

Advanced Excel Topics:

- 1.Vlookup
- 2.Index Match
- 3.Advanced conditional formatting
- 4.Pivot tables and reporting
- 5.Macros and VBA
- 6.Data Simulation

Vlookup:

VLOOKUP (vertical lookup) is a function to look up a value in a table and retrieve data from a specific column. Basically, it retrieves data in a table vertically using a lookup value.

The screenshot shows a Microsoft Excel spreadsheet with a table of employee data. The table has columns for ID, First, Last, Email, and Department. A formula is entered in cell E4: =VLOOKUP(D4,B8:F17,4, FALSE). The formula is highlighted in yellow. A handwritten note 'Lookup value' points to the value 622 in cell D4. Another handwritten note 'Result+' points to the cell containing the result, which is the email address j.adder@ace.com. The table rows are numbered 1 through 17. The columns are labeled 1 through 5. The 'Email' column is labeled 'Result' at the bottom. The 'Department' column is labeled 'Result' at the bottom. The EXCELJET logo is visible in the bottom right corner.

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8	610	Janet	Farley	j.farley@ace.com	Fulfillment	
9	798	Steven	Batista	s.batista@ace.com	Sales	
10	841	Evelyn	Monet	e.monet@ace.com	Fulfillment	
11	886	Marilyn	Bradley	m.bradley@ace.com	Fulfillment	
12	622	Jonathan	Adder	j.adder@ace.com	Marketing	
13	601	Adrian	Birt	a.birt@ace.com	Engineering	
14	869	Julie	Irons	j.irons@ace.com	Marketing	
15	867	Erica	Tan	e.tan@ace.com	Fulfillment	
16	785	Harold	Clayton	h.clayton@ace.com	Fulfillment	
17	648	Sharyn	Castor	s.castor@ace.com	Support	
18						
19						
20						
21						
22						

VLOOKUP is a valuable skill to have as it helps merge multiple sets of information into one — like a merger tool.

In practice, VLOOKUP is useful for:

- Coming up with the corresponding interest rate flow in a financial model with a debt schedule
- Looking up the quantity sold for a specific item
- Calculating sales bonuses

Index Match:

The INDEX MATCH combination is made up of two Excel functions — INDEX and MATCH. The former returns the value of a cell at a given location in a list or table. The latter returns the position of a cell in a row or column.

The screenshot shows an Excel spreadsheet with two tables. The left table has columns for Country, Capital, and Population. The right table has columns for Country and Capital population. A formula bar at the top contains the formula `=INDEX(C2:C10, MATCH(F1,A2:A10,0))`. An orange arrow points from the formula bar to the cell F2, which contains the value "Japan". Another orange arrow points from the cell F2 to the cell F1 in the right table, which also contains "Japan".

	A	B	C	D	E	F
1	Country	Capital	Population		Country	Japan
2	China	Beijing	20,693,000		Capital population	13,189,000
3	India	New Delhi	17,838,842			
4	Japan	Tokyo	13,189,000			
5	Russia	Moscow	11,541,000			
6	South Korea	Seoul	10,528,774			
7	Indonesia	Jakarta	10,187,595			
8	Iran	Tehran	9,110,347			
9	Mexico	Mexico City	8,851,080			
10	Peru	Lima	8,481,415			

In this example, Index Match is identifying and matching the population of Japan to F2.

Source: [Ablebits](#)

When combined, these functions allow a formula to become dynamic, like in the case of a two-way lookup. Its uses are similar to VLOOKUP although INDEX MATCH is more flexible.

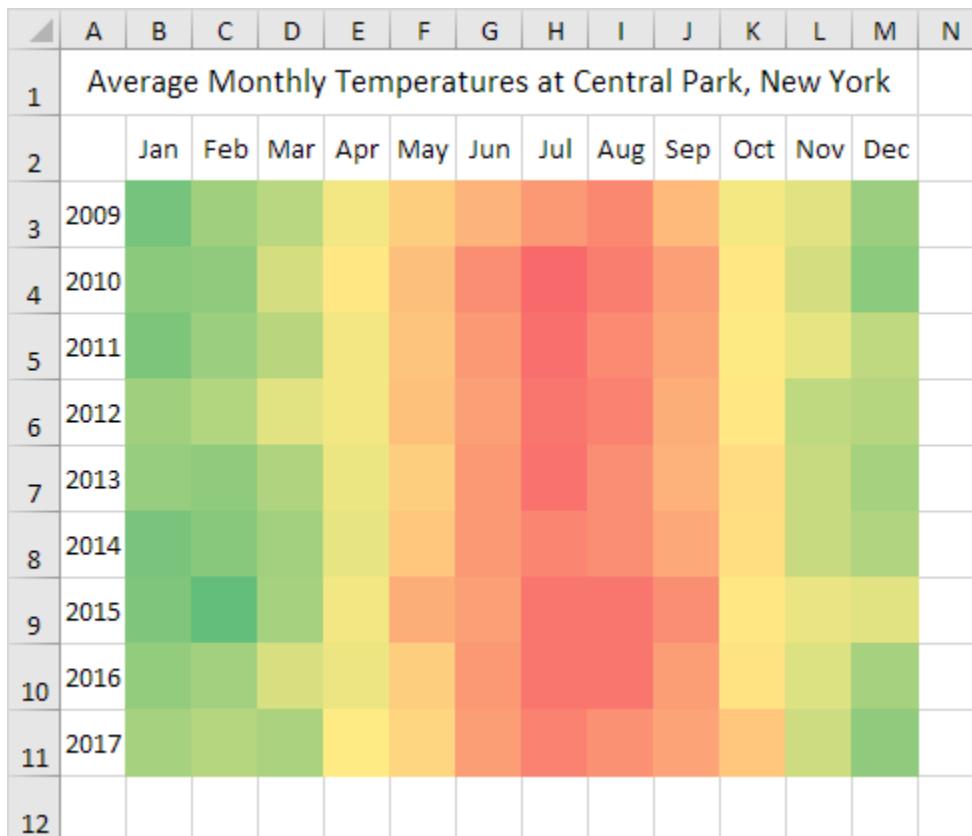
In terms of usage, here are examples:

- Returning the sales figures for a specific month for a specific agent
- Creating a financial summary
- Making a purchase order with a price list

Advanced conditional formatting

Conditional formatting is a great way to design a spreadsheet as it gives a user a quick way to add a visual analysis layer on a data set. It can also be used to create advanced tools like heat maps and Harvey bubbles.

A **heat map** is a representation of data with values represented as colors, usually a warm-to-cool color spectrum, to show which values are larger or smaller than the others.



In this heat map example, it is shown that temperatures at Central Park are warmer between May and September.

Source: [Excel-Easy](#)

Harvey balls are graphical representations of qualitative information to indicate the degree to which an item meets a specific criterion.

A	B	C	D	E	F	G
1	Score					
2	● 80					
3	○ 9					
4	● 81					
5	● 71					
6	● 100					
7	○ 24					
8	○ 56					
9	○ 37					
10		Score	Icon			
11		0	○			
		35	○			
		65	●			

The icon beside the scores indicate whether the score belongs in 0-34, 35-64, or 65 and above group.

Here's more of what advanced conditional formatting can do:

- Flag data entry problems
- Show duplicates
- Highlight rows that have the most sales

Pivot tables and reporting

A pivot table is a powerful Excel feature used in creating reports of large data sets. In a sense, a pivot table is like an ordinary report table with one vital difference — you can look at the same data from different perspectives.

	A	B	C	D	E	F	G	H	I	J
1	Category	(All)								
2										
3	Sum of Amount	Column								
4	Row Labels	Apple	Banana	Beans	Broccoli	Carrots	Mango	Orange	Grand Total	
5	Australia	20634	52721	14433	17953	8106	9186	8680	131713	
6	Canada	24867	33775		12407		3767	19929	94745	
7	France	80193	36094	680	5341	9104	7388	2256	141056	
8	Germany	9082	39686	29905	37197	21636	8775	8887	155168	
9	New Zealand	10332	40050		4390			12010	66782	
10	United Kingdom	17534	42908	5100	38436	41815	5600	21744	173137	
11	United States	28615	95061	7163	26715	56284	22363	30932	267133	
12	Grand Total	191257	340295	57281	142439	136945	57079	104438	1029734	
13										

This is a

two-dimensional pivot table where you can look further into the specific columns or rows.

Source: [Excel-Easy](#)

A user can group data into categories, filter data to include/exclude categories, and even build charts with pivot tables.

In real life, pivot tables can be used to build:

- Employee database
- Product database
- Project sales record

Macros and VBA

A macro is a small computer program that will do an action or a set of actions once turned on. Macros are written using VBA (Visual Basic for Applications) language stored in modules. Using a macro needs a deep understanding of VBA.

A	B	C	D	E
Name	Sales			
Alleen	\$18,476.26	Highest sales:		
Andreana	\$17,931.90	Name:		
Antoine	\$14,289.59			
Antony	\$14,498.50			
Bradney	\$14,088.62			
Cami	\$11,315.43			
Chaddy	\$12,502.93			
Cleo	\$10,580.90			
Danita	\$18,743.50			
Dix	\$14,696.99			
Dolorita	\$15,985.43			
Douglas	\$14,892.11			
Eadith	\$11,841.99			

Show High Sales

Once the user clicks the “Show High Sales” written with AVBA, Excel will compute the highest sales.

Source: [Spreadsheeto](#)

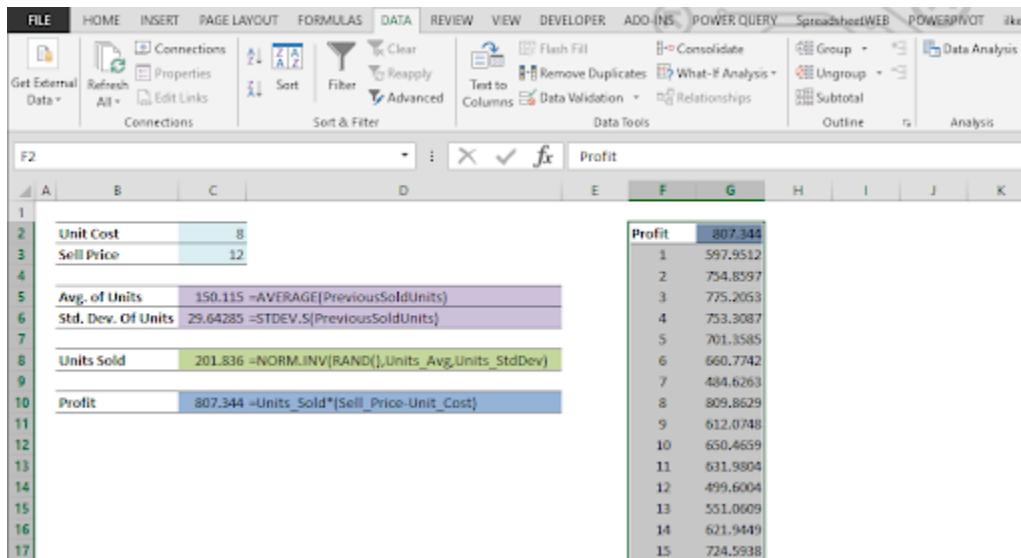
VBA macros help automate tasks. However, because of its complexity, not every Excel user has this skill.

Advanced Excel users apply VBA Macro to:

- Cleanup and format data quickly
- Listing data on all sheets
- Automate properties and actions in pivot tables
- Create and modify user forms
- Creating systems to make, update, or change Excel files

Data simulations

A simulation usually entails making a mathematical model that will represent the characteristics of a system. While there are specialized software programs today for simulations, someone with advanced skills can use Excel tools for simulation.



An example of data simulation where future profits are projected based on past data.

Source: [SpreadsheetWEB](#)

To do a simulation in Excel, a user needs to know how to use features like:

- Random number generation functions
- Statistical functions
- Data tables
- What-if analysis tools

In terms of application, here are some use cases of data simulations:

- Simulate online ads activities to determine possible average sales for a period
- Find sales patterns based on recent data
- Model customer lifetime value based on their product-purchasing trajectory