

Microsoft Excel – Advanced Topics

LOOKUP functions – a very powerful set of functions are the LOOKUP functions. This enables you to create a separate table of values to use as a source, and automatically fill in values on another sheet based on this table. Typical applications are price lists and zip codes. We'll design a lookup for our Mail Merge DB spreadsheet.

	A	B	C
1	City	State	Zip Code
2	London	NY	12345
3	New York	NY	10001
4	Westbury	NY	11580
5	Brookville	NY	11548
6	Farmingdale	NY	11735
7	Freeport	NY	11520
8	Garden City	NY	11530
9	Great Neck	NY	11020
10	Levittown	NY	11756
11	Long Beach	NY	11561
12	Massapequa	NY	11758
13	Rockville Center	NY	11571
14	Plainsville	NY	11603
15	Roslyn	NY	11576
16	Seaford	NY	11783
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On **Sheet2**, create a list as shown on the left. You can do this by copying the **City**, **State** and **Zip Code** columns from the **Raw DB** sheet and pasting them into **Sheet2**.

Then sort the list alphabetically by City, in ascending order. This is an important step – the **LOOKUP** functions will not work unless the lookup list is sorted alphabetically!

Create your list on **Sheet2**; this will be your lookup sheet.

	A	B	C
1	City	State	Zip Code
2	Brookville	NY	11548
3	Farmingdale	NY	11735
4	Freeport	NY	11520
5	Garden City	NY	11530
6	Great Neck	NY	11020
7	Levittown	NY	11756
8	London	NY	12345
9	Long Beach	NY	11561
10	Massapequa	NY	11758
11	New York	NY	10001
12	Plainsville	NY	11603
13	Rockville Center	NY	11571
14	Roslyn	NY	11576
15	Seaford	NY	11783
16	Westbury	NY	11580
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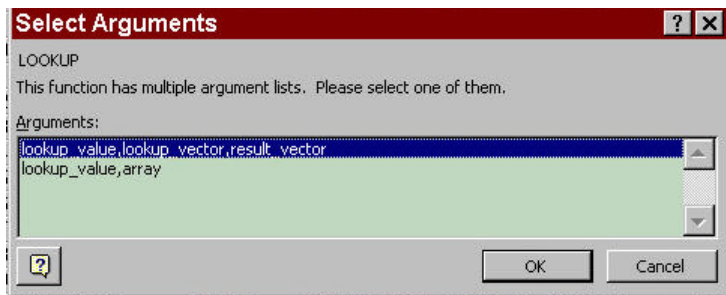
Now let's return to the **RawDB** tab. Delete all of the values in the **Zip Code** column, and select the first cell under the **Zip Code** heading (cell G2 in the diagram below). Now choose **Insert** ➔ **Function** from the menu (or click the function button: **fx**). In the Paste Function window, select the *Function category*: **Lookup & Reference**; then select the *Function name*: **LOOKUP**.

Click **OK** and you should have the **Select Arguments** window on the next page.

The screenshot shows the Microsoft Excel interface with the 'Mail Merge DB.xls' file open. The 'Raw DB' tab is selected. The spreadsheet has columns: Title, First Name, Last Name, Address, City, State, Zip Code, Date of Birth, Age, and Age Group. The 'Zip Code' column is currently empty. The 'Paste Function' dialog box is open, showing the 'Function category' as 'Lookup & Reference' and the 'Function name' as 'LOOKUP'. The 'LOOKUP(...)' description is visible at the bottom of the dialog box.

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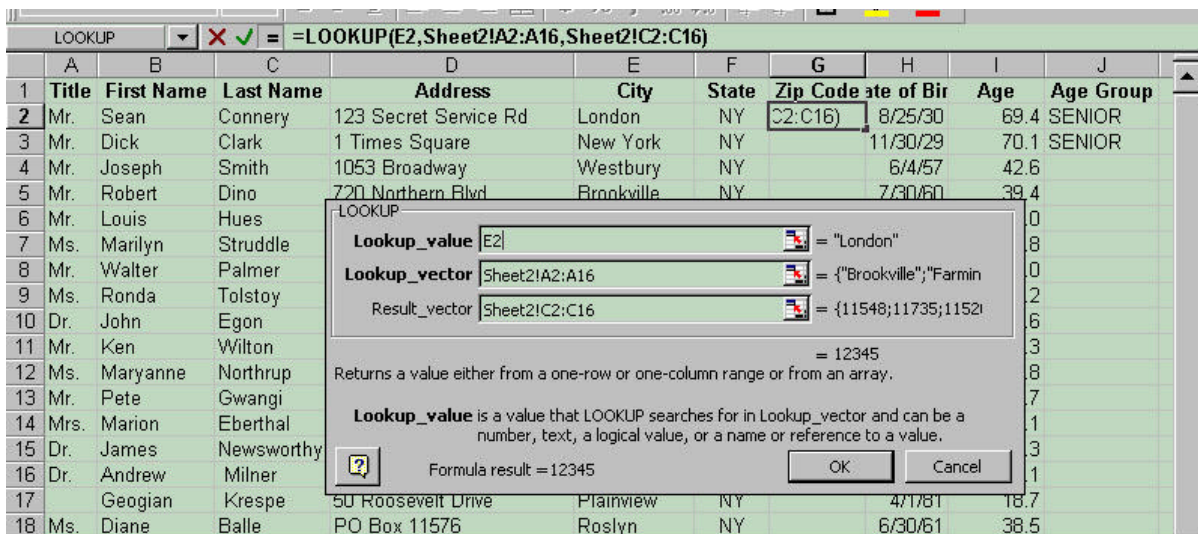
The Select Arguments windows offers you a choice of two kinds of LOOKUP functions.



The second one, “Lookup_value, array,” is a simple version which is easy to use, but has, among its limitations, the requirement of a list with no more than two columns.

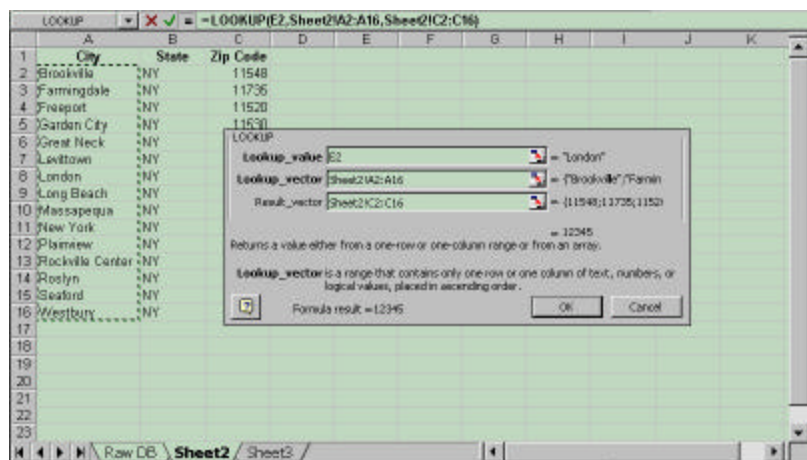
We’ll focus on the more versatile: “Lookup_value, lookup_vector, result_vector.”

Click on the **OK** button above, to reveal the function editor window show below (*yours might be in the upper left corner of your sheet, to move it, click on a dead area and drag it to a more appropriate location*).



There are three fields to fill out:

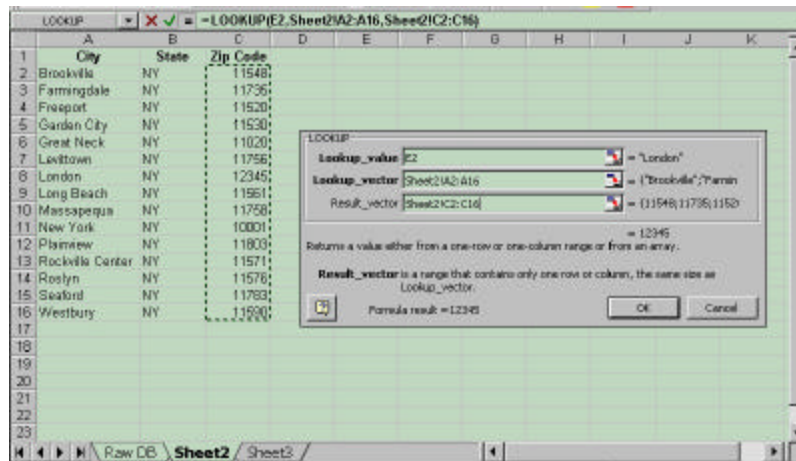
- **Lookup_value:** is the cell or value you want the function to use when it refers to the lookup list. In the figure above, you want to take “London” (the contents of cell E2) and go find it in the lookup list on **Sheet2**.
- **Lookup_vector:** is the range of cells in the lookup list that the function will try to find match with the **Lookup_value** you specified. In this example, click on **Sheet2**, and select the range of cells containing the city names as shown on the right.



- **Result_vector:** is the range of cells containing the value that should be returned when a match is found

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between the **Lookup_value** and the **Lookup_vector**. In the figure below, you can see that the entire range of data in the **Zip Code** column is what must be selected.



Click the **OK** button and the resulting formula will be placed in our cell: G2.

=LOOKUP(E2,Sheet2!A2:A16,Sheet2!C2:C16)

Before we copy this formula into all the appropriate cells below it, let's stop and think about what will happen. Remember that the cell references will update as we copy it to a new location. Thus, if we copy this formula from G2 to G3, the **Lookup_value** of E2 will become E3 – just like we want. However, the **Lookup_vector** range will also increment by one from Sheet2!A2:A16 to Sheet2!A3:A17 – ruining our formula! To prevent this from occurring, we must employ absolute cell references to the portion of the formula that we want to hold steady. Hence:

=LOOKUP(E2,Sheet2!\$A\$2:\$A\$16,Sheet2!\$C\$2:\$C\$16)

Now it's safe to copy this formula into all the necessary cells below it. When you do, you should see that the zip codes from the list in **Sheet2** are returned for all rows.

Try changing a city name in the **RawDB** sheet. You should see the zip code change as soon as you complete entry on the city cell (by hitting the Tab, Enter or arrow keys). BUT BEWARE, if you type a city that is NOT in the list, the **Result_vector** value of the next nearest match is used. Try typing "Mexico" into a city cell; you'll see the zip code for "Massapequa" displayed! To fix this, you could try modifying the formula so it first tests the comparison to see if an exact match is found. To do this, you could employ the **IF** function, **MATCH** function and the **ISNA** function to create a formula as shown below:

=IF(ISNA(MATCH(E2,Sheet2!\$A\$2:\$A\$16,0)),"not listed",LOOKUP(E2,Sheet2!\$A\$2:\$A\$16,Sheet2!\$C\$2:\$C\$16))

The **MATCH** function, as shown, tests the comparison to see if an exact match exists (the last zero is the key to this). If an exact match does not exist, this function returns a value of "#NA" - which we test for using the **ISNA** function. Putting it all together with the **IF** function tells instructs our formula to:

1. See if the result of the **MATCH** is the value "#NA"
2. If it is, enter the text "not listed" into the zip code cell
3. If it isn't, then an exact match was found and display the matching zip code