

Excel VLOOKUP and Pivot Tables

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1 NAMED RANGES

In Excel, a named range is a feature that allows you to assign a meaningful name to a specific cell or range of cells. Instead of referring to cells by their cell references (such as A1 or B2:C5), you can use a custom name to make formulas and functions more readable and easier to understand.

Here's how you can create a named range in Excel:

1. **Select the Cells:**
 - Click and drag to select the cells you want to name.
2. **Name Box:**
 - Look for the "Name Box" to the left of the formula bar at the top of the Excel window.
 - Click on the drop-down arrow in the Name Box.
3. **Enter the Name:**
 - Type the desired name for the range and press Enter.

Now, you can use this named range in formulas, charts, and other features in Excel. For example, if you named cells B2:C5 as "SalesData," you could use the name "SalesData" in formulas like `=SUM(SalesData)` instead of `=SUM(B2:C5)`. This makes your formulas more intuitive and easier to manage, especially in larger and more complex spreadsheets.

To manage and edit named ranges, you can go to the "Formulas" tab, click on "Name Manager" in the "Defined Names" group. Here, you can see a list of all named ranges, edit their references, or delete them if needed.

2 TABLES

"Format as Table" is a feature in Microsoft Excel that allows you to quickly and easily apply a professional-looking table style to a range of cells. This feature is useful for organizing and analyzing data, and it provides several benefits:

1. **Visual Appeal:** Formatting data as a table adds predefined formatting styles with alternating row colors, header formatting, and banded columns. This enhances the visual appeal of your data and makes it easier to read and understand.
2. **Dynamic Ranges:** When you convert a range of cells into a table, Excel automatically expands the table range as you add more data. This dynamic range feature is helpful when you have a growing dataset, as it ensures that new data is included in calculations and charts automatically.
3. **Filtering and Sorting:** Excel tables come with built-in filter and sort options. When you format data as a table, drop-down arrows appear in the header cells, allowing you to filter and sort data easily.

Here's how to format a range as a table in Excel:

1. **Select the Range:**
 - Click anywhere within the range of cells you want to format.
2. **Insert Table:**
 - Go to the "Home" tab on the Excel ribbon.
 - Click on the "Format as Table" option in the "Styles" group.
3. **Choose a Table Style:**
 - Select the desired table style from the gallery that appears.
4. **Confirm Table Range:**
 - Make sure the "Create Table" dialog box displays the correct range for your data.
 - Check the box if your table has headers.
5. **Click OK:**
 - Click the "OK" button to apply the chosen table style to your selected range.

Once applied, your data will be formatted as a table, and you can take advantage of the benefits mentioned earlier. Additionally, you can easily modify the table style or remove the table format by using the "Table Design" tab that appears when you have an active cell within the table.

3 WHAT IS A VLOOKUP

A VLOOKUP, or Vertical Lookup, is a function in Microsoft Excel and other spreadsheet software that allows you to search for a value in a specified column of a table or range, and retrieve a corresponding value from another column. The function is particularly useful for quickly finding and associating data in large datasets.

The basic syntax of the VLOOKUP function is as follows:

- **lookup_value**: The value to be searched in the first column of the table.
- **table_array**: The range of cells containing the data. The first column of this range should contain the values to be searched.
- **col_index_num**: The column number in the table_array from which to retrieve the value. The first column is 1, the second is 2, and so on.
- **range_lookup**: Optional. It can be either TRUE (approximate match) or FALSE (exact match). If omitted, the default is TRUE.

Here's a simple example:

```
=VLOOKUP(101, A2:C5, 2, FALSE)
```

In this example:

- **101** is the value you want to look up in the first column of the range **A2:C5**.
- The function retrieves the corresponding value from the second column of the range (**col_index_num** is 2).

If the lookup value is found, the function returns the value from the specified column; otherwise, it returns an error or #N/A if an exact match is required.

VLOOKUP is commonly used for tasks such as merging datasets, looking up pricing information, or associating data based on a common identifier.

Imagine you have two tables: one with employee information and another with their respective departments. We'll use the employee ID as the common key to perform the VLOOKUP.

Employee Information Table:

Employee ID	Name	Position	Salary
101	John Doe	Manager	60000
102	Jane Smith	Analyst	45000
103	Bob Johnson	Coordinator	35000
104	Alice Lee	Specialist	50000

Department Table:

Employee ID	Department
101	HR
102	Finance
103	IT
104	Marketing

Now, let's say you want to create a new table that includes both employee information and their respective departments using VLOOKUP.

Combined Table:

Employee ID	Name	Position	Salary	Department
101	John Doe	Manager	60000	HR
102	Jane Smith	Analyst	45000	Finance
103	Bob Johnson	Coordinator	35000	IT
104	Alice Lee	Specialist	50000	Marketing

To perform the VLOOKUP:

- In the "Department" column of the "Combined Table," you would enter the following formula in the first cell (assuming the Employee ID in the Combined Table is in column A):

phpCopy code

```
=VLOOKUP(A2, 'Department Table'!A:B, 2, FALSE)
```

Drag this formula down for the rest of the cells in the "Department" column.

This VLOOKUP formula looks for the Employee ID in the "Department Table" and returns the corresponding Department value. Adjust the cell references based on your actual Excel layout.

4 INDEX AND MATCH

In Excel, INDEX and MATCH are two powerful functions that are often used together to look up and retrieve data from a table. They are an alternative to the more commonly known VLOOKUP and HLOOKUP functions, offering greater flexibility and versatility.

Here's an explanation of each function:

1. INDEX Function:

- The INDEX function returns the value of a cell in a specified range based on the row and column number. Its syntax is as follows:

`INDEX (array, row_num, [column_num])`

- array:** The range of cells you want to reference.
- row_num:** The row number within the array from which to retrieve the value.
- column_num:** (Optional) The column number within the array. If omitted, only the row is considered.

Example:

`=INDEX(A1:B10, 3, 2)`

This formula would return the value in the third row and second column of the range A1:B10.

2. MATCH Function:

- The MATCH function searches for a specified value in a range and returns the relative position (row or column number) of that item. Its syntax is as follows:

`MATCH (lookup_value, lookup_array, [match_type])`

- lookup_value:** The value you want to find.
- lookup_array:** The range of cells where you want to search for the value.
- match_type:** (Optional) Specifies the type of match: 1 for less than, 0 for an exact match, and -1 for greater than.

Example:

`=MATCH("John", A1:A10, 0)`

This formula would return the relative position of "John" within the range A1:A10.

Now, combining INDEX and MATCH allows you to perform powerful and flexible lookups:

`=INDEX(B1:B10, MATCH("John", A1:A10, 0))`

In this example, the MATCH function finds the position of "John" in column A, and the INDEX function retrieves the corresponding value from column B. Using INDEX and MATCH together is often preferred over VLOOKUP or HLOOKUP because it allows you to perform lookups in any direction (horizontal or vertical) and doesn't require rearranging the data in a specific way.

5 PIVOT TABLES

A pivot table in Excel is a powerful tool for data analysis and summarization. It allows you to rearrange, organize, and summarize large amounts of data in a more meaningful and interactive way. Here's an explanation of key concepts related to pivot tables:

- **Source Data:**
 - The data you want to analyse with a pivot table is referred to as the "source data." This is typically organized in a tabular format with rows representing individual records and columns representing different attributes or variables.
- **Pivot Table Structure:**
 - A pivot table has a structure with four main areas: Rows, Columns, Values, and Filters.
 - **Rows:** These are the categories or labels by which you want to group your data vertically. For example, if you have sales data, you might use "Product" or "Region" as row labels.
 - **Columns:** These are the categories or labels by which you want to group your data horizontally. Continuing with the sales data example, you might use "Month" or "Year" as column labels.
 - **Values:** These are the numeric values you want to aggregate or summarize. In the sales data example, you might want to sum the "Revenue" or find the average "Quantity."
 - **Filters:** This area allows you to apply filters to the entire pivot table, limiting the data shown based on specific criteria.
- **Aggregation:**
 - The values in the "Values" area are aggregated using functions like SUM, AVERAGE, COUNT, etc. You can choose the appropriate aggregation function based on the nature of your data.
- **Dynamic:**
 - One of the key features of pivot tables is their dynamic nature. You can easily rearrange, add, or remove fields to see different perspectives of your data without altering the original dataset.
- **Drag-and-Drop Interface:**
 - Creating a pivot table is a user-friendly process. You can drag and drop fields from your source data into the different areas of the pivot table structure to quickly organize and summarize your information.

Here's a simple step-by-step guide to creating a pivot table in Excel:

- Select the range of cells that contain your source data.
- Go to the "Insert" tab on the Excel ribbon.
- Click on "PivotTable" and choose the location where you want to place the pivot table (e.g., a new worksheet).
- Drag and drop fields from your source data into the Rows, Columns, Values, and Filters areas to configure the pivot table structure.
- Customize the pivot table by applying filters, changing aggregation functions, and adjusting formatting as needed.

Pivot tables are a powerful tool for summarizing and analysing data, making it easier to derive insights from large datasets.

6 SLICERS

Slicers in Excel are visual controls that allow you to filter data easily in tables, PivotTables, and PivotCharts. When you use a slicer in conjunction with a table, it provides an intuitive and user-friendly way to interact with and analyse your data. Here's a step-by-step guide on how to use a slicer with a table in Excel:

Step 1: Create a Table

Assuming you already have a table set up in your Excel worksheet, if not, you can create one by selecting your data range and then going to the "Insert" tab and choosing "Table."

Step 2: Insert a Slicer

1. **Select the Table:**
 - Click anywhere within the table.
2. **Insert Slicer:**
 - Go to the "Table Design" tab (or "Design" tab, depending on your Excel version).
 - Click on "Insert Slicer."
3. **Choose Columns:**
 - In the "Insert Slicers" dialog box, check the columns that you want to use as filters.
 - Click "OK."

Step 3: Interact with the Slicer

Once you've inserted the slicer, it will appear as a separate window containing buttons for each unique item in the selected columns. These buttons represent the filter options.

- **Click on a Slicer Button:**
 - Clicking on a button filters the table to display only the data related to that specific item.
- **Use Multiple Slicers:**
 - If you inserted slicers for multiple columns, you can use them in combination to refine your data further.

Step 4: Customize the Slicer

1. **Resize and Reposition:**

- Click and drag the edges of the slicer to resize it.
- Move the slicer to a convenient location on your worksheet.

2. **Format and Style:**

- Right-click on the slicer to access formatting options, such as changing the color or style.

Step 5: Clear Filters

If you want to clear all filters applied by the slicer and show all data again:

- Right-click on the slicer.
- Select "Clear Filter."

Using slicers with tables in Excel provides a user-friendly way to filter and analyze data interactively. It's especially useful when you want to create dashboards or reports where users can easily explore and visualize specific subsets of your data.



7 SUMPRODUCT

The SUMPRODUCT function in Excel is used to multiply corresponding elements in one or more arrays and then sum the results. Let's create a simple example to demonstrate the SUMPRODUCT function.

Suppose you have two arrays of numbers, and you want to find the sum of the products of their corresponding elements.

	A	B
1	2	3
2	4	5
3	6	7

In this example, you can use the following formula to calculate the sumproduct:

`=SUMPRODUCT(A1:A3, B1:B3)`

This formula multiplies each element in column A with the corresponding element in column B and then sums up the results. In this case, it would be:

$$= (2*4) + (3*5) + (6*7) = 8 + 15 + 42 = 65$$

So, the result of the SUMPRODUCT function in this example is 65.

8 DATA VALIDATION

Data validation in Excel is a feature that allows you to control and restrict the types of data that users can enter into a cell or range of cells. By defining rules or criteria for data entry, you can help ensure data accuracy, consistency, and integrity in your Excel worksheets. Data validation is useful in various scenarios, such as creating drop-down lists, setting numerical limits, or enforcing specific text patterns.

Here's how you can use data validation in Excel:

Setting Up Data Validation:

1. **Select the Cells:**
 - Click on the cell or range of cells where you want to apply data validation.
2. **Go to the "Data" Tab:**
 - Navigate to the "Data" tab on the Excel ribbon.
3. **Click "Data Validation":**
 - In the "Data Tools" group, click on "Data Validation."

Configuring Data Validation Rules:

4. **Choose Validation Criteria:**
 - In the "Data Validation" dialog box, you can choose the criteria for your validation. Options include whole numbers, decimal numbers, dates, times, text length, and custom formulas.
5. **Set Criteria Details:**
 - Depending on the criteria you choose, you may need to specify additional details. For example, if you choose "List," you'll need to provide a list of valid items.
6. **Input Message (Optional):**
 - You can provide an optional input message that appears when the user selects the cell. This message can guide the user on what data is allowed.
7. **Error Alert (Optional):**
 - You can set up an error alert that appears if a user enters invalid data. This can include a custom error message and a style (Stop, Warning, or Information).
8. **Click "OK" to Apply:**
 - Once you've configured your data validation settings, click "OK" to apply them.

Examples of Data Validation:

- **Whole Number Limits:**
 - You can set a range of whole numbers that are allowed in a cell.
- **Decimal Limits:**
 - Define limits for decimal numbers, specifying the number of decimal places allowed.
- **Date and Time:**
 - Control entry of dates or times within a specific range.
- **List of Items:**
 - Create a drop-down list of predefined items for users to choose from.
- **Custom Formulas:**
 - Use custom formulas to enforce more complex validation rules.

Benefits of Data Validation:

1. **Data Accuracy:**



- Helps prevent data entry errors by ensuring only valid data is accepted.
2. **Consistency:**
 - Enforces standardized formats and values.
 3. **Ease of Use:**
 - Provides guidance to users with input messages and alerts.
 4. **Data Integrity:**
 - Helps maintain the integrity of your Excel worksheets by preventing incorrect or unexpected data.

Data validation is a powerful tool for maintaining data quality and consistency in Excel. It's particularly useful in situations where you want to control the types of data that users can input.