## 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.

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.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| | | | | | | **=INDEX(C2:C10, MATCH(F1,A2:A10,0))** |
| 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.
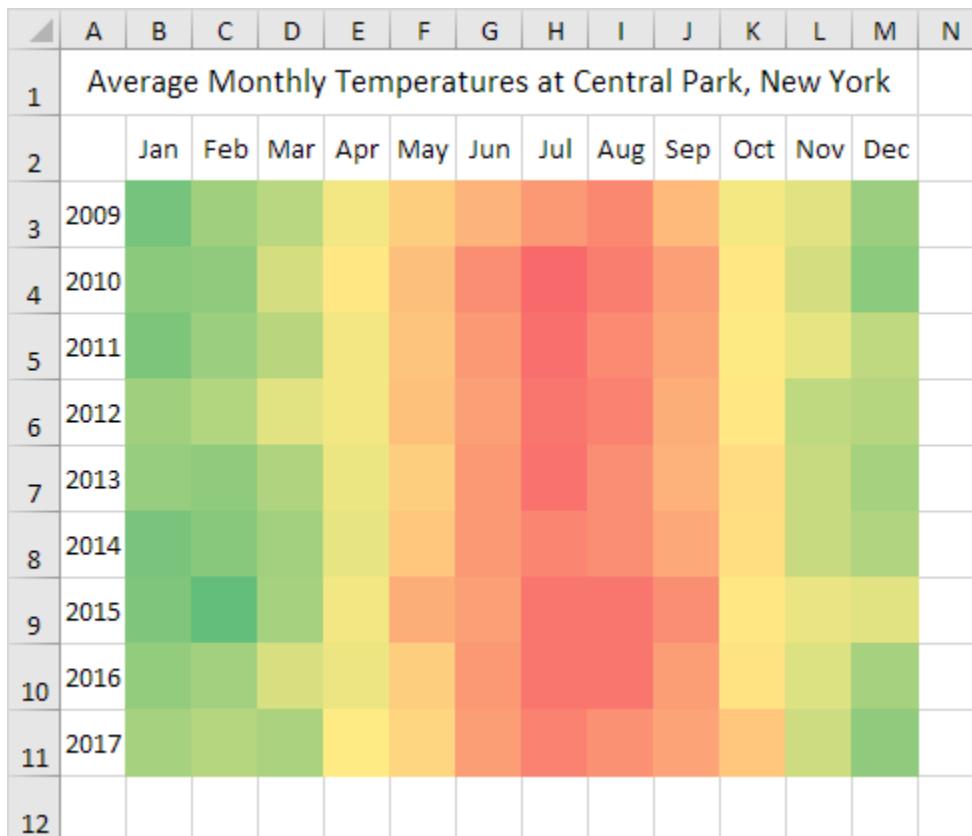
In terms of usage, here are examples:

- 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.

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



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 | | Show High | |
| | Chaddy | $12,502.93 | | Sales | |
| | Cleo | $10,580.90 | | | |
| | Danita | $18,743.50 | | | |
| | Dix | $14,696.99 | | | |
| | Dolorita | $15,985.43 | | | |
| | Douglas | $14,892.11 | | | |
| | Eadith | $11,841.99 | | | |

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

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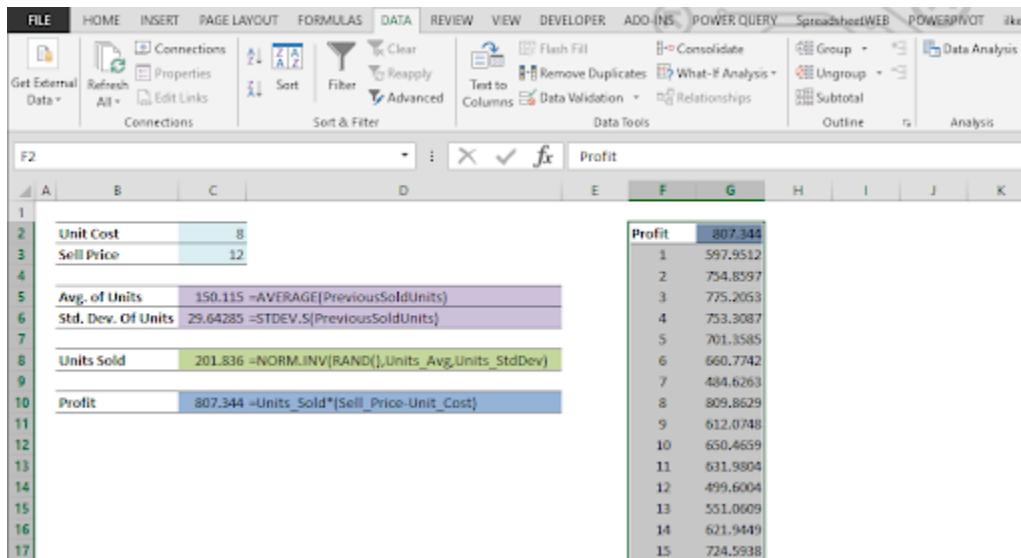
VBA macros help automate tasks. However, because of its complexity, not every Excel user has this skill.

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