# Elaborated Explanation of "Enter the Formula" in Conditional Formatting

When applying conditional formatting using a formula in Excel, the **formula** plays a critical role in determining which cells will receive the desired formatting. The formula needs to evaluate to either TRUE or FALSE for each cell in the selected range. If the result is TRUE, the formatting is applied to the cell; if FALSE, the cell remains unformatted.

This method provides a high degree of flexibility, as you can create custom rules based on complex conditions. Let's go step-by-step through various types of formulas and how they can be used with conditional formatting.

**1. Basic Formula Example:**

Let’s start with a simple example of comparing cell values.

**Example 1: Highlight cells greater than 100**

* **Range**: A1:A10
* **Goal**: Highlight cells where the value is greater than 100.
* **Formula**: =A1>100

**Steps:**

* Select A1:A10.
* Go to **Conditional Formatting** → **New Rule** → **Use a formula to determine which cells to format**.
* Enter the formula: =A1>100.
* Set the format (e.g., fill color: light green).
* Click **OK**.

This will highlight all the cells in the range A1:A10 where the value exceeds 100. The formula is relative, meaning it will apply this comparison to each cell individually within the selected range.

**Explanation:**

* **Relative Reference (A1)**: Since the formula uses a relative reference (A1), Excel will apply this condition to each cell starting from A1 down to A10, and automatically update the reference for each cell (e.g., A2>100, A3>100, etc.).

**2. Conditional Formatting with Relative and Absolute References:**

Relative and absolute references are key when writing formulas for conditional formatting.

**Example 2: Highlight rows where sales in column B exceed a certain target value in a fixed cell (e.g., $C$1)**

* **Range**: A2:C10
* **Goal**: Highlight entire rows where sales in column B exceed the target value in cell $C$1.
* **Formula**: =$B2>$C$1

**Steps:**

* Select A2:C10.
* Go to **Conditional Formatting** → **New Rule** → **Use a formula to determine which cells to format**.
* Enter the formula: =$B2>$C$1.
* Set the format (e.g., fill color: light yellow).
* Click **OK**.

**Explanation:**

* **Absolute reference to $C$1**: The target value in cell C1 remains constant across all rows, so the absolute reference ($C$1) ensures that Excel always checks the value in C1 against each cell in column B.
* **Relative reference to $B2**: The relative reference to B2 changes for each row. For row 2, Excel checks if B2 is greater than $C$1, for row 3 it checks if B3 > $C$1, and so on.

**Effect:**

The entire row (columns A to C) will be highlighted if the value in column B is greater than the target value in cell C1.

**3. Using Logical Functions (AND, OR) in Conditional Formatting:**

You can combine logical functions like AND and OR in your formula to create more complex conditions.

**Example 3: Highlight cells where the value is between 50 and 100**

* **Range**: A1:A10
* **Goal**: Highlight cells where the value is between 50 and 100.
* **Formula**: =AND(A1>50, A1<100)

**Steps:**

* Select A1:A10.
* Go to **Conditional Formatting** → **New Rule** → **Use a formula to determine which cells to format**.
* Enter the formula: =AND(A1>50, A1<100).
* Set the format (e.g., fill color: orange).
* Click **OK**.

**Explanation:**

* The **AND function** checks if both conditions are TRUE for each cell:
  + A1 > 50 (the cell value is greater than 50).
  + A1 < 100 (the cell value is less than 100).
* Only if both conditions are satisfied, the formula returns TRUE, and the formatting is applied.

**Effect:**

All cells with values between 50 and 100 (exclusive) will be highlighted in orange.

**Example 4: Highlight cells where the value is less than 50 or greater than 100**

* **Range**: A1:A10
* **Goal**: Highlight cells where the value is either less than 50 or greater than 100.
* **Formula**: =OR(A1<50, A1>100)

**Explanation:**

* The **OR function** returns TRUE if any of the conditions is satisfied:
  + A1 < 50 or A1 > 100.
* If either condition is met, the formatting is applied.

**4. Conditional Formatting Based on Another Cell’s Value:**

You can also create rules based on the values in other cells, which can be helpful for comparing columns or highlighting entire rows.

**Example 5: Highlight entire rows where sales in column B are less than the sales target in column C**

* **Range**: A2:C10
* **Goal**: Highlight rows where the sales in column B are less than the target in column C.
* **Formula**: =$B2<$C2

**Steps:**

* Select A2:C10.
* Go to **Conditional Formatting** → **New Rule** → **Use a formula to determine which cells to format**.
* Enter the formula: =$B2<$C2.
* Set the format (e.g., font color: red).
* Click **OK**.

**Explanation:**

* The formula compares the value in column B with the corresponding value in column C. If the value in B is smaller, the condition is met, and the entire row gets formatted.
* The relative references (B2 and C2) ensure that the comparison is made for each row independently.

**Effect:**

Rows where sales in column B are lower than the corresponding target in column C will be formatted with red font.

**5. Conditional Formatting Based on Text Values:**

You can also apply conditional formatting to text values, which is especially useful when dealing with categories or statuses.

**Example 6: Highlight cells containing the text "Completed"**

* **Range**: B1:B10
* **Goal**: Highlight cells where the text is "Completed".
* **Formula**: =B1="Completed"

**Steps:**

* Select B1:B10.
* Go to **Conditional Formatting** → **New Rule** → **Use a formula to determine which cells to format**.
* Enter the formula: =B1="Completed".
* Set the format (e.g., fill color: green).
* Click **OK**.

**Explanation:**

* The formula checks whether the text in each cell of column B equals "Completed". If it does, the condition is met, and the formatting is applied.

**Effect:**

Cells containing the text "Completed" will be highlighted in green.

**6. Conditional Formatting with Dates:**

You can also use conditional formatting to format cells based on dates, such as highlighting past due dates or future events.

**Example 7: Highlight dates that are in the past**

* **Range**: C1:C10
* **Goal**: Highlight dates that are before today’s date.
* **Formula**: =C1<TODAY()

**Steps:**

* Select C1:C10.
* Go to **Conditional Formatting** → **New Rule** → **Use a formula to determine which cells to format**.
* Enter the formula: =C1<TODAY().
* Set the format (e.g., fill color: red).
* Click **OK**.

**Explanation:**

* The **TODAY()** function returns the current date, and the formula checks if each date in column C is earlier than today’s date. If it is, the formatting is applied.

**Effect:**

All past dates will be highlighted in red.

**Summary of Key Formula Techniques:**

* **Relative References**: Use when you want the formula to adjust based on the relative position of each cell (e.g., =A1>50).
* **Absolute References**: Use when you need to fix the reference to a specific cell (e.g., =$A$1>50).
* **Logical Functions (AND, OR)**: Combine multiple conditions for more complex rules.
* **Text and Date Functions**: Work with text values (e.g., ="Completed") and date comparisons (e.g., =TODAY()).

Conditional formatting with formulas opens up endless possibilities for dynamically formatting your Excel data based on custom rules. By mastering the use of relative and absolute references, logical functions, and comparisons, you can create highly tailored and effective formatting rules.

# Excel "traverses" - relative or absolute cell reference

When you apply **Conditional Formatting** using a formula over a range such as A1:D4, Excel will evaluate each cell in that range individually. The way Excel "traverses" through the range depends on the type of cell references (relative or absolute) in the formula and how Excel interprets them.

Let’s break it down with an **elaborated explanation** on how Excel handles cell-by-cell evaluation when using a relative reference formula and how the logic applies to each cell.

**1. Starting Point:**

The traversal starts with the top-left cell of the selected range, which in this case is A1.

* Excel applies the formula to A1 first.
* Then, Excel moves across the row first, and after evaluating all cells in the first row (A1, B1, C1, D1), it moves down to the next row (A2, B2, C2, D2), and so on, until it covers the entire range (A1:D4).

**2. How Relative References Work:**

If you apply conditional formatting using a **relative reference formula**, Excel will **adjust the formula for each cell** it evaluates based on its position within the range.

Let’s say the formula you use for conditional formatting is: =A1>50. Here’s what happens for each cell in A1:D4:

**For the first row (A1:D1):**

* **Cell A1**: The formula is applied as written, i.e., A1>50.  
  Excel checks if the value in A1 is greater than 50. If it is, the formatting is applied.
* **Cell B1**: Since the reference to A1 is relative, Excel shifts the reference automatically to match the position of B1.  
  The formula becomes B1>50.  
  Excel checks if the value in B1 is greater than 50.
* **Cell C1**: Similarly, the formula adjusts for the position of C1 and becomes C1>50.  
  Excel checks if the value in C1 is greater than 50.
* **Cell D1**: The formula becomes D1>50.  
  Excel checks if the value in D1 is greater than 50.

**For the second row (A2:D2):**

When Excel moves down to the second row, the relative reference A1 updates according to the new row number.

* **Cell A2**: The formula now becomes A2>50.  
  Excel checks if the value in A2 is greater than 50.
* **Cell B2**: The formula becomes B2>50.  
  Excel checks if the value in B2 is greater than 50.
* **Cell C2**: The formula becomes C2>50.  
  Excel checks if the value in C2 is greater than 50.
* **Cell D2**: The formula becomes D2>50.  
  Excel checks if the value in D2 is greater than 50.

**For the third row (A3:D3):**

* **Cell A3**: The formula updates to A3>50.  
  Excel checks if the value in A3 is greater than 50.
* **Cell B3**: The formula becomes B3>50.  
  Excel checks if the value in B3 is greater than 50.
* **Cell C3**: The formula becomes C3>50.  
  Excel checks if the value in C3 is greater than 50.
* **Cell D3**: The formula becomes D3>50.  
  Excel checks if the value in D3 is greater than 50.

**For the fourth row (A4:D4):**

* **Cell A4**: The formula updates to A4>50.  
  Excel checks if the value in A4 is greater than 50.
* **Cell B4**: The formula becomes B4>50.  
  Excel checks if the value in B4 is greater than 50.
* **Cell C4**: The formula becomes C4>50.  
  Excel checks if the value in C4 is greater than 50.
* **Cell D4**: The formula becomes D4>50.  
  Excel checks if the value in D4 is greater than 50.

**3. Absolute vs. Relative References:**

The example above assumes **relative references** (A1). However, if you use an **absolute reference**, the behavior changes.

**Example of Absolute Reference:**

If your formula is =$A$1>50, Excel always checks the value in **cell A1** regardless of the position of the cell being evaluated.

* For **every cell in the range A1:D4**, Excel will apply the condition A1>50.  
  This means that **if cell A1 is greater than 50**, the conditional formatting will be applied to all cells in A1:D4—even if the values in those cells don’t meet the condition.

**4. Mixed References:**

You can also use **mixed references** to control how the formula adjusts across rows and columns.

**Example of Mixed Reference:**

Let’s say you use the formula =$A1>50 for conditional formatting over A1:D4.

* **For column A** (i.e., A1:A4): The formula will compare the values in column A against 50, since the row reference (1) is relative, but the column reference (A) is absolute.  
  So, Excel will evaluate:
  + A1>50
  + A2>50
  + A3>50
  + A4>50
* **For columns B, C, and D**: Excel will still compare values from column A due to the absolute column reference ($A).  
  So, for cells in columns B, C, and D, Excel will apply the formula:
  + B1>50, C1>50, and D1>50 (relative to row 1, but column A is used).
  + B2>50, C2>50, and D2>50 (relative to row 2, but column A is used).

**This approach applies formatting to cells in columns B, C, and D based on the values in column A.**

**Summary of Traversal:**

1. **Row-first traversal**: Excel evaluates each cell starting from the top-left corner (A1) and moves **across** each row first, before moving **down** to the next row.
2. **Relative references adjust**: If you use a relative reference like A1, Excel updates the reference for each cell it evaluates, making the formula adjust to the cell’s position.
3. **Absolute references stay fixed**: If you use absolute references (like $A$1), the formula will always refer to that specific cell, regardless of which cell is being evaluated.
4. **Mixed references** give you control over whether the row or column remains fixed during the traversal, allowing for more flexible formatting based on specific conditions.

Beware!

If your Excel formula starts with an equal sign (=) or a minus sign (-), Excel automatically interprets it as a calculation, even if you don't intend it to be a formula; this means if you simply want to type text that begins with a minus sign, it will be treated as a formula and might not display correctly - to fix this, simply add an apostrophe (') before the first character in your text to tell Excel that it's not a formula.

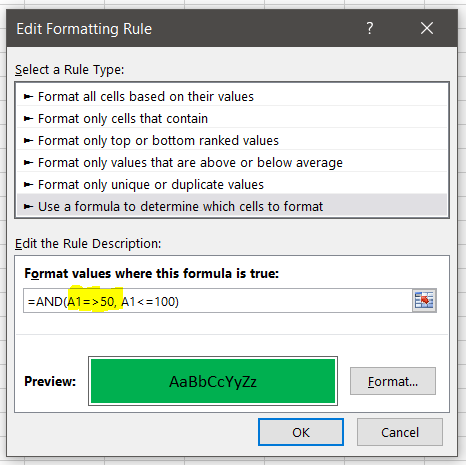
Key points about this issue:

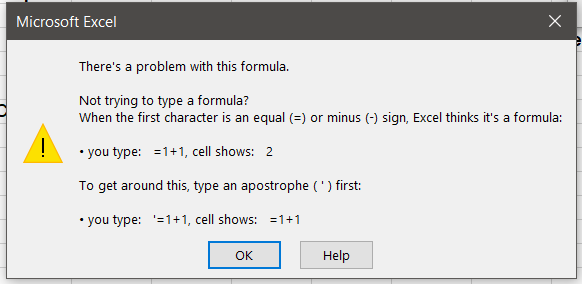
* The problem:

When you type a minus sign (-) or an equal sign (=) at the beginning of a cell, Excel automatically assumes you're entering a formula, even if you just want to type plain text.

* The solution:

To prevent this, type an apostrophe (') before the minus sign or equal sign. For example, to type "-10" as text, you would actually type '-10.





Corrected formula:

