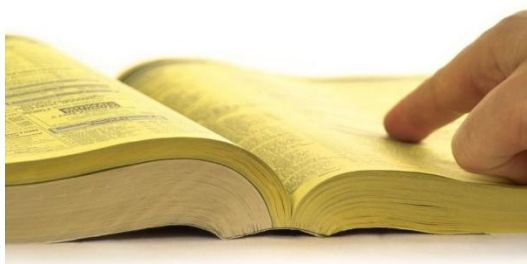
After you found your preferred dish, then you wanted to know the price, so you moved your eyeballs like a Tennis match attendant, from left to right, the price was on the right column.

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If your budget is tight; you would start looking at the price column to see what dishes match with your pocket. And then, you would move your eyes to the left to figure out what dishes you can afford.

Anyway, when you look through a column of data to find what you are looking for and retrieve any related information in corresponding columns, you are performing a Vlookup.

Humans perform Vlookups every day; at the restaurant, at the bookstore, at the movie theater, when you pick a phone number from the directory, the list goes on and on.



The Vlookup function allows you to find information you are looking for and pick any related attributes.

HOW DOES THE VLOOKUP FUNCTION WORK?

So then, what is a Vlookup function? Let's define it.

In a nutshell...

The Information you are looking for:

Vegetables

lookup_value

table_array

col_index_num

Vlookup result

range_lookup

Fajita	
All our fajitas are served with sizzling peppers and onion in a cast iron skillet. They are accompanied by Mexican-style rice, refried beans, fresh guacamole and your choice of corn or flour tortillas.	
Skirt Beef	\$198
Tender strips of grilled steak	
Chicken	\$178
Tender strips of grilled chicken	
Chicken & Beef	\$189
Tender strips of grilled chicken breast and steak	
Shrimp	\$199
Juicy sautéed shrimp	
El Patrón Mixed Fajitas	\$210
Grilled chicken breast, steak and shrimp	
Vegetables	\$159
Sautéed fresh vegetables	
SEAFOOD	
Chipotle Shrimp	\$265
Six jumbo shrimp marinated in chipotle chile sauce, served with Mexican-style rice and a corn and black bean relish.	
Tikinixic Mayan-style Fish	\$205

FROM THE GRILL	
Grilled	\$325
Choice of tender cut 12 oz New York steak, grilled to order and served on a bed of onion and poblano chile slices. Served with a cheese chile relleno, rice and black beans.	
Caribbean Lobster & Angus Beef Fillet	\$399
Six-ounce Caribbean lobster tail accompanied by a six-ounce charbroiled steak.	
	\$185

Give a look at the Excel Vlookup function in action:

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E2		=VLOOKUP(D2,\$A\$2:\$B\$7,2,0)				
	A	B	C	D	E	F
1	Dish	Price		Dish	Price	
2	Skirt beef	198		Vegetables	159	
3	Chicken	178				
4	Chicken & Beef	189				
5	Shrimp	199				
6	El Patron Mixed Fajitas	210				
7	Vegetables	159				
8						
9						

The syntax is as follows (Source: Excel help):

VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

Where:

lookup_value Required. The value to search in the first column of the table or range. The lookup_value argument can be a value or a reference. If the value you supply for the lookup_value argument is smaller than the smallest value in the first column of the table_array argument, VLOOKUP returns the #N/A error value.

table_array Required. The range of cells that contains the data. You can use a reference to a range (for example, A2:D8), or a range name. The values in the first column of table_array are the values searched by lookup_value. These values can be text, numbers, or logical values. Uppercase and lowercase text are equivalent.

col_index_num Required. The column number in the table_array argument from which the matching value must be returned. A col_index_num argument of 1 returns the value in the first column in table_array; a col_index_num of 2 returns the value in the second column in table_array, and so on.

range_lookup Optional. A logical value that specifies whether you want VLOOKUP to find an exact match or an approximate match:

If range_lookup is either TRUE or is omitted, an exact or approximate match is returned. If an exact match is not found, the next largest value that is less than lookup_value is returned.

IMPORTANT If range_lookup is either TRUE or is omitted, the values in the first column of table_array must be placed in ascending sort order; otherwise, VLOOKUP might not return the correct value.

For more information, see Sort data in a range or table.

If range_lookup is FALSE, the values in the first column of table_array do not need to be sorted.

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If the `range_lookup` argument is `FALSE`, `VLOOKUP` will find only an exact match. If there are two or more values in the first column of `table_array` that match the `lookup_value`, the first value found is used. If an exact match is not found, the error value `#N/A` is returned.

If you have been writing Vlookup functions, you know that things are not so easy; you need to proceed systematically to avoid traps and headaches.

Now it is time to explore the 7 principles to implement a successful Vlookup...

{STEP 1}

3 SECRETS FOR A SUCCESSFUL VLOOKUP - WHY IT'S IMPORTANT TO DEVELOP THE CORRECT MATCH MINDSET?

“Computers are useless. They can only give you answers”

— Pablo Picasso

MATCHING DATA IN EXCEL IS NOT A HEADACHE if you discover that Excel deals with only comparable data, and not on what the eye sees.

As step 1, you must grasp these matching principles to make sense of errors and to avoid unnecessary frustration.

If Excel says to you that a given item is not on the index column of the lookup table (message #N/A) it's because **the item is DEFINITELY not there.**

See for yourself...

In column C, I wrote the formula =EXACT(A2,B2). This formula returns TRUE if both cell contents are exactly the same, and FALSE if not.

If you rely on your eyes, you may expect totally different results...

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	A	B	C	D
1	A	B	Same?	Reason
2	Susan Wilson	Susan Wilson	FALSE	Trailing space on B
3	1.23	1.23	FALSE	More digits on A but not shown
4	1.235	1.24	TRUE	Same digits in B but not shown
5	1/22/2010	40200	TRUE	Date on A and its corresponding serial number on B
6	1/22/2010	"1/22/2010"	FALSE	Date on B is not a date

After reading the following details, **you will think like Excel does...**

Excel matches texts on a character by character basis

Computers don't recognize a difference in meaning, they only deal with 1s and 0s. Humans have the ability to recognize subjective differences in meaning like the fact that "Susan Wilson" and "Susan W." are the same person; however, computers do not.

Humans usually depend on the senses, in this particular case to the eyes. We use our eyes to recognize a name in a pile.

For computers, the match is at the character by character level. If you are searching "Susan Wilson", the index column of your table array must contain that information bit by bit, no extra spaces, no extra characters, no abbreviations, etc.

You should know the way Excel stores data so that you don't make wrong assumptions.

The numbers on screen are not the same that Excel stores

The screen usually distracts Excel users because the shown data is not always the information that is stored by Excel. For example: the number 1.34587 can be stored as a two decimal number, so it is shown this way 1.35. Both numbers are the same, they are shown differently.

This fact usually leads to confusion; users tend to enter numbers in the lookup_value argument as the data they see. This leads to an unavoidable #N/A error.

The solution is that you don't rely on format anymore, for example; deal with numbers after you press F2 (or see at the formula bar) and not on what you see on screen.

To paraphrase a famous terminology in the computing world: **what you see is not what you get** or WYSINWYG.

It is time to understand how Excel stores dates

Numbers are dates and dates are numbers. This fact is usually misunderstood by so many Excel users because the software stores dates in the typical format 12/05/2001.

I was tempted to interpret dates as a special type of data, a kind of mystical one. I was wrong. Nothing is farther from the truth!

The fact is that dates are a sequence of numbers from 1 (01/01/1900) to 2,958,465 (31/12/9999). Each date in that number range has a straightforward correlation with a number (integer of course).

For example, today, the day I am finishing this manifesto, it is 1/22/2010 or the day 40200. The starting date is 1 (this is arbitrary).

As soon as you enter a date and format it, Excel converts it to the form 12/05/2001, keep in mind that internally, this date is an integer number.

Now...I would like to summarize some points about date...

- ☐ A date is not a text by any means. Never quote a date in the lookup_value.
- ☐ A date should be entered in the correct order so Excel converts it to a date. Otherwise, it will be a text (aligned to the left automatically). 1/22/2010 is a date while this one 22/01/2010 not
- ☐ Custom dates like these ones: SEP252010, 01122005 are not dates, they are texts. They must be converted to dates by some mean: hand editing, using text functions (MID, LEFT, RIGHT) and the DATEVALUE function, exporting dates from external applications in compatible format, etc.

{STEP 2}

HAVE AN INDEX COLUMN IN TABLE ARRAY YOU CAN BE PROUD OF - BACKEND FIRST

“Intellectuals solve problems; geniuses prevent them”

— Albert Einstein

ALMOST ALL PROBLEMS WITH VLOOKUP #N/A ERRORS ORIGINATE IN THE BACKEND TABLE; at least in my experience. The reason? Excel users want to write only the formula (frontend).

The fact is that **focusing exclusively on the formula at the frontend is a very bad idea**. Just think this...a messy table array (backend) will lead to messy results (frontend). The reason is simple, this is not magic, it is only information extraction; you cannot extract an information that is not on the backend table.

When I say that the information is not on the lookup table, I mean...it could be on another column, it could contain spaces, or simply the lookup data does not correspond to the nature of the index column data (you are searching "Product Code" in a left column that contains "Product Sales").

Most of the time, getting rid of #N/A errors is as simple as NOT skipping the backend polishing work.

Focus on the backend table before you write any lookup formula

Place your index column at the leftmost side of your lookup table

The left side of the backend table is reserved to the index column. If you decide to ask me why, I would say to you that this is a VLOOKUP limitation. The fact is that you can/want to search any column of your table array.

Sorry, if your column is not on the left, VLOOKUP cannot help you. You must please the function by moving the desired column to the left of the table so it becomes an index column.

Here's a brief example...

A table with the "Product code" column at the left allows you only to lookup Product Codes. If you want to look up a "Product Name", the best solution I know, is to move "Product Name" column to the left.

Keep this in mind please...

The configuration of the column is not customizable in the VLOOKUP function (at least until Excel 2007, as far as I know). If you want to search in other columns of your lookup table without moving columns each time, or because you look up two or more different columns in the same report, you should use the INDEX and MATCH formula.

The INDEX and MATCH formula allows you to search in any column of the table array you specify.

Preparing your index column entries for unique spelling is critical

Humans are the unique entities capable of noting that "Company A Limited" is the same as these other entries.

- ☐ "Company A Ltd"
- ☐ "Co A Limited"
- ☐ "Company A Limited." (notice the period at the end)

Unfortunately, if you are looking up "Company A Limited" and the index column contains any of the other versions, the VLOOKUP function will simply not find it. **Don't insist on this please!**

I have a reader who told me that if Google can search a term in a big mess of information, then there should be a way to build a custom VLOOKUP using VBA to do it; and yes you can.

Why solve a problem that should and could be avoided?

I had something to say to him...

First, Google is one of the most advanced pieces of technology ever made by man, and we should hope that Microsoft engineers include such power in lookup functions, I am eager for that to happen soon. Second, Google has a spell error algorithm "did you mean?" but is not totally reliable with very messy spelling. Don't believe me? Try to search "emcel" instead of "excel".

My recommendation is to keep things simple...

Avoid trying to build such complex custom functions or editing thousands of misspelled registers in massive databases by hand. It is

tedious and takes time. How? Avoid misspelled data entering your databases...

How to get rid of wrong spelling?

Eyes in combination with a perceptive brain are a powerful tool; they can recognize a broken pattern very easily. Just by scanning a pile of texts, you can detect spelling problems.

Find spelling problems this way...

- ☐ Scan the index column, it is the best way I know to find spelling problems
- ☐ Get help in the scanning process by sorting the index column ascending/descending first

Ideally, you must not have wrong spelling in your tables; but you know that this is nearly impossible, since data comes from so many different sources, and from so many data entry users that you don't have control over.

My strong recommendation is that as far as you have control over the data entry process, do the following;

- ☐ Never type the same data twice, copy and paste instead. Remember that a wrong instance could be replicated in so many files and tables that may go out of control and proportions
- ☐ Avoid misspellings at the front end by using the Data validation command. This way, a text exists as only one entity across the entire document and any operator will not be able to enter a different term to look up a given text

Delete leading, trailing, and inter word spaces in the index column

Helper Columns are a useful strategy; it consists of adding an extra column to a table to perform further calculation, entering relevant information and so on.

A helper column is the key element for getting rid of spaces in the index column of the table array...

Insert a helper column to the right of your index column to create a spaces-clean column, use the TRIM function to do the job.

This function deletes all the leading, inter and trailing spaces from the content of cells. Once you have the text free of spaces in the helper column, you copy and paste values to the original index column and delete the HC.

Your index column is now free of undesired extra spaces.

Format your DATE index column correctly

Take into account the following directions...

- ☐ Format dates properly, they should be in the right format (correct sequence). How do I identify that a date is a date? You can use the function ISNUMBER (dates are numbers so this function will return TRUE for each date checked), Additionally, dates that are not dates are automatically formatted as texts and aligned to the left accordingly
- ☐ Avoid working with custom format dates like: SEP252010, etc. To convert such pseudo date into an Excel date you could do the following...
 1. Split the custom date cell content by using the Text to Columns command. For example: turn SEP252010 into SEP 25 2010 in three separate cells
 2. Replace SEP by 9 and
 3. Convert the three cells information into a date by using this formula =DATE(E5,C5,D5). Assuming that the year is in E5, the month is in C5 and the day is in the cell D5
- ☐ Avoid working with custom format dates like: 01122005, etc. Use the function DATE and the text functions MID, LEFT, RIGHT. Here's how...
 1. Use the Function DATE (year, month, day) How to assign the arguments if they are all together in the same cell? See step 2
 2. Extract year, month and day from each cell using the functions RIGHT, LEFT and MID as shown below:
=DATE(RIGHT(A1;2);MID(A1;3;2);LEFT(A1;2))
 3. Use RIGHT, LEFT and MID appropriately when the order changes: year-month-day, month-year-day, etc. And be aware of some irregularities in the year, month or day:
 - a. Years with two digits: 07 instead of 2007
 - b. Days or months with one digit: 1 instead of 01

Format your TEXT index column correctly

Characters are the unique information that computes match, keep in mind that texts should be entered character by character the same. Don't rely on the eyes, it could lead you to think that below texts are the same...

- ☐ "Susan Wilson"

- ☐ "Susan Wilson" (the extra space makes this text different, they are for Excel, two different things)

Never type a same entry twice, copy and paste it instead. If the data exists somewhere, you must never type it again.

The things you can do to uniform texts once they are corrupted, are the following:

1. Delete spaces with TRIM
2. Sorting ascending/descending, helps to scan and detect irregular patterns

Format your NUMBER index column correctly

One of the main problems with numbers in the index column is that they are stored as texts. The best way to find numbers that are not numbers in the index column, is by seeing the numbers that are aligned to the left. Excel aligns texts to the left automatically.

A left aligned number is for sure a number stored as text.

Here's how to proceed if you have this problem.

- ☐ Be sure of computer settings before importing external data. Some countries use the (,) sign as the decimal delimiter, when you import a given dataset from a text file, replace the delimiter in the source file, or change the computers parameters for the new delimiter
- ☐ Replace the wrong delimiter (,) instead of (.) by using the find and replace command. Such numbers are formatted as text and are not convertible to number
- ☐ Another common way to have numbers stored as texts is because they are preceded by an apostrophe (') in this case you must convert the numbers stored as texts, to numbers
- ☐ In case numbers contain spaces, use TRIM

How to convert numbers stored as text, to numbers...

1. Select any empty cell
2. Copy this cell (essentially putting a zero on the clipboard)
3. Highlight the cells with numbers-stored-as-text
4. Go to Paste Special (CTRL+ALT+V)>Add
5. Ok

Is it necessary to always sort ascending the index column?

Myths are everywhere, they are lies that the majority don't confirm at the correct time, and they snowball. The truth is that **you don't**

need to sort the index column ascending when you are performing a VLOOKUP exact match (range_lookup = 0)

because Excel is able to find the unique item in the pile (it finds the needle in the haystack).

On the other hand, an approximate VLOOKUP is the only type of function that requires you to sort ascending the index column. The reason is simple... Imagine the list below, if you look up 4.5, Excel will return the next major value, in this case 4.

1
2
3
4
5

If you don't sort ascending, for example the list below. You will get 1 instead...

5
2
3
4
1

Duplicates do not produce a #N/A error, but other mistakes

Duplicates don't produce #N/A errors, and the reason is simple...If you are looking up "Susan" and the index column contains two of them, VLOOKUP will give you the first instance.

The problem with duplicates is that they lead you to mistakes, for example you can return the attribute of the wrong (outdated) entry.

Duplicates do not produce #N/A errors but should be deleted if you want to rest in peace after you send reports.

How to delete duplicates? It is very easy...

- ☐ Remove Duplicates in Excel 2007 by going to:
Design>Tools>Remove Duplicates
- ☐ Remove Duplicates manually in Excel 2007 by going to:
Home>Styles>Conditional formatting>Highlight Cells
Rules>Duplicate values

- ☐ Remove duplicates in Excel 2003 by going to:
Data>Filter>Advanced Filter>Unique records only

What to do if the back end is clean and ready, and still I receive a #N/A error?

Focus on the frontend formula, there is no other place to search for source of errors. Check arguments because the mistakes you have committed must be there.

More on this now...

{STEP 3}

**A QUICK CHECK THAT REALLY WORKS! -
KEEP THE ARGUMENTS ALWAYS
CORRECTLY SET: LOOKUP_VALUE,
TABLE_ARRAY, INDEX_COL_NUM AND
RANGE_LOOKUP**

"Man is still the most extraordinary computer of all"

— John F. Kennedy

A QUICK CHECK OF VLOOKUP ARGUMENTS MAY SAVE YOU TONS OF FRUSTRATION AND TIME; you should be willing to invest this time before you go deeper in further debugging.

Here are the details...

The lookup_value at a glance

When the lookup_value is referenced to a cell, it should look as an Excel cell reference or range; for example:

=VLOOKUP(**A2**, \$J\$2:\$K\$6, 2, 0), =VLOOKUP(**B12**, \$J\$2:\$K\$6, 2, 0),
etc.

On the other hand, you can hard code directly the lookup_value in the formula, you should pay special attention to this procedure:

- ☐ Always quote texts. For example:
=VLOOKUP(**"Susan"**, \$J\$2:\$K\$6, 2, 0)
- ☐ Enter numbers directly (no quotes). For example:
=VLOOKUP(**1050**, \$J\$2:\$K\$6, 2, 0)
- ☐ Never quote dates. For example:
=VLOOKUP(**"11/22/2010"**, \$J\$2:\$K\$6, 2, 0)
- ☐ Never enter dates directly. For example:
=VLOOKUP(**11/22/2010**, \$J\$2:\$K\$6, 2, 0)
- ☐ Enter dates with the DATEVALUE, DATE functions. For example:
=VLOOKUP(**DATEVALUE("1/23/2010")**, \$M\$16:\$N\$20, 2, 1)
or =VLOOKUP(**DATE(2010,1,23)**, \$M\$16:\$N\$20, 2, 1)

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Additionally; you can use named ranges in the lookup_value, in this case you should confirm that the name exists and it is properly set. Your formula should look this way...

=VLOOKUP(**NAME_HERE**,J\$2:\$K\$6,2,0).

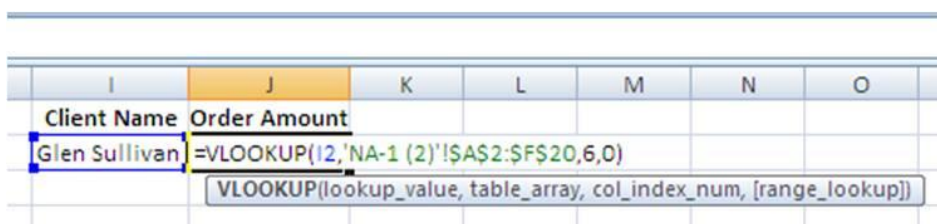
Check that the table_array argument points to the correct dataset

The lookup dataset should be referenced at the table_array argument, and you should check several things:

- ☐ Check that an array range goes after the first comma or lookup_value. For example:
=VLOOKUP(O16,**\$M\$16:\$N\$20**,2,1),
=VLOOKUP(DATEVALUE("1/23/2010"),**\$M\$16:\$N\$20**,2,1).
You can also use a named range as the table_array
- ☐ Check that the table_array reference is set to absolute. What does this mean? The formula could be copied and pasted wherever you want, and the reference remains intact. You assign absolute reference to a range reference very easily, just place the cursor in editing mode in the table_array reference and press F4. A couple of dollar signs will appear. For example: the reference A2:F15 turns into this one \$A\$2:\$F\$15
- ☐ Check that the range refers to the dataset properly. See example below...

How do you do it?

Press F2 to see the formula content or edit the function at the formula bar. See below...



The screenshot shows an Excel spreadsheet with columns I through O. Column I is labeled 'Client Name' and column J is labeled 'Order Amount'. In cell J2, the value 'Glen Sullivan' is entered. The formula bar shows the formula: =VLOOKUP(I2,'NA-1 (2)',\$A\$2:\$F\$20,6,0). A tooltip below the formula bar explains the arguments: VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup]).

I	J	K	L	M	N	O
Client Name	Order Amount					
Glen Sullivan	=VLOOKUP(I2,'NA-1 (2)',\$A\$2:\$F\$20,6,0)					

Focus on the table_array argument and check that the upper left corner (A2 for the example shown below) and the bottom right corner (F20 for the example shown below) include the database thoroughly. Notice that the field headers are not needed.

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SUM X ✓ fx =VLOOKUP(I2,'NA-1 (2)!'\$A\$2:\$F\$20,6,0)						
	A	B	C	D	E	F
1	Client Name	City	Order Number	Number of Items	Order Date	Order Amount
2	Alberto Diaz	Santiago	3518	2	12/19/2007	\$ 1,220.20
3	Alberto Egusquiza	Lima	10607	1	5/3/2008	\$ 26.96
4	Antonio Gonzales	Texas	2522	8	8/5/2007	\$ 20.58
5	Clara Zackowitz	Miami	10553	1	6/6/2008	\$ 121.30
6	Claudia Galindo	Sao Paulo	10283	1	11/23/2008	\$ 12.99
7	Claudio Alves	Curitiba	4265	1	3/30/2008	\$ 23.54
8	Claudio Dos Santos	Curitiba	10229	1	12/27/2008	\$ 5.40
9	Glen Sullivan	Washington	1028	1	1/13/2007	\$ 66.12
10	Javier Cañas	Santiago	10337	6	10/20/2008	\$ 1,012.20
11	John Ballard	New York	10121	1	3/5/2009	\$ 23.19
12	Julio Lopez	Lima	10175	1	1/30/2009	\$ 121.90
13	Ken Sigan	Boston	2024	7	5/29/2007	\$ 35.76
14	Liu Chang	Sao Paulo	3767	4	1/22/2008	\$ 456.32
15	Luis Rincon	Bogota	10445	2	8/13/2008	\$ 295.08
16	Luis Velasco	Bogota	10499	3	7/10/2008	\$ 2,200.50
17	Patricia Griffin	Miami	10067	3	4/8/2009	\$ 234.31
18	Robin Pereira	Bogota	10391	3	9/16/2008	\$ 351.29
19	Sofia Vergara	Bogota	3269	8	11/15/2007	\$ 150.40
20	Stuart Smith	Texas	1526	4	3/22/2007	\$ 50.94
21						

Additionally, you can use named ranges in the table_array; this manner you speed the writing process. Your formula should look this way...

=VLOOKUP(A2,**NAME_HERE**,2,0).

Using named ranges in the table_array has some shortcomings:

- ☐ The name is not automatically re-sized if you add more rows or columns to the data set
- ☐ The left column (after being moved) may be outside the named range definition

The index_col_num argument and the role it plays in the #N/A error generation

If you enter the wrong column number, **VLOOKUP will give you the wrong attribute.** For example, if you have a table with 3 columns...

	A	B	C
1	Product code	Total Sales	Average Sales
2	AACH1	10000	1500
3	AACH2	30000	3500

Vlookup Tutorial

And you want to know the "Average sales" for the "Product Code" AACH1 (see above table), but you type 2 as the column number (index_col_num)...

=VLOOKUP(E2,\$A\$2:\$C\$3,2,0)

Then, VLOOKUP will return "Total Sales" for AACH1. You will get 10000 instead of 1500 (see below)

E	F
Product code	Average Sales
AACH1	10000

No #N/A errors this time but you will have a wrong figure and a wrong report.

Occasionally this error is easily detectable since VLOOKUP returns a number when you expect a text or vice versa.

And sometimes you do get errors...

A mistake in the third argument col_index_num leads to errors, but not to #N/A errors.

You will receive errors when you enter the col_index_num argument wrong...

- ☐ You get a #VALUE! error when you enter 0 or a negative value
- ☐ You get a #REF! error when you enter a greater column number than the dataset dimension

Never overlook the range_lookup argument

Default values in software are great time savers; they prevent you from configuring the same frequent parameters again and again. For example, when you turn on the TV, by default the current channel is the last one you watched.

This is the case of the fourth argument of the VLOOKUP function, range_lookup; this argument determines if the VLOOKUP searches the exact match (range_lookup= 0) or the approximate match (range_lookup= 1 or omitted).

The default value of range_lookup is 1; what does this mean? If you omit this argument, Excel will interpret the function as a VLOOKUP 1 or approximate match VLOOKUP.

Vlookup Tutorial

This default value makes you prone to overlook setting the range_lookup properly when you are writing an exact match VLOOKUP (which requires you set it to 0).

My recommendation to avoid overlooking range_lookup setting and avoiding future headaches is that you **ALWAYS enter the range_lookup argument**. This way you will be aware of the type of lookup type you are doing.

{STEP 4}

**YOU DON'T HAVE TO DO SOMETHING
COMPLICATED TO FIX A TYPICAL MISTAKE
- POINT THE LOOKUP_VALUE TO THE LEFT
INDEX COLUMN**

“People think computers will keep them from making mistakes.
They're wrong. With computers you make mistakes faster”

— Adam Osborne

The **LOOKUP_VALUE IS THE SINGLE MOST IMPORTANT
PIECE OF INPUT** in the VLOOKUP formula. Why do I say
this? An error here, causes the most impact in the results.

The worst errors are those which cannot be detected, so this step
consists of a simple but usually over sighted mistake: the
lookup_value does not refer to the left index column.

Let's see in detail...

Take into account the left-column limitation of VLOOKUP

You may want to look up any field of the lookup table on a recurrent
basis. For example: "Product Code", "Product Name", etc. The fact is
that you sometimes forget that you are limited to search only the left
column of the table array; consequently, you write a lookup_value
assuming the VLOOKUP will search the respective index column.

This is too frequent a mistake; you don't move the respective
column to the left, you just enter the lookup_value that points
somewhere (other than the left column). Sincerely, I committed this
mistake tons of times.

**If your table array has the "Product code" at the leftmost
column, your lookup_value can only be a "Product code"**

Vlookup Tutorial

Prevent this error from persisting

Mindset is everything! Each time you enter the lookup_value, you must think that you are looking at the left column of the table array. At that moment you will realize if things are going correctly.

For example: on the table shown below, you can only search by "Client Name"

	A	B	C	D
1	Client Name	Order Date	City	Order Number
2	Alberto Diaz	12/19/2007	Santiago	3518
3	Alberto Egusquiza	5/3/2008	Lima	10607
4	Antonio Gonzales	8/5/2007	Texas	2522
5	Clara Zackowitz	6/6/2008	Miami	10553
6	Claudia Galindo	11/23/2008	Sao Paulo	10283
7	Claudio Alvez	3/30/2008	Curitiba	4265
8	Claudio Dos Santos	12/27/2008	Curitiba	10229
9	Glen Sullivan	1/13/2007	Washington	1028
10	Javier Cañas	10/20/2008	Santiago	10337
11	John Ballard	3/5/2009	New York	10121
12	Julio Lopez	1/30/2009	Lima	10175
13	Ken Sigan	5/29/2007	Boston	2024

So the below formula in J2 is wrong (`=VLOOKUP(I2,'NA-7'!$A$2:$D$13,3,0)`). Why? It is pointing to the column "Order Number" not the leftmost one.

I	J
Order Number	Client Name
4265	#N/A

The confusing fact is that the order number 4265 is in the table but not in the leftmost column (the unique column where the VLOOKUP searches).

If your need to look up in different columns, and you don't like to move the columns to the left each time you want to write a different VLOOKUP; then, you must say "welcome" to the INDEX and MATCH formula.

This formula allows you to search any column from the front end, without editing the order of the backend columns. Very useful if you are performing searches based on Product Name, Product Price, Product Code, etc.

Check that your lookup_value is pointing to the left index column

Eyes are the best tool to check if the index column is at the left of your table array, the name of the field should be relevant and you can also scan the column to see expected results.

Additionally, you can look up the left index column for some testing. This is useful when you are not familiar with the data.

Once your eyes detect that the index column does not match the lookup_value nature, then you must edit the table array to move the column to the left, or change the lookup_value to point to the current left column.

In other words, if your lookup_value is NAMES, your index column must be NAMES too.

VLOOKUP does not allow you to configure a non-left column to look up. At least up to the Excel 2007 version I know.

{STEP 5}

REFERENCE THE LOOKUP_VALUE IN CELLS LIKE THE PROS

“The good news about computers is that they do what you tell them to do. The bad news is that they do what you tell them to do”

— Ted Nelson

EXCEL NUMBERS, DATES, AND TEXTS, FOLLOW THEIR OWN RULES, you must know each one, so that you can use VLOOKUP comfortably and effectively.

So here are...

The ways that numbers can be referenced in a cell

Numbers go directly into cells; enter them simply as they are: 1.23, 234.65, 1500, etc. Wait; there is some problems with this. **The number of digits should be exactly the same as the index column for a match to occur.**

Excel numbers can also be referenced as a result of a formula or function.

Typical confusions with numbers

Precision is stored but not always seen. What does this mean? This is difficult to grasp at the beginning, because we trust in what we see. **Our eyes see the cell formatting and not the entire content.** For example: the number 1.231764 can be shown as 1.23, 1.232, etc. All those numbers are the same, just they are being shown with less/more digits.

You should enter the lookup_value with the same number of digits as the index column, if you want to have a match. A good alternative is to use the ROUND function.

I have something important to say you now...

Vlookup Tutorial

You may have the lookup_value number correctly set but still receive #N/A error; **this usually occurs when numbers are stored as texts in the index column of the table array**. This happens for several reasons:

- ☐ Wrong delimiter (,) instead of (.) or vice versa
- ☐ Leading apostrophe (')
- ☐ Quotes ("")
- ☐ Inter spaces (for example: 1 1 instead of 11)

Refer to step 2 of this manifesto to fix above issues.

The 2 different ways that dates can be referenced in a cell

Dates are a special type of data, you can enter dates both ways:

- ☐ Enter dates in cells as dates, for example 1/22/2010.
- ☐ You can also enter a date as the serial number it represents, the equivalent serial number for the above date is 40200

An important fact to take into account is that Excel searches dates internally as numbers; Excel dates are numbers, integers to be more precise. For example if your VLOOKUP searches the date 1/22/2010, it will search the number 40200.

Typical confusions with dates

Here are the details...

- ☐ Interpreting Excel Dates as texts. Dates are numbers, so quoting them will lead you to an error
- ☐ Assuming that a custom date is an Excel date. Dates are managed in different ways by different systems, so when you import external data, they usually appear as a custom date that is not an Excel date. For example: 10OCT11 or the most typical 10112010. (*Refer to step 2 of this manifesto to fix this issue*)
- ☐ Assuming that a date is such whatever the sequence you enter it. For example: the date 22/01/2010 is not a date, while this one is 1/22/2010

How to reference texts

Texts in cells do not need quotes.

The main problem with texts you must take care of, is spelling. Some typical causes of wrong spelling are: spaces, extra/less characters, abbreviations, etc.

Vlookup Tutorial

To avoid wrong spelling, you should take some kind of validation measures...

- ☐ Avoid at all costs to enter existing texts manually; if the data exists somewhere, copy and paste it
- ☐ Limit the lookup_value entry choices to the index column possibilities. Use the Data validation command to do this effectively

How can I reference wildcards?

Excel supports the following wildcards:

Use	To find
? (question mark)	Any single character For example, sm?th finds "smith" and "smyth"
* (asterisk)	For example, *east finds "Northeast" and "Southeast"
~ (tilde) followed by ?, *, or ~	A question mark, asterisk, or tilde For example, fy91~? Finds "fy91?"

To use wildcards in cells just enter the wildcard besides the text. No quotes needed.

See the example below. The formula in E2 is
=VLOOKUP(D2,\$A\$2:\$B\$4,2,0)

Notice the wildcards in D2 cell.

Vlookup Tutorial

	A	B	C	D	E
1	Number	Text		Number	Text
2	John	b		John F*	a
3	John F	a			
4	John D	c			

How can I reference logical operators?

Logical operators cannot be used since they create several matches, for example the condition "greater than" produces more than one match, and VLOOKUP is only able to return a single match.

Use Named ranges as the lookup_value to speed up the formula writing process

Using named ranges in VLOOKUP has several advantages...

- ☐ Save time entering the lookup_value without using the mouse or the keyboard to select the lookup cell
- ☐ Avoid pressing F4 to set the reference to absolute each time you write the formula
- ☐ Keep the formula pointing always to the correct lookup cell

{STEP 6}

HARD CODE THE LOOKUP_VALUE LIKE THE PROS TOO

“To err is human - and to blame it on a computer is even more so”

— Robert Orben

HARD CODING IS NOT A GOOD PRACTICE; it leads you to errors and wasting time when copying the formulas.

Anyway, I will expose the main principles right now...

The ways that numbers can be hard coded

Numbers can go directly in the lookup_value argument place holder if you like. What does this mean? Write the number as it is. For example: =VLOOKUP(**2015**, \$M\$16:\$N\$20, 2, 1)

Again, take into account that Excel considers all the digits for the lookup operation; so write the number with exact number of digits of the index column instance.

Let me explain this better...

Imagine that you have a number 2015 in the index column but the formula =VLOOKUP(**2015**, \$M\$16:\$N\$20, 2, 1) returns a #N/A. So you start blaming Excel... If you go a little deeper, you realize that the number 2015 on the index column contains more digits that are not being shown.

Excel always tells the truth!

Quote numbers only when they are intentionally stored in the index column as texts. For example: phone numbers or credit cards numbers.

The other way you can hard code numbers is by using an Excel Function inside. For example, you can use the ROUND function. This practice is not so common but it is possible to do it.

Typical confusions with numbers

Looking up numbers represents a big headache. I will outline now, the main source of misunderstanding...

- ☐ Believing that formatting a number to two digits throws hidden digits away. Precision of numbers is always the same no matter if you see it or not. They remain there for computations. The format is for presentation purposes. The exceptions to this rule are the results of ROUND, ROUNDDOWN, ROUNDUP functions
- ☐ Quoting numbers
- ☐ Number correctly entered at the lookup_value but numbers stored as texts in the index column. This happens for several reasons...
 - ☐ Wrong delimiter
 - ☐ Importing numbers as text
 - ☐ Leading apostrophe (')
 - ☐ Intruder characters
 - ☐ Inter spaces

Refer to step 2 of this manifesto to fix above issues.

Anyway, you must convert the numbers stored as texts to numbers, to have a match. An easy way to detect this is by seeing the difference in formatting; numbers are automatically formatted to the right and text to the left.

The 3 different ways that dates can be hard coded

Dates are numbers, so you can hard code a date these ways:

- ☐ As the serial number it represents. This is not a typical way to do it, but it is totally valid. For example
=VLOOKUP(40200,\$N\$16:\$O\$20,2,1) returns the same result as this formula
=VLOOKUP(DATEVALUE("1/22/2010"),\$N\$16:\$O\$20,2,1) since the serial number 40200 represents the date 1/22/2010
- ☐ Never enter a date directly into the formula, you must use either the DATEVALUE, for example
=VLOOKUP(**DATEVALUE("1/22/2010")**,\$N\$16:\$O\$20,2,1)
or use the DATE function
=VLOOKUP(**DATE(2010,1,22)**,\$N\$16:\$O\$20,2,1)

Typical confusions with dates

Dates produces headaches too, here I outline some of the main typical wrong procedures...

- ☐ Quoting dates. Stop quoting dates this way "1/22/2010" because it won't work. Remember that dates are numbers not texts
- ☐ Using custom dates as Excel dates. They come in the form 10OCT11 or the most typical 10112010
- ☐ Entering dates in the wrong sequence. For example if you type the following information in the DATEVALUE function 1/22/2010, Excel will convert it to a date (and a corresponding serial number 40200 specifically) while if you enter 22/01/2010, Excel will not convert it to a date because it isn't

What happens if texts are not quoted?

Named ranges can be entered as the lookup_value, if you enter a text without quotes, Excel will interpret as a named range and will search internally, if it finds a name, then it will use it. If not, it will present the error message #NAME.

Never enter texts without quotes.

How can I hard code wildcards?

Ampersand symbol is the key (&) for wildcards. Notice its use in the formula: =VLOOKUP("*"&"Susan"&"*",Haystack!\$A\$2:\$D\$11,1,0).

You can combine hard coding and referencing. For example: =VLOOKUP("*"&A2&"*",Haystack!\$A\$2:\$D\$11,1,0). Personally, I try at all costs to either hard code or reference.

You can also use the CONCATENATE function instead of the symbol &.

An important note now...

Hard coding is not a good practice because of the amount of work that it represents. You need to change the hard coded parameter in each formula at a time. On the other hand, if you reference parameters in a cell, a change in a cell will affect all the instances of the formulas.

{STEP 7}

GET RID OF THE LEGITIMATE #N/A ERRORS ONCE FOR ALL

“I think it's fair to say that personal computers have become the most empowering tool we've ever created. They're tools of communication, they're tools of creativity, and they can be shaped by their user”

— Bill Gates

WHEN EVERYTHING IS IN PLACE, #N/A ERRORS ARE **LEGITIMATE** and you must treat them as such. Knowing that a searched item is not on your index column is priceless. So treat this machine-message as valuable information because it is.

And use that message to convey extra meaning to your end users.

Excel and the reason #N/A errors appear

System errors are the way software converses with the user. When software shows a warning message, it is informing you; on the other hand, an error message requires you do something to fix the error. You need to act to avoid the message from appearing again.

What do you do when machines inform you?

- ☐ battery low!, you hurry to charge the battery
- ☐ no signal, you change the TV channel
- ☐ CD not blank!, you replace it with a blank CD
- ☐ #N/A, ?

You got the point, users never allow error messages to persist, we do something...

Replace the #N/A error by a meaningful message

Professional messages increase the quality of the report and increase the confidence of the end user.

Moreover, adding meaningful messages may help end users in the decision process. They may filter data by a message that makes sense and maybe color them with conditional format.

Which report would you like to receive?

This one...

I	J
Client Name	Order Amount
Glen Sullivan	66.12
John Ballard	23.19
Patricia Griffin	234.31
Steve Manning	#N/A

Or this one... (I used conditional formatting to improve the informative nature of the report)

I	J
Client Name	Order Amount
Glen Sullivan	66.12
John Ballard	23.19
Patricia Griffin	234.31
Steve Manning	Client not found

The classic method to replace a legitimate #N/A error with a message

Use the formula that contains the functions: IF and ISNA. This is the classic way to trap a #N/A error, and show a message instead. Take into account that you should trap errors when you are sure the data is not mismatched by formatting issues like spaces, spelling, etc. In other words, after applying the 6 steps outlined in this book.

The formula is this one...

=IF(ISNA(VLOOKUP()),"your_message_here",VLOOKUP())

This method has the shortcoming that slows down the calculations when used massively in a sheet. The explanation is that the formula performs VLOOKUP twice, this Repetition increases the Time of computations.

The more efficient method to replace a legitimate #N/A error with a message (Excel 2007)

IFERROR is the formula used to trap #N/A errors in Excel 2007.

Use it this way...

=IFERROR(VLOOKUP(),"your_message_here")

This solution is faster because Excel evaluates VLOOKUP once. So the time of computation is not significantly affected.

Well...

I hope this Manifesto has provided you with some helpful solutions to some of the common VLOOKUP problems that many Excel users struggle with day to day.

I am John Franco - of Ecuador South America. I invite you to visit me at my blog www.Excelcream.com where we can become better acquainted. **I will show you many amazing truths of Excel.**

About John



John Franco is native of Ecuador, he is a Civil Engineer and a Bachelor in Applied Linguistics with focus on creating systems for work, his long term objective in life is helping others to gain momentum in the application of ideas.

For over seven years, he worked as a Civil Engineer for [Norberto Odebrecht Construction Company](#) (the 44th largest construction contracting firm from around the world according to [Engineering News Record 2008](#)).

During that time, **He had an Excel Maven Boss;** Nilton Teti, one of those old-time-Excel-geniuses who makes precious models, uses just the keyboard and hates BI corporate packages. His almost “religious fervor” for Excel, and his amazing knowledge, was the source of his great interest in Spreadsheets.

During all these years he really experienced the professional benefits of using Excel to accomplish his duties; **he says to you that being skilled in Excel gives you a tremendous advantage at the office and in your career!**

Having always been very entrepreneurial in his nature, he quit his job at Norberto Odebrecht in order to devote his full passion and knowledge of advanced Excel methods to others around the world who can benefit from it.

His first entrepreneurial initiative was the site

www.Excel-Spreadsheet-Authors.com, that later evolved to <http://www.ExcelCream.com>; a blog dedicated to Mid/Advanced Excel users so they know the quintessence of Excel spreadsheet and reach higher productivity and clarity



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