Tracer Arrows

In a large, complex worksheet, it can be difficult to determine the relationships involved in some formulas. The auditing tools assist you to determine these relationships by using a system of arrows to show which cells are involved in which formulas. Auditing tools also contain tools for ‘watching’ variables (the Watch Window) and for evaluating how a formula returns its result (Evaluate Formula).

The various tools involved can be found in the Formula Auditing group of commands on the Formulas tab.

The screenshot below shows a spreadsheet containing tracer arrows.

Tracing precedents

By selecting a cells that contains a formula, this technique draws arrows on the spreadsheet indicating cells that provide data to the selected formula. Such cells are known as ‘precedents’.

1. Select a cell containing a formula.
2. Select the Formulas tab.
3. In the Formula Auditing group, click Trace Precedents.
4. Click on the Trace Precedents button again to view additional precedent levels (if any).

Tracing dependents

By selecting a cell containing a value, this technique draws arrows on the spreadsheet indicating cells that contain formulas using the selected cell. These cells are known as ‘dependents’.

1. Select a cell containing a formula.
2. Select the Formulas tab.
3. In the Formula Auditing group, click Trace Dependents.
4. Click on the Trace Dependents button again to view additional dependent levels (if any).

Trace Errors

Excel provides error checking ‘indicators’ to help you correct errors in formulas. Indicators display in the top left corner of a cell as a small green triangle . When the cell is selected, an information button appears giving a description of the error and offering a menu of choices.

These error indicators are determined by rules designed to find formulas with common mistakes. These rules are described in the following table.

<table>
<thead>
<tr>
<th>Rule</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluates to an error value</td>
<td>The formula syntax appears to be incorrect</td>
</tr>
<tr>
<td>Text date with 2 digit year</td>
<td>A two-digit year could be computed in the wrong century</td>
</tr>
<tr>
<td>Number stored as text</td>
<td>Numbers formatted as text may sort improperly</td>
</tr>
<tr>
<td>Inconsistent formula in region</td>
<td>The formula does not match the reference sequence of adjacent formulas</td>
</tr>
<tr>
<td>Formulas omits cells in region</td>
<td>The formula does not contain the entire range of cells to be calculated</td>
</tr>
<tr>
<td>Unlocked cells containing formulas</td>
<td>The formulas in unlocked cells can be inadvertently changed</td>
</tr>
<tr>
<td>Formulas referring to empty cells</td>
<td>The formula references empty cells</td>
</tr>
</tbody>
</table>

In addition to these error indicators, the Auditing Tools offer an option to draw tracer arrow indicating the cells that are causing an error in the formula.

1. Select the cell containing the error indicator.
2. Select the Formula tab.
3. Click the drop down arrow to the right of the Error Checking button.

Removing tracer arrows

1. Click the down arrow to the right of Remove Arrows in the Formula Auditing group.
2. Click Remove Precedent Arrows as many times as necessary to hide all levels.

The Watch Window

The Watch Window keeps track of cells and their formulas as you make changes to a worksheet. You can use the Watch Window to view one or more ranges of cells in a single location.

1. Select the Formula tab.
2. Click Watch Window in the Formula Auditing group.
3. Click Add Watch.
4. Select the cell(s) you want to watch.
5. Click Add.
6. Move or adjust the size of the Watch Window.

NB: If you move the Watch Window to the side of the application window or the top of the spreadsheet, it will dock along the edge.

To remove an item from the Watch Window

1. Select the item in the Watch Window.
2. Click Delete Watch.
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Evaluate a formula

The **Evaluate Formula** auditing tool steps through a formula so that you can clearly see how it arrives at the answer. It is a useful technique to employ in cases where a formula is not returning the expected result.

1. Select the formula you wish to evaluate.
2. Select the **Formula** tab.
3. Click **Evaluate Formula** in the **Formula Auditing** group.
4. Click the **Evaluate** button to see the result of the underlined expression.
5. Continue clicking **Evaluate** until you get to the final result.
6. Use the **Restart** button if you wish to check the expression again.
7. When finished click the **Close** button.

**NB**: In complex formula involving nested expressions, use the **Step In** and **Step Out** buttons enter or exit an expression early.