



Excel Business Modelling

Sample manual - first two chapters



Wise Owl
Training

TABLE OF CONTENTS (1 of 5)

| 1 | SEVEN MODELLING GUIDELINES | Page |
|-----|--|------|
| 1.1 | Guideline 1 – Use a Cover Sheet | 7 |
| 1.2 | Guideline 2 – Separate Inputs and Calculations | 8 |
| | <i>Checking for Rogue Formulae</i> | 8 |
| 1.3 | Guideline 3 – Use Styles | 9 |
| 1.4 | Guideline 4 – Use Range Names | 10 |
| 1.5 | Guideline 5 – Keep Formulae Simple | 10 |
| 1.6 | Guideline 6 – Copy Formulae Across | 11 |
| 1.7 | Guideline 7 – Use Consistent Period Headings | 11 |

| 2 | RANGE NAMES | Page |
|-----|---|------|
| 2.1 | What are Range Names? | 12 |
| | <i>Going to a Range Name</i> | 12 |
| 2.2 | Creating Range Names | 13 |
| | <i>Method 1 – Using the Name Box</i> | 13 |
| | <i>Method 2 – Defining Names</i> | 13 |
| | <i>Method 3 - Creating Range Names from Selected Cells</i> | 14 |
| 2.3 | Range Names in Formulae | 15 |
| | <i>Referencing Range Names in Formulae</i> | 15 |
| | <i>Dealing with Spill Errors</i> | 16 |
| | <i>The Possible Spill Errors</i> | 16 |
| | <i>Implicit Intersection using @</i> | 17 |
| | <i>Two-Dimensional Range Formulae</i> | 17 |
| | <i>Getting Aggregation Functions to Work using +</i> | 18 |
| 2.4 | Working with Range Names | 19 |
| | <i>Editing and Deleting Range Names</i> | 19 |
| | <i>Viewing Range Names</i> | 19 |
| 2.5 | The Scope of Range Names | 20 |
| | <i>Choosing the Scope of a Range Name</i> | 20 |
| | <i>Copying Worksheets Copies their Range Names with Local Scope</i> | 20 |
| 2.6 | 3-Dimensional Ranges | 21 |

| 3 | STYLES | Page |
|-----|---|------|
| 3.1 | Overview of Styles | 22 |
| | <i>Benefits of Styles (1) – Consistent Formatting</i> | 22 |
| | <i>Benefits of Styles (2) – Protection</i> | 22 |
| 3.2 | Applying Styles | 23 |
| | <i>Adding Styles to the Quick Access Toolbar</i> | 23 |
| 3.3 | Creating Styles | 24 |
| | <i>Creating Partial Styles</i> | 24 |
| 3.4 | Changing Styles | 25 |
| 3.5 | Merging Styles | 26 |

| 4 | NUMBER AND DATE FORMATS | Page |
|-----|---|------|
| 4.1 | What are Number Formats? | 27 |
| | <i>Examples of Number Formats</i> | 27 |
| | <i>Examples of Date Formats</i> | 27 |
| 4.2 | Formatting Dates | 28 |
| | <i>How Dates and Times are Stored</i> | 28 |
| | <i>Quick Ways to Enter Dates and Times</i> | 28 |
| | <i>Quick Formatting Dates and Times</i> | 29 |
| | <i>Selecting Different Date/Time Formats</i> | 29 |
| | <i>Custom Date Formats</i> | 30 |
| | <i>Custom Date Formatting Codes</i> | 30 |
| | <i>Custom Time Formatting Codes</i> | 31 |
| | <i>Displaying Elapsed Times without Overflow</i> | 31 |
| 4.3 | Standard Number Formats | 32 |
| | <i>Standard Number Formats using the Ribbon</i> | 32 |
| | <i>Standard Number Formats using Format Cells</i> | 33 |
| 4.4 | Custom Number Formats | 34 |
| | <i>Creating Custom Number Formats</i> | 34 |
| | <i>General Rules for Custom Number Formats</i> | 34 |
| | <i>Example of a Typical Custom Number Format</i> | 35 |
| | <i>Re-using Custom Number Formats</i> | 35 |
| 4.5 | Tricks with Number Formats | 36 |
| | <i>Tricks with Text</i> | 36 |
| | <i>Hiding Parts of a Number Format</i> | 36 |
| | <i>Colouring Parts of a Number Format</i> | 36 |
| | <i>Getting Positive and Negative Numbers to Line Up</i> | 37 |
| | <i>Getting Decimal Points to Line Up</i> | 37 |
| | <i>Fractions</i> | 37 |
| | <i>Scaling Large Numbers</i> | 38 |
| | <i>Filling Spaces</i> | 38 |

TABLE OF CONTENTS (2 of 5)

| 5 | CONDITIONAL FORMATTING | Page |
|-----|--|------|
| 5.1 | Overview | 39 |
| 5.2 | Creating Conditional Formats | 40 |
| | <i>Applying a Pre-set Conditional Format</i> | 40 |
| | <i>Creating your own Conditional Format – a Case Study</i> | 41 |
| 5.3 | Editing and Deleting Conditional Formats | 42 |
| | <i>Changing the Order in which Rules Apply</i> | 42 |
| 5.4 | More Sophisticated Rules | 43 |
| | <i>Picking out Statistical Trends</i> | 43 |
| | <i>Using Formulae in Rules</i> | 44 |
| | <i>Using Formulae in Rules to Highlight a Whole Row</i> | 45 |
| 5.5 | Viewing Conditionally Formatted Cells/Rules | 46 |
| | <i>Viewing All Conditionally Formatted Cells</i> | 46 |
| | <i>Viewing all Conditional Formatting Rules</i> | 46 |

| 6 | NOTES | Page |
|-----|---|------|
| 6.1 | Overview of Notes | 47 |
| 6.2 | Working with Notes | 48 |
| | <i>Creating Notes</i> | 48 |
| | <i>Changing the Default User Name</i> | 48 |
| | <i>Editing and Deleting Notes</i> | 49 |
| | <i>Formatting Notes</i> | 49 |
| | <i>Printing Notes</i> | 50 |
| 6.3 | Ways to Show Notes | 51 |
| | <i>Hiding Red Triangles</i> | 51 |
| | <i>Showing/Hiding All Notes</i> | 51 |
| | <i>Selecting Cells Containing Notes</i> | 51 |

| 7 | DATA VALIDATION | Page |
|-----|---|------|
| 7.1 | What is Data Validation? | 52 |
| 7.2 | Creating Validation Rules | 53 |
| | <i>Step 1 – Saying what is Allowed</i> | 53 |
| | <i>Step 2 – Defining your Punishment for Mistakes</i> | 54 |
| 7.3 | Referencing Formulae in Validation | 55 |
| 7.4 | Dropdown Lists | 56 |
| | <i>Step 1 - Creating a Range Name</i> | 56 |
| | <i>Step 2 – Setting the List</i> | 56 |
| 7.5 | Input Messages | 57 |
| 7.6 | Copying and Clearing Validation Settings | 58 |
| | <i>Copying Validation</i> | 58 |
| | <i>Clearing Validation Settings</i> | 58 |
| 7.7 | Highlighting Validated Cells | 59 |
| | <i>Highlighting Cells which have Validation Applied</i> | 59 |
| | <i>Circling Invalid Data</i> | 59 |

| 8 | PROTECTION | Page |
|-----|--|------|
| 8.1 | Types of Protection | 60 |
| 8.2 | Protecting Worksheets | 61 |
| | <i>Unlocking Cells</i> | 61 |
| | <i>A Note on Unprotecting Cells using Styles</i> | 62 |
| | <i>Protecting and Unprotecting Worksheets</i> | 62 |
| 8.3 | Protecting a Workbook's Structure | 63 |
| 8.4 | Password-Protecting Workbooks | 64 |
| 8.5 | Preventing Accidental Changes to a Workbook | 65 |
| 8.6 | Hiding Worksheets | 66 |
| | <i>Very Hidden Worksheets</i> | 66 |
| 8.7 | Hiding Cells and Formulae | 67 |
| | <i>Hiding Cells</i> | 67 |
| | <i>Hiding Formulae</i> | 67 |

TABLE OF CONTENTS (3 of 5)

| 9 | GROUPING (OUTLINING) | Page |
|-----|---|------|
| 9.1 | Using Grouping | 68 |
| 9.2 | Creating Grouping/Outlining | 69 |
| | <i>Creating Automatic Outlines</i> | 69 |
| | <i>Manually Grouping Rows/Columns</i> | 69 |
| 9.3 | Problems with Grouping/Outlining | 70 |
| | <i>Changing Outlining Position</i> | 70 |
| | <i>Using Grouping/Outlining with Protection</i> | 70 |
| 9.4 | Removing Outlining/Grouping | 71 |
| | <i>Removing Outlining/Grouping from Selected Rows/Columns</i> | 71 |
| | <i>Removing All Outlining</i> | 71 |

| 10 | IF FUNCTIONS | Page |
|------|---|------|
| 10.1 | Overview of IF Functions | 72 |
| | <i>Relational Operators</i> | 72 |
| 10.2 | Creating IF Functions | 73 |
| | <i>Typing IF Functions</i> | 73 |
| | <i>Using the Function Wizard</i> | 74 |
| 10.3 | Nesting IF Conditions | 75 |
| | <i>Step 1 – Define the Conditions</i> | 75 |
| | <i>Step 2 – Create the Nested IF Function</i> | 75 |
| | <i>An Alternative: the IFS function</i> | 76 |
| 10.4 | The SWITCH Function | 77 |

| 11 | INFORMATION FUNCTIONS | Page |
|------|-----------------------------|------|
| 11.1 | The CELL and INFO Functions | 78 |
| | <i>The INFO Function</i> | 78 |
| | <i>The CELL Function</i> | 78 |
| 11.2 | Sheet Number / Numbers | 79 |
| | <i>The SHEET Function</i> | 79 |
| | <i>The SHEETS Function</i> | 79 |

| 12 | TEXT FUNCTIONS | Page |
|------|---|------|
| 12.1 | List of Text Functions | 80 |
| | <i>Searching and Replacing Text</i> | 80 |
| | <i>Extracting one String from Another</i> | 80 |
| | <i>Converting Strings</i> | 81 |
| | <i>Other Text Functions</i> | 81 |
| | <i>Joining Multiple Items</i> | 81 |
| | <i>Converting Numbers and Dates to Text</i> | 82 |
| 12.2 | Text Functions – a Case Study | 83 |

| 13 | DATE AND TIME FUNCTIONS | Page |
|------|---|------|
| 13.1 | Returning Date Information | 84 |
| | <i>Returning Parts of a Date</i> | 84 |
| | <i>Returning today's Date/Time</i> | 84 |
| | <i>Returning Parts of a Time</i> | 85 |
| | <i>Converting Numbers/Text into Dates/Times</i> | 85 |
| 13.2 | Manipulating Dates | 86 |
| | <i>Returning Different Dates</i> | 86 |
| | <i>Returning the Difference between Dates</i> | 86 |

| 14 | THE VLOOKUP FUNCTION | Page |
|------|--|------|
| 14.1 | Types of Lookup Table | 87 |
| | <i>Exact Matches or Not?</i> | 87 |
| | <i>Horizontal or Vertical?</i> | 87 |
| 14.2 | Inexact Matches (Continuous Value Lookups) | 88 |
| | <i>Creating the Lookup Table</i> | 88 |
| | <i>Giving the Lookup Table a Range Name</i> | 88 |
| | <i>Creating the VLOOKUP Formula</i> | 89 |
| 14.3 | Exact Match Lookup Tables | 90 |
| | <i>Syntax of the Exact VLOOKUP Function</i> | 90 |
| | <i>Creating a Range Name for your Lookup Table</i> | 91 |
| | <i>Creating the Lookup Formula</i> | 91 |
| 14.4 | Trapping Errors | 92 |
| | <i>Method 1 - Preventing Errors Happening with Data Validation</i> | 92 |
| | <i>Method 2 - Adding Outliers to your Input Table</i> | 93 |
| | <i>Method 3 – Converting Invalid Values using IF</i> | 93 |
| | <i>Method 4 – Trap Errors when they Occur</i> | 93 |

| 15 | INSPECTION AND ERROR FUNCTIONS | Page |
|------|--|------|
| 15.1 | Inspection Functions | 94 |
| | <i>Non-Error Inspection Functions</i> | 94 |
| | <i>Error Inspection Functions</i> | 94 |
| 15.2 | Handling Errors | 95 |
| | <i>General Error Trapping using IFERROR</i> | 95 |
| | <i>Avoiding the Error in the First Place</i> | 95 |

TABLE OF CONTENTS (4 of 5)

| 16 | THE XLOOKUP FUNCTION | Page |
|------|---------------------------------------|------|
| 16.1 | Introduction to XLOOKUP | 96 |
| | <i>Our Example for this Chapter</i> | 96 |
| | <i>The XLOOKUP Function Arguments</i> | 96 |
| 16.2 | Using XLOOKUP | 96 |
| | <i>Basic Lookups</i> | 97 |
| | <i>Reversing the Sort Order</i> | 97 |
| | <i>Using Wildcards</i> | 98 |
| | <i>Setting a Not Found Value</i> | 99 |
| | <i>Returning Arrays</i> | 99 |

| 17 | CONDITIONAL STATISTICS | Page |
|------|--|------|
| 17.1 | Overview of Conditional Statistical Functions | 100 |
| | <i>Using IF instead of Conditional Statistical Functions</i> | 100 |
| | <i>The Special Functions Available</i> | 100 |
| 17.2 | SUMIFS, COUNTIFS, etc | 101 |
| | <i>Syntax of the Functions</i> | 101 |
| | <i>Worked Example</i> | 101 |
| | <i>Example with Multiple Criteria and Wildcards</i> | 102 |
| | <i>AVERAGEIF, COUNTIF and SUMIF</i> | 103 |
| | <i>Using with a Summation Range</i> | 103 |
| | <i>Combining the Criteria and Summation Range</i> | 103 |

| 18 | LOGICAL FUNCTIONS / MASKING | Page |
|------|-----------------------------|------|
| 18.1 | Masking | 104 |
| 18.2 | Logical Functions | 105 |

| 19 | OTHER LOOKUP FUNCTIONS | Page |
|------|---|------|
| 19.1 | Combining MATCH and INDEX | 106 |
| | <i>Reasons to Prefer MATCH/INDEX to VLOOKUP</i> | 106 |
| | <i>The Range Names for our Example</i> | 107 |
| | <i>The Syntax of MATCH</i> | 107 |
| | <i>Using MATCH to Find Row/Column Numbers for our Example</i> | 108 |
| | <i>Syntax of the INDEX Function</i> | 108 |
| | <i>Creating the INDEX Function for our Example</i> | 109 |
| | <i>Combining MATCH and INDEX in a Single Function</i> | 109 |
| 19.2 | The XMATCH Function | 110 |
| | <i>The XMATCH Function Arguments</i> | 110 |
| 19.3 | The CHOOSE Function | 111 |
| 19.4 | The OFFSET Function | 112 |
| | <i>Basic Offsetting</i> | 112 |
| | <i>Setting the Number of Rows/Columns Returned</i> | 113 |
| 19.5 | The INDIRECT Function | 114 |
| | <i>Example: Picking Out Figures from a Chosen Worksheet</i> | 114 |

| 20 | THE SUMPRODUCT FUNCTION | Page |
|------|---|------|
| 20.1 | Our Example | 115 |
| 20.2 | Solutions without SUMPRODUCT | 116 |
| | <i>Summing the Results of IF Functions</i> | 116 |
| | <i>Using SUMIFS</i> | 116 |
| 20.3 | The SUMPRODUCT Function | 117 |
| | <i>What Summing Products Means</i> | 117 |
| | <i>Vectors of TRUE / FALSE values</i> | 117 |
| | <i>Forcing SUMPRODUCT to Calculate True/False Correctly</i> | 118 |
| | <i>Weighted Averages using SUMPRODUCT</i> | 118 |

| 21 | DYNAMIC RANGE NAMES | Page |
|------|---|------|
| 21.1 | Examples of Dynamic Range Names | 119 |
| 21.2 | Making a Range Name Dynamic | 120 |
| | <i>The Principle: the OFFSET Function</i> | 120 |
| | <i>Creating the Range Name</i> | 120 |
| | <i>Using Dynamic Range Names</i> | 121 |
| 21.3 | Dynamic Range Names and Charts | 122 |
| | <i>Creating the Range Names</i> | 122 |
| | <i>Making the Chart Refer to these Ranges</i> | 122 |

TABLE OF CONTENTS (5 of 5)

| 22 | CASHFLOW | Page |
|------|--|------|
| 22.1 | Template for a Cashflow Calculation | 123 |
| 22.2 | Calculating Interest | 124 |
| | <i>Step 1 – Splitting the Cash Stream into Positive and Negative Amounts</i> | 124 |
| | <i>Step 2 – Calculating the Deposit/Loan Rate</i> | 125 |
| | <i>Step 3 – Calculating the Deposit/Loan Amount</i> | 125 |

| 23 | INVESTMENT APPRAISAL | Page |
|------|---|------|
| 23.1 | Discount Rates | 126 |
| 23.2 | Discounted Cashflow | 127 |
| 23.3 | NPV and IRR Functions | 128 |
| | <i>NPV Function</i> | 128 |
| | <i>IRR Function</i> | 129 |
| | <i>Using IRR or NPV to Assess an Investment</i> | 129 |
| | <i>Non-Periodic Cashflows using XNPV and XIRR</i> | 130 |
| | <i>Modified Internal Rate of Return Function</i> | 130 |

| 24 | MULTIPLE WORKSHEETS | Page |
|------|--|------|
| 24.1 | Moving between Worksheets | 131 |
| 24.2 | Common Tasks | 132 |
| | <i>Selecting and De-selecting Worksheets</i> | 132 |
| | <i>Renaming Worksheets</i> | 132 |
| | <i>Changing Worksheet Tab Colours</i> | 133 |
| | <i>Hiding and Unhiding Worksheets</i> | 133 |
| 24.3 | Inserting and Deleting Worksheets | 134 |
| | <i>Inserting Single Worksheets</i> | 134 |
| | <i>Inserting Multiple Worksheets</i> | 134 |
| | <i>Deleting Worksheets</i> | 134 |
| 24.4 | Moving and Copying Worksheets | 135 |
| | <i>Moving Worksheets within a Workbook</i> | 135 |
| | <i>Copying Worksheets within a Workbook</i> | 135 |
| | <i>Moving and Copying to a Different or New Workbook</i> | 136 |
| 24.5 | Group Mode | 137 |
| 24.6 | Summing across Sheets | 138 |

| 25 | SCENARIOS | Page |
|------|---|------|
| 25.1 | Overview of Scenarios | 139 |
| 25.2 | Creating a Scenario | 140 |
| | <i>Base case scenarios</i> | 140 |
| | <i>Starting the Scenario Manager</i> | 140 |
| | <i>Creating a Scenario</i> | 141 |
| 25.3 | Showing Different Scenarios | 142 |
| | <i>Showing Different Scenarios using the Ribbon</i> | 142 |
| | <i>Switching Scenarios using the Quick Access Toolbar</i> | 142 |
| 25.4 | Editing, Deleting and Merging Scenarios | 143 |
| | <i>Editing or Deleting Scenarios</i> | 143 |
| | <i>Merging Scenarios</i> | 143 |
| 25.5 | Summarising Scenarios | 144 |

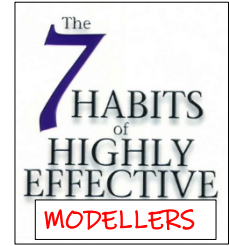
| 26 | GOAL-SEEKING | Page |
|------|----------------------|------|
| 26.1 | Goal-Seeking Example | 145 |
| 26.2 | Using Goal-Seeking | 146 |

| 27 | DATA TABLES | Page |
|------|--|------|
| 27.1 | Overview of Data Tables | 147 |
| | <i>One-Way and Two-Way Data Tables</i> | 147 |
| | <i>Example of a Data Table</i> | 147 |
| 27.2 | One-Way Data Tables | 148 |
| | <i>Step 1 – Create your Formulae</i> | 148 |
| | <i>Step 2 – Create your Inputs</i> | 148 |
| | <i>Step 3 – Create the Data Table Itself</i> | 149 |
| 27.3 | Two-Way Data Tables | 150 |
| | <i>Step 1 – Create your Formula</i> | 150 |
| | <i>Step 2 – Create your Inputs</i> | 150 |
| | <i>Step 3 – Create the Data Table</i> | 151 |

| 28 | MODELLING SHORT-CUTS | Page |
|------|---|------|
| 28.1 | Creating a Row of Data | 152 |
| 28.2 | Other Keyboard Shortcuts | 154 |
| | <i>Shortcuts for Moving and Selecting</i> | 154 |
| | <i>Shortcuts for Formatting</i> | 154 |
| | <i>Shortcuts for Range Names</i> | 155 |
| | <i>Shortcuts for Formulae and Data</i> | 155 |

CHAPTER 1 - SEVEN MODELLING GUIDELINES

This chapter lists the seven habits of highly effective modellers (with apologies to Stephen R. Covey).



1.1 Guideline 1 – Use a Cover Sheet

Our first guideline is to include a cover sheet as the first worksheet in any model:

| | A | B | C | D |
|---|---|--------------------------|------------------------|---|
| 1 | | | | |
| 2 | | Title of model ==> | The Chocolate Emporium | |
| 3 | | | | |
| 4 | | Start date for model ==> | 01 Sep 2020 | |
| 5 | | | | |
| 6 | | Version number ==> | 1.0 | |
| 7 | | | | |
| 8 | | Status ==> | (Very) untested | |
| 9 | | | | |

You can hide all of the columns and rows not being used to create a tidier effect.

Things this might contain include:

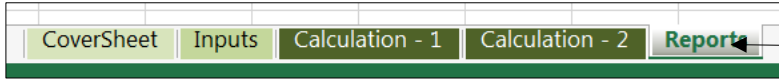
| Cover sheet field | Notes |
|--|---|
| <i>Who wrote the model</i> | Your name and contact details |
| <i>Revision dates and version number</i> | When the model was created, when it was last revised and any version number |
| <i>Confidentiality</i> | Whether the model contains confidential data |



If your company or organisation has a standard model template which you can use, so much the better!

1.2 Guideline 2 – Separate Inputs and Calculations

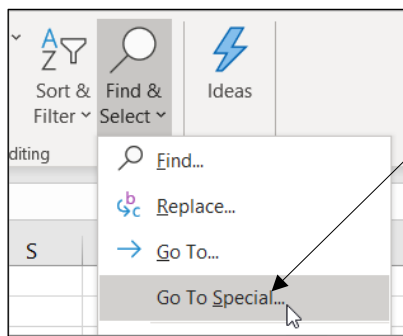
As a fundamental principle, you should put all of your input assumptions on one (or more) separate worksheet(s):



You could use colouring to show the different types of worksheet tab.

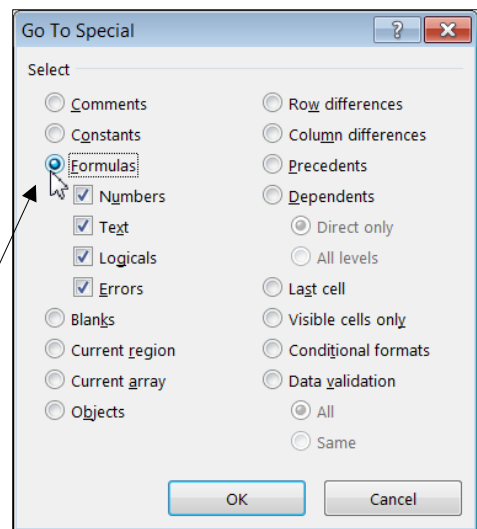
Checking for Rogue Formulae

You can highlight any rogue formulae in an input worksheet as follows:



a) Choose this tool from the **HOME** tab of the ribbon (or press **F5**) and choose the **Special...** button at the bottom left of the dialog box which appears).

b) Choose to highlight formulae.



| | A | B | C | D | E | F | G | H |
|----|------------------------|------------------|----------------|-------------|------|------------|------------|------------|
| 1 | The Chocolate Emporium | | Period ==> | | | 1 | 2 | 3 |
| 2 | | | Start date ==> | | | 01/03/2015 | 01/04/2015 | 01/05/2015 |
| 3 | Section | Input row title | Units | of date ==> | | 31/03/2015 | 30/04/2015 | 31/05/2015 |
| 4 | | | | | | | | |
| 5 | Costs | | | | | | | |
| 6 | | Raw materials | £' | | | -500 | -500 | -600 |
| 7 | | Labour | £' | | | -400 | -390 | -380 |
| 8 | | Overheads | £' | | | -300 | -350 | -400 |
| 9 | | | | | | | | |
| 10 | Revenue | | | | | | | |
| 11 | | Base sales | £' | | 1000 | Revenue | | |
| 12 | | Sales multiplier | % | | | 0 | 0.1 | 0.2 |

c) Apart possibly from column headers, as here, no cells should be selected on input sheets.



Another good way to check this is to press **Ctrl + `** (this strange symbol, called a backtick, is usually at the top left of your keyboard, above the **Tab** key) to display formulae. For an inputs worksheet, this shouldn't change any of the displayed values.

1.3 Guideline 3 – Use Styles

Imagine how much easier modelling in your company or organisation would be if everyone used consistent formatting!

| | | | | | |
|----|------------------------|------------------|----------------|--------------|-----------------------|
| 1 | The Chocolate Emporium | | Period ==> | 1 | 2 |
| 2 | | | Start date ==> | 01/09/2020 | 01/10/2020 |
| 3 | Section | Input row title | Units | End date ==> | 30/09/2020 31/10/2020 |
| 4 | | | | | |
| 5 | Costs | | | | |
| 6 | | Raw materials | £ | -500 | -300 |
| 7 | | Labour | £ | -400 | -390 |
| 8 | | Overheads | £ | -300 | -350 |
| 9 | | | | | |
| 10 | Revenue | | | | |
| 11 | | Base sales | £ | 1000 | RevBase |
| 12 | | Sales multiplier | % | 0 | 0.1 |
| 13 | | | | | |

This input cell is formatted with the **InputCell** style, which makes it appear with a yellow background and borders ...

... which is also why all of these other input cells have the same formatting.

Here is a suggestion for a set of styles that you could create:

| Worksheet type | Suggested name | Used for |
|----------------|----------------------|--|
| Inputs | <i>InputPercent</i> | Input cells which contain percentages |
| | <i>InputCurrency</i> | Input cells which contain currency amounts |
| | <i>InputDate</i> | Input cells which contain dates |
| | <i>InputOther</i> | Input cells containing text and numbers |
| Calculations | <i>CalcPercent</i> | Calculation cells which contain percentages |
| | <i>CalcCurrency</i> | Calculation cells which contain currency amounts |
| | <i>CalcDate</i> | Calculation cells which contain dates |
| | <i>CalcOther</i> | Calculation cells containing text and numbers |
| Reports | <i>RepPercent</i> | Report cells which contain percentages |
| | <i>RepCurrency</i> | Report cells which contain currency amounts |
| | <i>RepDate</i> | Report cells which contain dates |
| | <i>RepOther</i> | Report cells containing text and numbers |
| General | <i>GenRangeName</i> | How range names appear to the right of each row |
| | <i>GenUnits</i> | How units appear |
| | <i>GenTitle</i> | Titles for blocks of data |
| | <i>GenItem</i> | Individual item lines in a report |



It doesn't matter whether your input cells are blue, pink or red with yellow spots, just as long as they are consistent.

1.4 Guideline 4 – Use Range Names

A *range name* is a name given to a cell (or to a block of cells), which you can then use in your formulae. Range names make formulae easier to read, write, maintain and test!

| | | | | | |
|----|---|---|---|-------|-------|
| fx | =CostLabour+CostMaterials+CostOverheads | | | | |
| | C | D | E | F | G |
| £ | | | | 1000 | 1100 |
| £ | | | | -1200 | -1240 |
| £ | | | | -200 | -140 |

Range names like this are so much easier to read

... than cell references like this.

| | | | | | |
|----|--------------------------------|---|---|-------|-------|
| fx | =Inputs!F7+Inputs!F6+Inputs!F8 | | | | |
| | C | D | E | F | G |
| £ | | | | 1000 | 1100 |
| £ | | | | -1200 | -1240 |
| £ | | | | -200 | -140 |



You should aim to avoid using any references at all in your models (although there will be a few times when you have to relax this slightly).

1.5 Guideline 5 – Keep Formulae Simple

Here is a sequence of formulae which display a message saying how many spaces there are in a worksheet name (this is a daft thing to do, but that's not the point!).

A series of formula to display a message like this in the final cell:

| | |
|------------------------------|---------|
| List of calcs has 2 space(s) | Message |
|------------------------------|---------|

| | |
|---|---------------|
| =CELL("filename") | FileName |
| =FIND("]",FileName)+1 | SheetStarts |
| =RIGHT(FileName,LEN(FileName)-SheetStarts+1) | SheetName |
| =SUBSTITUTE(SheetName," ","") | WithoutSpaces |
| =LEN(SheetName)-LEN(WithoutSpaces) | NumberSpaces |
| =SheetName & " has " & NumberSpaces & " space(s)" | Message |

Here's the same thing done in a single formula – probably!

```
=RIGHT(CELL("filename"),LEN(CELL("filename"))-FIND("]",FileName)+1) & " has " & (LEN(RIGHT(CELL("filename"),LEN(CELL("filename"))-FIND("]",FileName)+1))-LEN(SUBSTITUTE(RIGHT(CELL("filename"),LEN(CELL("filename"))-FIND("]",CELL("filename"))+1)," ",""))) & " space(s)"
```

Our guideline will be to keep formulae short and simple (if necessary breaking them up into several steps).



If you prefer the single long formula above, you're not going to like your Wise Owl Excel course!

1.6 Guideline 6 – Copy Formulae Across

Imagine a software application which colours Excel cells using these rules (such programs do exist – for example, *Spreadsheet Detective* and *Operis Analysis Kit*, or *OAK*):

| Contents of cell | What Excel would do |
|---------------------------|---|
| Unique formula | Colour the cell pink and put an F in the cell |
| Copied from its neighbour | Colour the cell green and put a > in the cell |

Such a program would produce a map like this for our model:

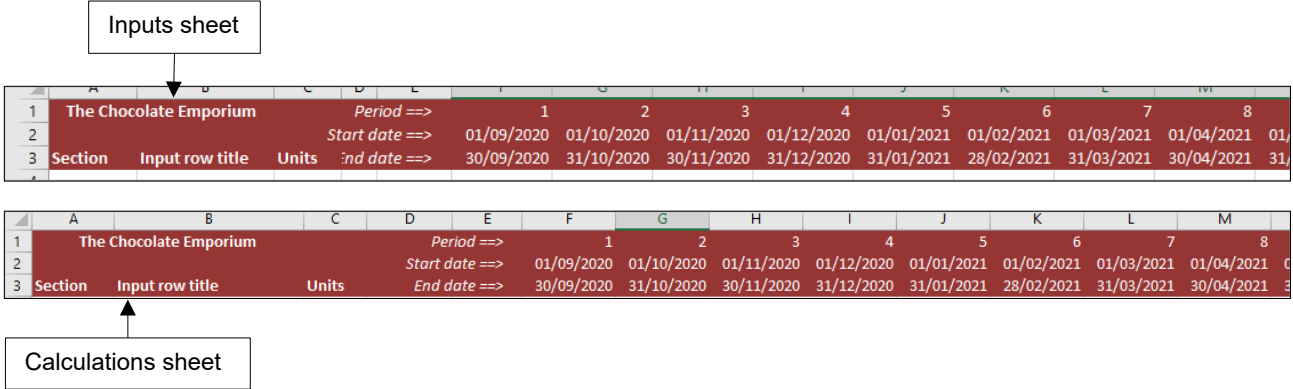
| | | | | | | | | | | | | | | | | | | | |
|----|---------------------------------|-----|---|--------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-----------------|
| 5 | File name | | | | | | | | | | | | | | | | | | |
| 6 | Name of file | N/A | F | FileName | | | | | | | | | | | | | | | |
| 7 | Where worksheet starts | N/A | F | SheetStarts | | | | | | | | | | | | | | | |
| 8 | Sheet name | N/A | F | SheetName | | | | | | | | | | | | | | | |
| 10 | Month/season | | | | | | | | | | | | | | | | | | |
| 11 | Month number | N/A | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | MonthNumber |
| 12 | Month name | N/A | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | MonthNames |
| 13 | Season | N/A | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | SeasonFactor |
| 15 | Revenue and labour costs | | | | | | | | | | | | | | | | | | |
| 16 | Revenue | £ | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | RevenueTotal |
| 17 | Seasonally adjusted revenue | £ | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | RevenueAdjusted |
| 18 | Number of labour units | LU | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | LabourUnits |
| 19 | Labour costs | £ | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | CostLabourTotal |
| 20 | Last year's revenue | £ | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | RevenuePrevious |
| 22 | Holidays | | | | | | | | | | | | | | | | | | |
| 23 | Holiday month | N/A | F | HolidayMonth | | | | | | | | | | | | | | | |
| 24 | Working time mask | N/A | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | MaskWorking |
| 25 | Revenue allowing for holiday | £ | F | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | RevenueMasked |

In a well-written model, you'd see a map with Fs in the first column and chevrons in subsequent columns showing where the formulae had been copied over.

Our guideline will be to ensure that unique formulae only appear in the first column of any row, making the resulting spreadsheet easier to maintain and test.

1.7 Guideline 7 – Use Consistent Period Headings

It is good practice to ensure that each of the worksheets of your model uses the same time period headings beginning in the same columns:



To do this, break your columns down into the smallest required level of granularity (for the example above this is by month).

CHAPTER 2 - RANGE NAMES


2.1 What are Range Names?

You can assign *names* to individual cells, or to blocks of cells:

| | | | | | | | | | | |
|----|----------------|------------------|---|------|---------|------|------|------|------|--|
| 4 | | | | | | | | | | |
| 5 | Costs | | | | | | | | | |
| 6 | | Raw materials | £ | | -500 | -500 | -500 | -500 | -500 | |
| 7 | | Labour | £ | | -400 | -390 | -380 | -300 | -290 | |
| 8 | | Overheads | £ | | -300 | -350 | -400 | -800 | -850 | |
| 9 | | | | | | | | | | |
| 10 | Revenue | | | | | | | | | |
| 11 | | Base sales | £ | 1000 | RevBase | | | | | |
| 12 | | Sales multiplier | % | | 0 | 0.1 | 0.2 | 1 | 1.1 | |

For example, you could call this single cell a name like **RevBase** ...

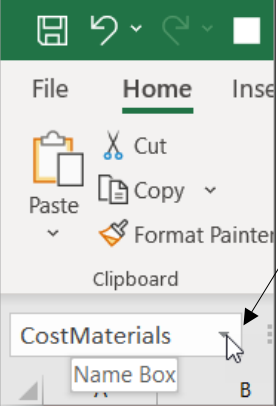
... and this block of cells a name like **CostMaterials**.



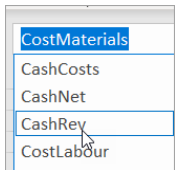
The key to using Excel effectively is to gain a thorough understanding of what range names are and how you can use them in your formulae.

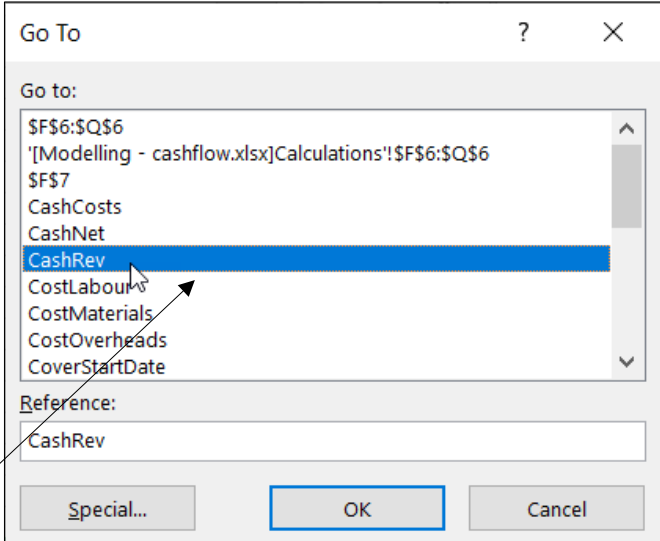
Going to a Range Name

One of the many benefits of range names is that they allow you to find a cell (or block of cells) quickly:



You can click on this arrow to the right of the **Name Box**, and choose which range you want to go to (it doesn't have to be on the same worksheet):





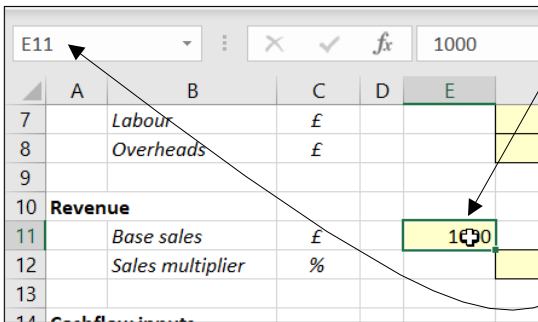
Alternatively, press the **F5** function key to go to a range, then double-click on it in the list (or select it and choose **OK**).

2.2 Creating Range Names

There are (at least) three ways to create a range name in Excel – the best one is probably the last!

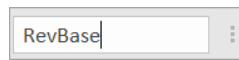
Method 1 – Using the Name Box

To create a range name for a cell or block of cells using the **Name Box**:



a) Select the cell or cells to which you want to attach a name.

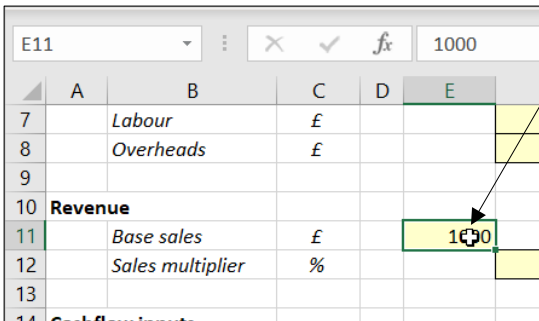
b) Click in the name box, and type in the name you want to use (you can use underscores, but can't use spaces):



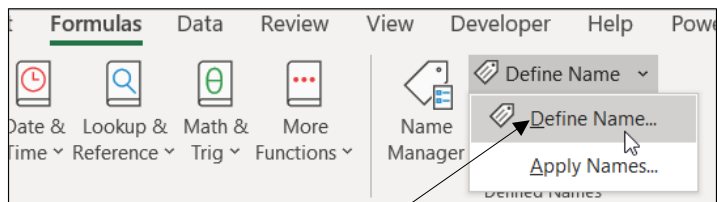
You must then press **Enter** to confirm the range name.

Method 2 – Defining Names

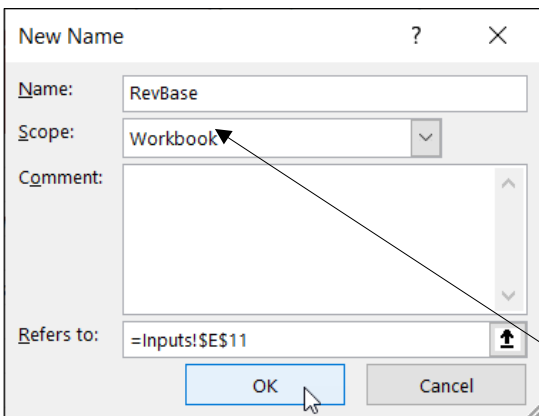
Another (harder) way to create a range name is using the ribbon:



a) As for the first method, first select the cell or cells you want to name.




b) Choose to define a range name on the **Formulas** tab of the ribbon.



c) Type in a name for your range (again, no spaces please) and select **OK** (the best thing to do is to leave the scope as **Workbook** – scope is explained later in this chapter).

Method 3 - Creating Range Names from Selected Cells

This is the best way to create range names, partly because it lets you assign names to lots of blocks of cells at the same time.



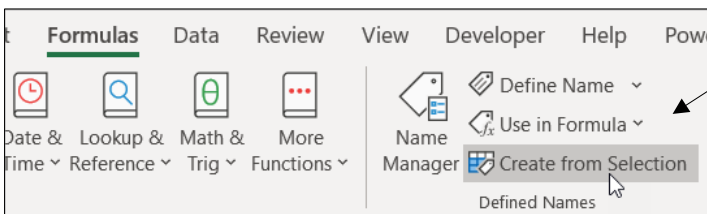
Wise Owl's Hint

Another advantage of this method is that you can see which names refer to which blocks of cells, but be aware that this is not dynamic (if you change the range name typed in next to a block of cells, this won't have any affect on the existing range name applied to them).

Here's how to use this method:

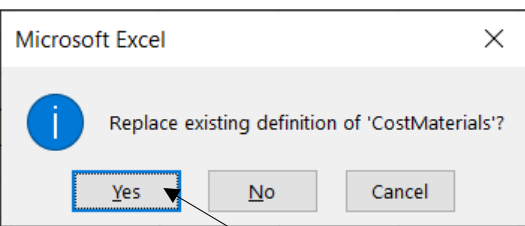
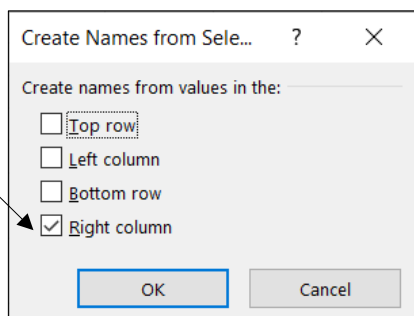
a) Select a block of cells which includes the names that you want to use and the cells that you want to name.

| | A | B | C | D | E | F | G | P | Q | R |
|----|------------------------|------------------|----------------|--------------|------------|------------|------------|------------|------|---------------|
| 1 | The Chocolate Emporium | | Period ==> | 1 | 2 | 11 | 12 | | | PeriodIn |
| 2 | | | Start date ==> | 01/09/2020 | 01/10/2020 | 01/07/2021 | 01/08/2021 | | | StartDateIn |
| 3 | Section | Input row title | Units | End date ==> | 30/09/2020 | 31/10/2020 | 31/07/2021 | 31/08/2021 | | EndDateIn |
| 4 | | | | | | | | | | |
| 5 | Costs | | | | | | | | | |
| 6 | | Raw materials | £ | | | -500 | -500 | -500 | -500 | CostMaterials |
| 7 | | Labour | £ | | | -400 | -390 | -300 | -290 | CostLabour |
| 8 | | Overheads | £ | | | -300 | -350 | -800 | -850 | CostOverheads |
| 9 | | | | | | | | | | |
| 10 | Revenue | | | | | | | | | |
| 11 | | Base sales | £ | | 1000 | | | | | |
| 12 | | Sales multiplier | % | | | 0 | 0.1 | 1 | 1.1 | RevMultiplier |
| 13 | | | | | | | | | | |



b) Choose this option on the **Formulas** tab of the ribbon (or you can do the same thing by pressing **Ctrl** + **Shift** + **F3**).

c) Excel often (but not always) guesses correctly what you want to do. On this occasion we do want to create range names using labels in the right-hand column, so select **OK**.



d) If you already have one or more ranges with these names, you will be prompted whether you want to override them.

| | | | |
|----|---------------|--|---------------|
| | CostMaterials | | CostMaterials |
| | CostLabour | | CostLabour |
| | CostOverheads | | CostOverheads |
| 00 | RevMultiplier | | RevMultiplier |

e) Excel creates these four range names for this example (the blank cells/rows are ignored).

2.3 Range Names in Formulae

Referencing Range Names in Formulae

For the following example, suppose we want the total cost to be the sum of the three ranges called **CostMaterials**, **CostLabour** and **CostOverheads**. Here's how to create this formula:

a) Start typing in a formula, and begin typing the first range name that you want to reference. Press the **Tab** key to get this:

| | | | | | | | |
|----|----------------------|---|------|---------|------|------|---------------|
| 5 | Costs | | | | | | |
| 6 | Raw materials | £ | | -500 | -500 | -500 | CostMaterials |
| 7 | Labour | £ | | -400 | -390 | -380 | CostLabour |
| 8 | Overheads | £ | | -300 | -350 | -400 | CostOverheads |
| 9 | | | | | | | |
| 10 | Revenue | | | | | | |
| 11 | Base sales | £ | 1000 | RevBase | | | |
| 12 | Sales multiplier | % | | 0% | 10% | 20% | RevMultiplier |
| 13 | | | | | | | |
| 14 | Monies in/out | | | | | | |
| 15 | Total cost | £ | | =Cost | | | |
| 16 | Total revenue | £ | | | | | |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |

CostMaterials

b) Type in a **+** sign, then type in the start of the next range name and again press **Tab**.

c) For the third range name, as an alternative you could press **F3** to bring up a dialog box listing the range names in your workbook in alphabetical order:

=CostMaterials+CostLabour+

Paste Name

Paste name


- CashCosts
- CashNet
- CashRev
- CostLabour
- CostMaterials
- CostOverheads**
- CoverStartDate
- CoverStatus

OK Cancel

d) Double-click on the final range name to complete your formula.

| | | | | | | | |
|----|----------------------|---|--|-------|-------|-------|--|
| 14 | Monies in/out | | | | | | |
| 15 | Total cost | £ | | -1200 | -1240 | -1280 | |
| 16 | Total revenue | £ | | | | | |
| 17 | | | | | | | |

e) The formula fills cells corresponding to the widths of the referenced ranges.



Once you've clicked in the list of range names, you can type the first letter of a range name repeatedly to cycle to it (so for the above example you could press **C** six times to go to the 6th range name beginning with a **C**).

Dealing with Spill Errors

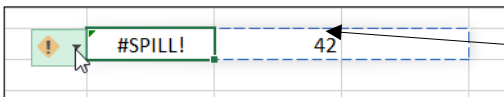
The formula we've created only exists in the left-hand cell, but it uses a new Excel feature called *dynamic arrays* to fill multiple cells:

| | A | B | C | D | E | F | G | H | I |
|----|---|------------------|---|---|------|---------|-------|-------|---------------|
| 7 | | Labour | £ | | | -400 | -390 | -380 | CostLabour |
| 8 | | Overheads | £ | | | -300 | -350 | -400 | CostOverheads |
| 9 | | | | | | | | | |
| 10 | | Revenue | | | | | | | |
| 11 | | Base sales | £ | | 1000 | RevBase | | | |
| 12 | | Sales multiplier | % | | | 0% | 10% | 20% | RevMultiplier |
| 13 | | | | | | | | | |
| 14 | | Monies in/out | | | | | | | |
| 15 | | Total cost | £ | | | -1200 | -1240 | -1280 | |

The formula shows up in light grey in the formula bar if you click on ...

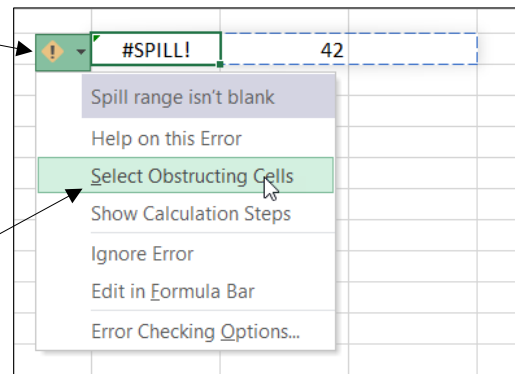
... any cell apart from the left-hand one in your row.

If there's something in the way Excel can't create the formula and shows a spill error:

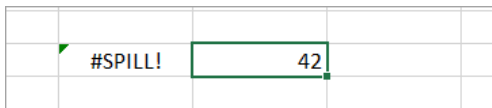


a) Here someone has typed 42 into the second cell, preventing the formula from spanning its full width.

b) You can click on the floatie to see what the error is.



b) It's as we thought: the spill range isn't blank. The best thing to do would be to select (and then delete the contents of) the obstructing cells:



The Possible Spill Errors

You can get a **#SPILL!** error in Excel when one of the following happens:

| Error | How to solve |
|--------------------------------------|--|
| <i>The spill range isn't blank</i> | Remove the obstructing cell contents (as above) |
| <i>Indeterminate size</i> | Don't use functions like =RAND or =RANDBETWEEN with dynamic arrays |
| <i>Extends beyond worksheet edge</i> | Use a smaller range/array |
| <i>Table formula</i> | Spilled array formulae are not supported in tables |
| <i>Out of memory</i> | Try referencing a smaller array or range |
| <i>Spill into merged cells</i> | Un-merge the cells |
| <i>Unrecognized / Fallback</i> | Check your formula for errors! |

Implicit Intersection using @

You can prefix range names with the @ character to tell Excel not to use dynamic arrays:

| | | | |
|------|------|------|---------------|
| -500 | -500 | -500 | CostMaterials |
| -400 | -390 | -380 | CostLabour |
| -300 | -350 | -400 | CostOverheads |

=CostMaterials+CostLabour+CostOverheads

This example uses dynamic arrays: the formula entered fills all 3 cells.


| | | | |
|------|------|------|---------------|
| -500 | -500 | -500 | CostMaterials |
| -400 | -390 | -380 | CostLabour |
| -300 | -350 | -400 | CostOverheads |

=@CostMaterials+@CostLabour+@CostOverheads

This example doesn't use dynamic arrays: the formula entered only fills the left-hand cell, and you would have to copy it across to the other two cells:

| | | | |
|------|------|------|---------------|
| -500 | -500 | -500 | CostMaterials |
| -400 | -390 | -380 | CostLabour |
| -300 | -350 | -400 | CostOverheads |

-1200



Wise Owl's Hint

When you open a workbook created in an older version of Excel, Microsoft will add @ prefixes before range names in formulae to show that you are not using dynamic ranges (you couldn't have been; they didn't exist in earlier versions).

Two-Dimensional Range Formulae

You can create a matrix of results by creating formulae combining ranges of different shapes:

| | | | | | | | | |
|-----|---|-------------------------|---|----|----|----|-----------|--|
| SLN | | | | | | | | |
| | A | B | C | D | E | F | G | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | 1 | 2 | 3 | 4 | SampleRow | |
| 5 | | =SampleRow*SampleColumn | | | 15 | 20 | | |
| 6 | | 6 | 6 | 12 | 18 | 24 | | |
| 7 | | 7 | 7 | 14 | 21 | 28 | | |
| 8 | | SampleColumn | | | | | | |

Here the formula multiplies the value in the green range (SampleRow) for the column in question by the value in the blue range (SampleColumn) for the row in question.

Getting Aggregation Functions to Work using +

Some common statistical functions (think **SUM**, **MAX**, **MIN**, **AVERAGE**, **COUNT**) work on a whole range, whereas we want them to work sometimes on a cell-by-cell basis:

| | A | B | C | D | E | F | G |
|----|---|-------------------|---------------------------------|------|--------|-------|-----------------|
| 1 | | | | | | | |
| 2 | | | Quarterly Forecast Sales | | | | |
| 3 | | | | | | | |
| 4 | | | <i>Quarters</i> | | | | |
| 5 | | | 1 | 2 | 3 | 4 | |
| 6 | | | | | | | |
| 7 | | Cash balance (£m) | (100.0) | 50.0 | (25.0) | 125.0 | CashBalance |
| 8 | | | | | | | |
| 9 | | Postive balance | =max(CashBalance,0) | | | | PostiveBalance |
| 10 | | Negative balance | | | | | NegativeBalance |

Without any modification this formula will give us 125 in each cell, since this is the highest value out of -100, 50, -25, 125 and 0!

| | | | | |
|-------------------|---------|-------|--------|-------|
| Cash balance (£m) | (100.0) | 50.0 | (25.0) | 125.0 |
| Postive balance | 125.0 | 125.0 | 125.0 | 125.0 |

To get this formula to give the positive balance for each quarter, precede the range name by a **+**:

| | | <i>Quarters</i> | | | |
|--|-------------------|----------------------|------|--------|-------|
| | | 1 | 2 | 3 | 4 |
| | Cash balance (£m) | (100.0) | 50.0 | (25.0) | 125.0 |
| | Postive balance | =MAX(+CashBalance,0) | | | |
| | Negative balance | | | | |

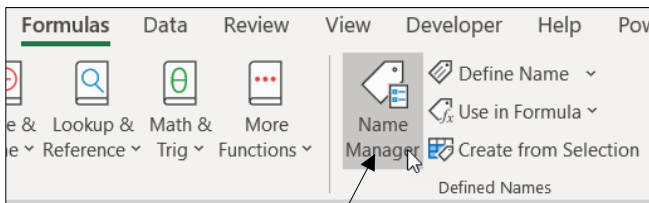
It's amazing how much difference a single plus sign can make in a formula. This would give:

| | | | | |
|-------------------|---------|------|--------|-------|
| Cash balance (£m) | (100.0) | 50.0 | (25.0) | 125.0 |
| Postive balance | 0.0 | 50.0 | 0.0 | 125.0 |

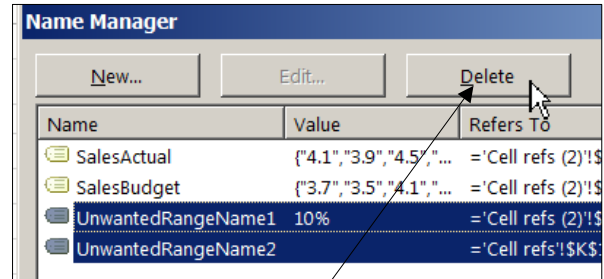
2.4 Working with Range Names

Editing and Deleting Range Names

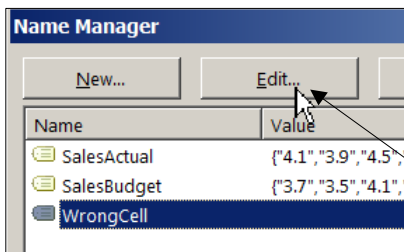
Range names are harder to edit/delete than they are to create!



Press **Ctrl + F3** or click on this tool on the **Formulas** tab of the ribbon to bring up the **Name Manager** in Excel.



To delete ranges, select them (using the **Ctrl** key if more than one) and click on **Delete**.



To edit a range name (whether to change its name, or to change the cells that it points to) select the range name in the list and click on the **Edit...** button.

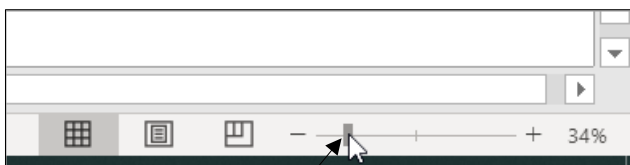


Wise Owl's Hint

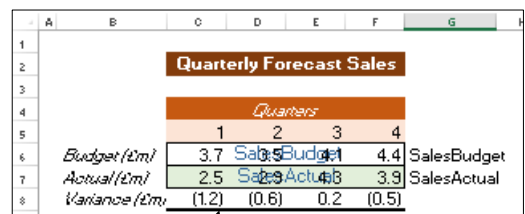
Because editing range names to point to different cells is a pain (and in particular, because it can't be done using the **Name Box**), by far the easiest way to change the cells that range names point to is by using the **Create from Selection** facility shown earlier in this chapter..

Viewing Range Names

A bizarre feature of Excel is that if you zoom in to a tiny view (generally anything less than 40% will do) you can see range names superimposed:



If you use this slider at the bottom right corner of Excel to zoom in to a number less than 40% ...



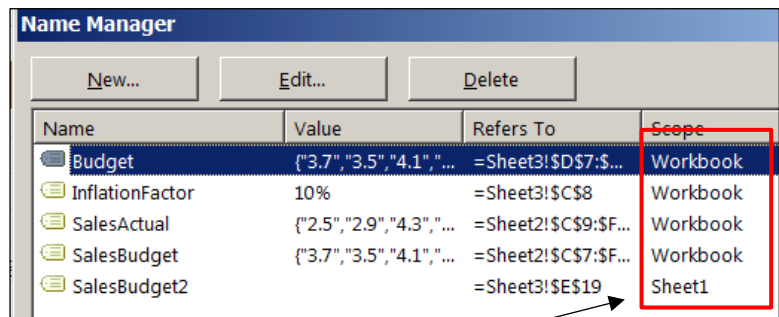
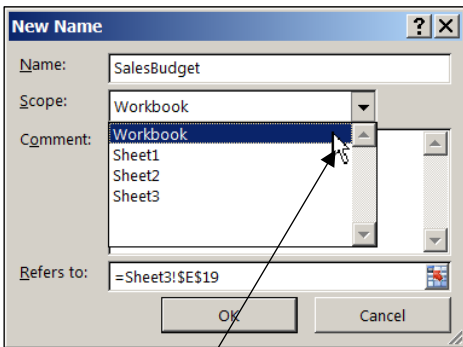
... you can see range names superimposed on the cells to which they apply (but it's useless, because the font is too small to read!).

2.5 The Scope of Range Names

The *scope* of a range name controls where you can use it. Range names can be scoped to an entire workbook, or to a specific worksheet within it.

Choosing the Scope of a Range Name

You can only choose the scope of a range name when you create it, and then only if you use the **Define Name** method (range names created by other methods always have workbook scope).

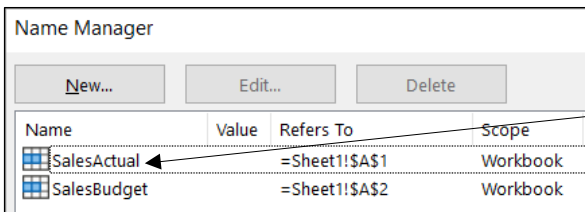


You can choose the scope of a range name when creating it by clicking on this drop list.

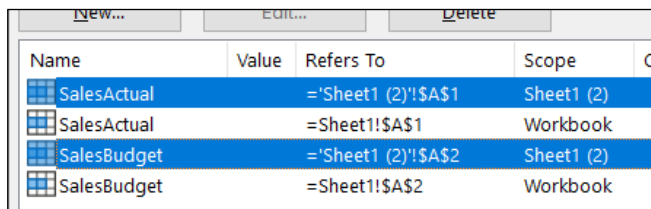
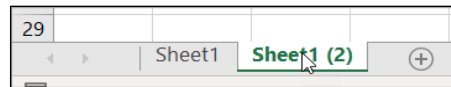
You can use **Name Manager** to view range name scopes, as here. You can refer to names scoped to a workbook from any worksheet, but names scoped to a specific worksheet can only be used in that worksheet.

Copying Worksheets Copies their Range Names with Local Scope

When you copy a worksheet, you create copies of all of its range names:



Suppose you have a worksheet called **Sheet1** which contains two range names as shown, and you then take a copy of this worksheet:



Excel will create one local copy of each range name – for example:

| Range name | Scope |
|-------------|-------------------------------|
| SalesActual | Workbook |
| SalesActual | Local to the new copied sheet |



This can be very confusing! The best strategy may be to carefully rename unwanted local copies of range names immediately after you copy any worksheets.

2.6 3-Dimensional Ranges

To impress friends you can create *3-dimensional* range names:

| | A | B | C | D | E | F |
|---|---|---------------|--------------------------|-------|-----|-------|
| 1 | | | | | | |
| 2 | | | Quarterly Forecast Sales | | | |
| 3 | | | | | | |
| 4 | | | Quarters | | | |
| 5 | | | 1 | 2 | 3 | 4 |
| 6 | | Budget (£m) | 3.7 | 3.5 | 4.1 | 4.4 |
| 7 | | Actual (£m) | 2.5 | 2.9 | 4.3 | 3.9 |
| 8 | | Variance (£m) | (1.2) | (0.6) | 0.2 | (0.5) |

| | Year 1 | Year 2 | Year 3 | Total |
|----|--------|--------|--------|-------|
| 30 | | | | |

| | A | B | C | D | E | F |
|---|---|---------------|--------------------------|-------|-------|-------|
| 1 | | | | | | |
| 2 | | | Quarterly Forecast Sales | | | |
| 3 | | | | | | |
| 4 | | | Quarters | | | |
| 5 | | | 1 | 2 | 3 | 4 |
| 6 | | Budget (£m) | 2.9 | 3.9 | 4.1 | 4.4 |
| 7 | | Actual (£m) | 4.1 | 3.3 | 3.9 | 3.8 |
| 8 | | Variance (£m) | 1.2 | (0.6) | (0.2) | (0.6) |

| | Year 1 | Year 2 | Year 3 | Total |
|--|--------|--------|--------|-------|
| | | | | |

| | A | B | C | D | E | F |
|---|---|---------------|--------------------------|-------|-----|-------|
| 1 | | | | | | |
| 2 | | | Quarterly Forecast Sales | | | |
| 3 | | | | | | |
| 4 | | | Quarters | | | |
| 5 | | | 1 | 2 | 3 | 4 |
| 6 | | Budget (£m) | 2.8 | 4.0 | 4.4 | 4.9 |
| 7 | | Actual (£m) | 2.2 | 3.7 | 4.4 | 4.4 |
| 8 | | Variance (£m) | (0.6) | (0.3) | 0.0 | (0.5) |

| | Year 1 | Year 2 | Year 3 | Total |
|--|--------|--------|--------|-------|
| | | | | |

Suppose that you want to create a single range name called **AllBudget** which includes cells C6:F6 on worksheets **Year 1**, **Year 2** and **Year 3**, such that the following formula would work:

| | B | C | D |
|------------------|---|------|---|
| Total budget ==> | | 47.1 | |

To do this, follow these steps:

New Name [?] [X]

Name: AllBudget

Scope: Workbook

Comment:

Refers to: ='Year 3'!\$C\$6:\$F\$6

OK Cancel

a) On the **FORMULA** tab of the ribbon, choose **Define Name** to create a new range name and type in a name.

b) Click here to select a range of cells, and select the block of cells on the first worksheet (here **Year 1**):

| | A | B | C | D | E | F |
|---|---|---------------|--------------------------|-------|-----|-------|
| 1 | | | | | | |
| 2 | | | Quarterly Forecast Sales | | | |
| 3 | | | | | | |
| 4 | | | Quarters | | | |
| 5 | | | 1 | 2 | 3 | 4 |
| 6 | | Budget (£m) | 3.7 | 3.5 | 4.1 | 4.4 |
| 7 | | Actual (£m) | 2.5 | 2.9 | 4.3 | 3.9 |
| 8 | | Variance (£m) | (1.2) | (0.6) | 0.2 | (0.5) |





| | Year 1 | Year 2 | Year 3 | Total |
|--|--------|--------|--------|-------|
| | | | | |

c) Hold down the **Shift** key and click on the last worksheet for the range name, then press **OK** twice.

d) The result is a range name for a 3D block of cells!

| Name | Value | Refers To | Scope |
|-------------|-------|------------------------------|----------|
| AllBudget | (...) | =Year 1:Year 3!\$C\$6:\$F\$6 | Workbook |
| CashBalance | #REF! | =#REF!\$C\$7:\$F\$7 | Workbook |

WHAT WE DO

| |  |  |  |  | |
|-------------------------|---|---|---|---|---|
| | ONLINE TRAINING | MANCHESTER OR LONDON | AT YOUR OFFICE | BESPOKE CONSULTANCY | |
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| | VBA macros | ✓ | ✓ | ✓ | ✓ |
| | Office Scripts | ✓ | | ✓ | |
| | Microsoft Access | | | | ✓ |
| POWER PLATFORM | Power BI and DAX | ✓ | ✓ | ✓ | ✓ |
| | Power Apps | ✓ | | ✓ | |
| | Power Automate | ✓ | ✓ | ✓ | ✓ |
| SQL SERVER | Reporting Services | ✓ | ✓ | ✓ | ✓ |
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| | Integration Services | ✓ | ✓ | ✓ | ✓ |
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| | Python | ✓ | ✓ | ✓ | ✓ |



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