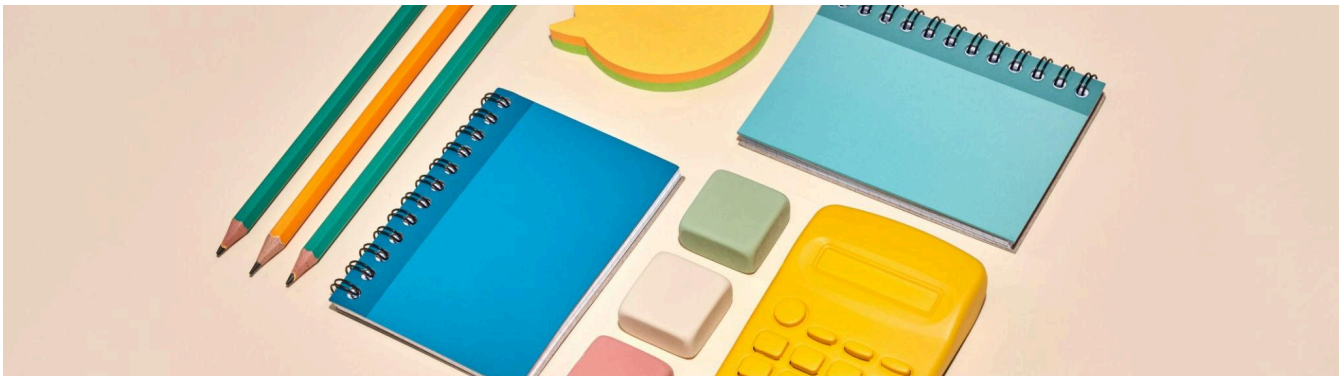

Advanced Excel

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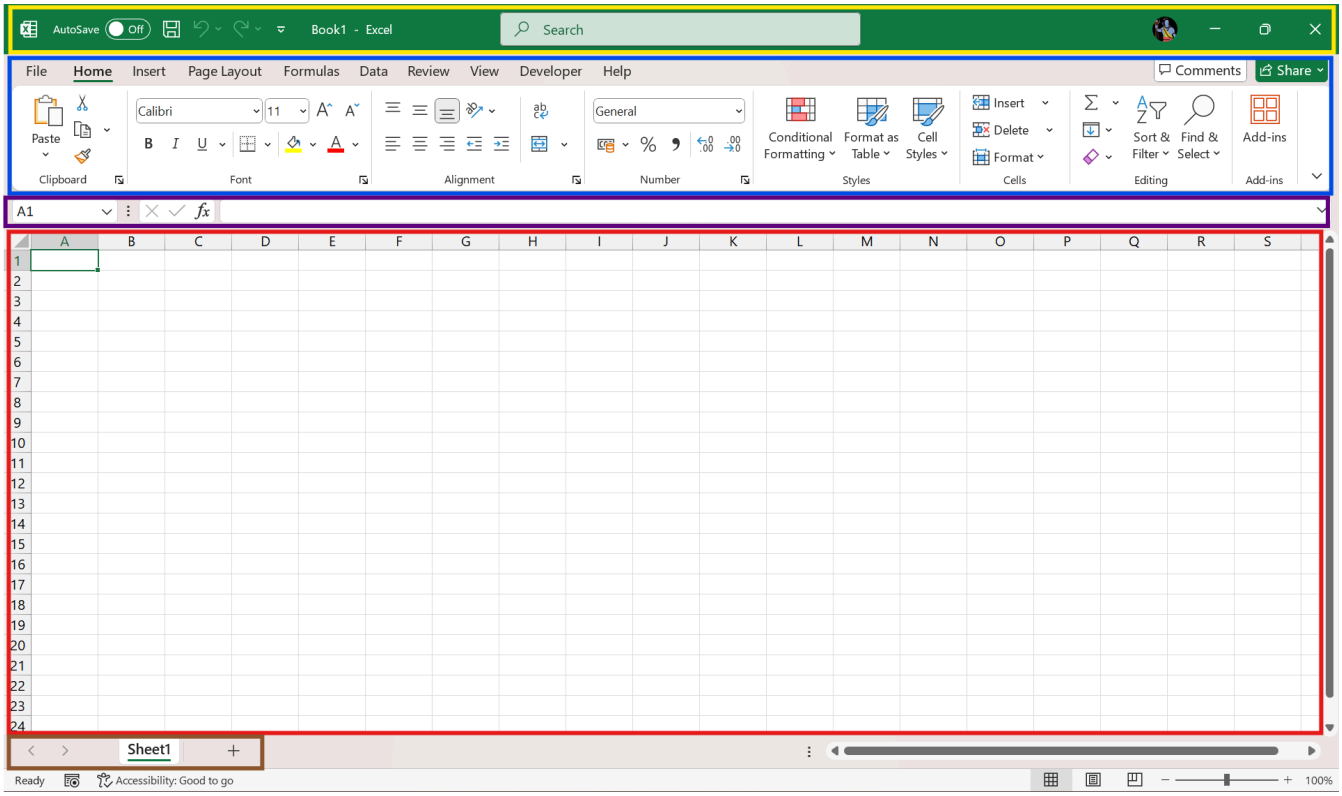
01: Introduction

This document provides a comprehensive walkthrough of an advanced Excel training project, designed to cover real-world data handling, visualization, and automation skills using Microsoft Excel. It spans core topics such as Conditional Formatting, What-If Analysis, Scenario Manager, Data Validation, Macros (VBA), Dashboard Design, and Power Query.

Excel is one of the main tools for data analysis and visualization. In this documentation, I discuss how to use different Excel functionalities.

Raw Data → Gather it → Clean it → Analyze it → Data → Transform (charts, tables, graphs)

02: Excel Workbook - How does it look?



Title Bar (🟡): Autosave, Undo, Redo, Search Bar.

Command Bar (🔵): File, Home, Insert, Page Layout, Data, Review, View, Developer, Help.

Formula Bar (🟣): Cell number and contents, as it is.

Worksheet (🔴): Space containing cells, where actual work happens.

Sheets (🟤): Add or remove sheets, more like pages.

From now on, there won't be *long descriptive sentences*, there will only be short and helpful lines. Shortcuts are mentioned wherever they can be used. I will refer only by the terminology specified above, and deeper paths into options are displayed in `option-a > option-b > option-c` format.

03: Entering and Formatting Data

- Enter your data into tabular form by selecting the cells
- Double-click cells to edit; otherwise, the inner content is rewritten every time it is under selection

- Once you have entered your data, you can handle the columns' data type by formatting them into the right type. Select your column > Command Bar > Dropdown names 'General' > edit that.
- In the same segment above, other options such as decimal point shift, adding currency, are also present.
- Just to the left of this column, there are alignment buttons. They're the same as in Word documents.
- The plus sign on the Sheets bar can be used to create more worksheets.
- (TAB) moves right; (SHIFT+TAB) moves left.
- (ENTER) moves down; (SHIFT+ENTER) moves up.
- After formatting your table, we need to tell Excel that the 'thing' is to be treated as a table. We do this as follows: select your table > Command Bar > Insert > Table > Yes.

04: Sorting and Filtering Data

- Once Excel recognizes the table, it is highlighted, usually in blue.
- In each column header, notice a small down arrow; click it.
- You'll be seeing plenty of dropdown options now, but don't panic, it's really simple.
    - **Numeric Type:** Sort (smallest to largest or reverse), by color means to differentiate rows by specific colors. Filters (above avg, below avg) are constraints that can be set for each column.
    - **Date Type:** Sort(oldest to newest or reverse), by color, filters (weekly, monthly, quarterly).
    - **Text Type:** Sort (A to Z or reverse), by color, filters (contains, starts with, and more).
- Once you set any of these filters, the downarrow(⬇️) changes to a small funnel/filter.
- Select some cells from one of your numeric columns, and look to the right of the Sheets panel. You will be seeing some statistics like SUM or COUNT.

05: Data Mining using 'IF' function

- It is just like how we use basic formulae in columns like =SUM() or =AVG()
- Say sales data needs a boolean discount column based on price, if it is more than 20k. Then we can use: =IF(cell_num_of_price > 20000, "Yes", "No")
- Syntax: =IF(logical_condition, true_value, false_value)

06: VLOOKUP

- It is just the same as having joins in SQL. Don't worry if you don't know SQL.

- Its main purpose is to link data from various tables.
- Say, Table 1 has data like person (p) and country_id (cid). Table 2 has country_id and country_name. We want the person and country_name (cn) columns. Then we use VLOOKUP here.
- For above case: =VLOOKUP(cell_cid, table_2_cell_selection, 2, FALSE). Here, 2 comes because the output value after the lookup is from column 2 of table 2. FALSE is for exact lookup.
- Syntax: =VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

07: Pivot Tables

- These are mini informative tables from your main big table.
- Select your table > Command Bar > Insert > Pivot Table > New Worksheet option > OK.
- This will open a new worksheet. There, you will see a toggle bar with a lot of stuff on the right. This is your play arena.
- It will have fields or your columns, columns, rows, values, and filter boxes.
- Next is a drag-and-drop show. Select any field and drop it into the rows box. Next, choose a numeric value and put that into the values box. Note: The Values box takes only numeric fields.

08: Conditional Formatting

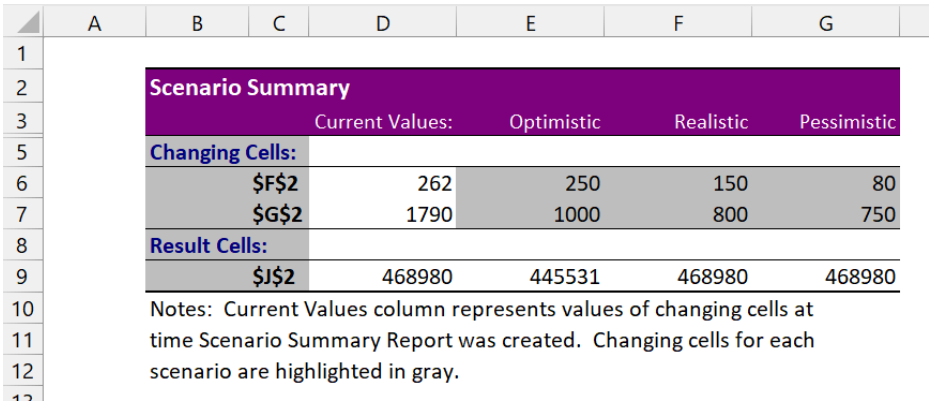
- Select any column > Command Bar > Home > Conditional Formatting > New Rule.
- This has an option to use a formula. You can use that.
- Or else, to keep it simple, we can use a color scale in the same dropdown. This gives a hue to the column values.
- Data Bars are also helpful. Try them out, they're easy to understand.

09: What-If Analysis (Goal Seek)

- Say you have values of units_sold, unit_price, and total amount. We are asked unit_price when the total amount is 50K, for fixed units_sold. This is okay to do for a few columns, but it gets out of hand when the columns are in thousands.
- Command Bar > Data > What-If Analysis > Goal Seek:
    - Set cell: total_amount
    - To value: 50000
    - By changing: unit_price
- This should be applied only on a formula-based column (like total_amount), otherwise it won't be able to calculate.

10: What-If Analysis (Scenario Manager)

- Say we build three scenarios:
  - Optimistic: 250 units at 1000 each
  - Realistic: 150 units at 800 each
  - Pessimistic: 80 units at 750 each
- Command Bar > Data > What-If Analysis > Scenario Manager > Add.
- Enter its name, and select the units_sold and unit_price column cells.
- Click on the “Summary” button and choose the total_amount price.
- This creates another sheet with each scenario's details. An example is as below:



Scenario Summary				
	Current Values:	Optimistic	Realistic	Pessimistic
Changing Cells:				
F2	262	250	150	80
G2	1790	1000	800	750
Result Cells:				
J2	468980	445531	468980	468980

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

11: Data Validation

- Select column > Command Bar > Data > Data Tools Block > Data Validation.
  - Allow: any value (no constraint), whole number, decimal, list, date, time, text length.
  - Data: Enter the list like “East,West,North,South”.
  - In the other tabs, there are input message popups and error alert options too. Toggle and explore with them.

12: Macros

- Macros are helpful to automate repeating processes.
- Command Bar > View > Macros > Record Macro. Name it, add a shortcut, store ‘In This Workbook’, and click OK.
- Once you click this, Excel starts to track all your activities, like formatting and editing.
  - Change the alignment
  - Change color
  - Change font

- Once done, go to the same place and Stop Recording. Your macro is ready to use!
- But where? Use the shortcut key, remember?
- If this still seems a little boring, you can have a button for this! We will discuss that in the “Form Controls” section.

13: Data Tables

- It is a level-up of Goal Seek.
- For this, create sample values of the scenario (unit_price can be 30,40,50,60, and total_amount can be 50K, 60K, 70K, 80K).
- Row: unit_price
- Column: total_amount
- In the top-left empty cell of this small table, type the formula for this calculation, and select it. Then go to Command Bar > Data > What-If Analysis > Data Table.

14: INDEX-MATCH Combo

- It is an advanced version of VLOOKUP
- Syntax: =INDEX(ref_array, MATCH(lookup_value, table_array_to_lookin, 0))
- Zero in the last field is used for an exact match.

15: SUMIFS and COUNTIFS

- They can handle multiple constraints.
- =SUMIFS(sum_range, feature1_range, feature1, feature2_range, feature2)
- =COUNTIFS(feature1_range, feature1, feature2_range, feature2)

16: Text Functions

- TEXT() - format numbers/dates with custom style
- CONCAT(), TEXTJOIN() - combines values from multiple cells
- LEFT(), RIGHT(), MID() - extract specific parts of string
- UPPER(), LOWER(), PROPER() - change text case
- LEN(), TRIM() - clean unwanted spaces

17: Dynamic Named Ranges

- Helps create dynamic lists that update with changes made to your table.
- Formulas > Name Manager > New
    - Name it

    - Refers to: = OFFSET(cell_num, 0, 0, COUNTA(column)-1, 1)
- Use it in Data Validation > List option inside the opening box.

18: Form Controls

- Command bar > Developer > Insert > Form Controls
- Buttons, Combo box. List box, scroll bar, checkbox, group box, option button, spin button, and label are available. Click on any one and edit it.
- After that, right-click on it, assign a Macro. Choose your Macro created a while ago. Now, the shortcut is a button on the worksheet!

19: VBA

- It stands for Visual Basic for Applications.
- It is the programming language behind Excel Macros.
- Open the VBA Editor by pressing Alt+F11, Insert > Module. This opens the code window.
- Simple pop-up code:

```
Sub Note()

    MsgBox “Hello, welcome!”

End Sub
```

- Click the ▶️ button to run the VBA code. Save it for later use, and you can use it while assigning macros.

20: Dashboarding

- **Pivot Tables:** Insert > Pivot Tables > Add necessary fields
- **Charts:** Select pivots, insert charts. E.g., bar, line, scatter, box, bubble, pie, donut, radial, hierarchy, funnels, etc.
- **Formatting and Layouts:** These appear when we are working with a specific visualization or chart in the command bar in green color. Use the templates for a better look.
- **Slicers:** Select a pivot table, Insert > Slicer > select the field you wish to slice. It creates a filter box.
- **Applying the slicer to multiple tables:** select the slicer, right click, go to “report connections”, select all the tables required. This will make the slicer applicable to multiple charts based on different tables.

Conclusion!

This documentation represents a professional and structured flow of advanced Excel learning. The steps can be reused or modified for portfolio purposes, corporate reporting, or automation workflows.

Thank you for reading!