



# Macro Programming

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## Dynamic Ranges and Named Ranges

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## Named Ranges

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- A **Named Range** is a user-defined name for a cell or range of cells.
- Instead of writing formulas with cell references (`=SUM(A2:A10)`), you can use names (`=SUM(Sales)`).
- Benefits:
  - Improves **readability** of formulas
  - Easy to **reuse** in multiple formulas
  - Reduces errors



## Named Ranges

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### Example:

- Define name `Sales` for `B2:B10`
- Formula: `=AVERAGE(Sales)` instead of `=AVERAGE(B2:B10)`



### Steps:

1. Select the cell range (e.g., **B2:B10**).
2. Go to **Formulas** → **Define Name**.
3. Enter a name (e.g., **Sales**).
4. Click OK.

**Alternative:** Use the **Name Box** (left of formula bar).



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## Rules for Named Ranges

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- Names must start with a **letter** (not a number).
- No spaces → use underscore (\_) or camelCase.
- Cannot use cell references as names (e.g., **A1**).
- Names are **case-insensitive** (**Sa1es** = **SALES**).



## Dynamic Ranges

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- **Dynamic Ranges** automatically expand/shrink when data changes.
- Useful for:
  - Adding new sales rows without editing formulas
  - Auto-updating charts
  - PivotTables with live data



## Dynamic Ranges

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### Example Problem:

- Formula `=SUM(B2:B10)` will ignore values if you add new rows (B11, B12, ...).
- Solution → Use a **Dynamic Named Range**.





## Creating Dynamic Ranges with Tables

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- Convert data into an **Excel Table** (**Ctrl + T**).
- Tables automatically expand when new rows are added.
- Use **structured references** in formulas:
  - Example: `=SUM(SalesData[Total Sales])`
- Charts & PivotTables linked to the Table also update automatically.



## Creating Dynamic Ranges with Formulas

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Using **OFFSET + COUNTA**:

- Formula:

`=OFFSET($B$2, 0, 0, COUNTA($B:$B)-1, 1)`

**Meaning:** Start at B2, count all filled cells in column B, return that range.

Using **INDEX**:

Formula:

`=$B$2:INDEX($B:$B, COUNTA($B:$B))`

- More efficient than OFFSET.



## Example

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Month	Sales
Jan	2000
Feb	2500
Mar	3000



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## Example

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If April = 4000 is added:

- Normal formula `=SUM(B2:B4)` ignores it.
- Dynamic range `=SUM(Sales)` automatically includes April.



## Dynamic Ranges in Charts

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- Create a Named Range `SalesData` using OFFSET/INDEX.
- Insert a chart → Select Data → Use formula:

`=Sheet1!SalesData`

- When new data is added, the chart updates automatically.



## Applications

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- Dashboards, Charts, PivotTables → auto-update when data grows.
- Cleaner formulas with better maintainability.



## Summary

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### Named Ranges

- Assign a name to a cell or range (e.g., **Sales** for **B2:B10**).
- Makes formulas more **readable and reusable** (**=SUM(Sales)** vs **=SUM(B2:B10)**).

### Dynamic Ranges

- Ranges that automatically **expand/shrink** when data changes.
- Prevents formulas/charts from breaking when new data is added.



## Summary

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### Ways to Create Dynamic Ranges

1. **Excel Tables** (best for beginners): Auto-expands with new rows; supports structured references.
  2. **Formulas** (advanced users):
    - **OFFSET + COUNTA**
    - **INDEX + COUNTA** (preferred, efficient).
- Use meaningful names (**MonthlySales**, not **Data1**).
  - Prefer Tables for simplicity.
  - Use Name Manager to review & organize ranges.





**THANK YOU**

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