Information Technology Services

Guide to

Good Practice Guidelines for Spreadsheet Design

http://www.lse.ac.uk/itservices

Introduction

Audits of spreadsheets in UK financial institutions and other organisations regularly turn up a surprising -- and alarming -- level of errors. Research into this persistent problem has shown that the single most important factor is ignorance of the fundamental good practice guidelines which should be applied to spreadsheet design and construction. Outlined below are some of the most important of these guidelines.

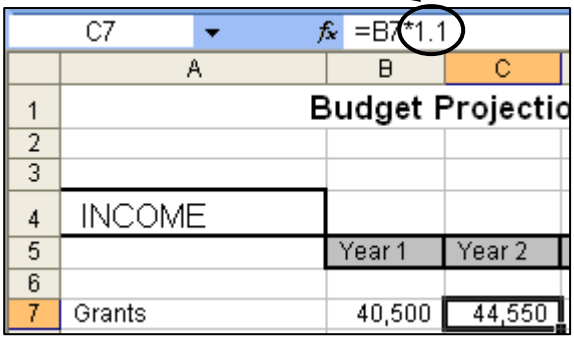
Good Practice Guidelines for Spreadsheet Design

1. **Never use a number in a formula; type the number into a cell and use the cell reference instead.**

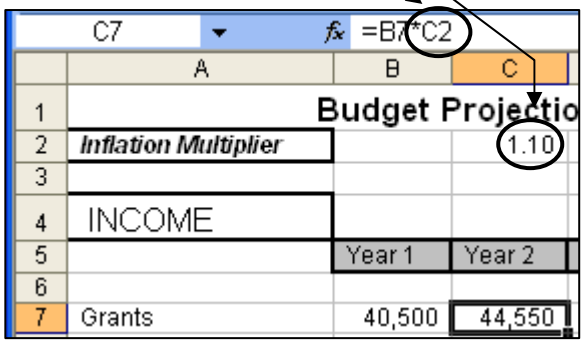
WHY IMPORTANT?

- Transparency: all numbers used in formulas are clearly visible on the sheet, even when printed, rather than hidden within the formulas themselves.
- Changes to numbers used in formulas are quicker, easier and visible to all.

BAD PRACTICE



GOOD PRACTICE



2. **Never *type* a cell reference into a formula. Instead, click on the cell to enter its cell reference in a formula.**

WHY IMPORTANT?

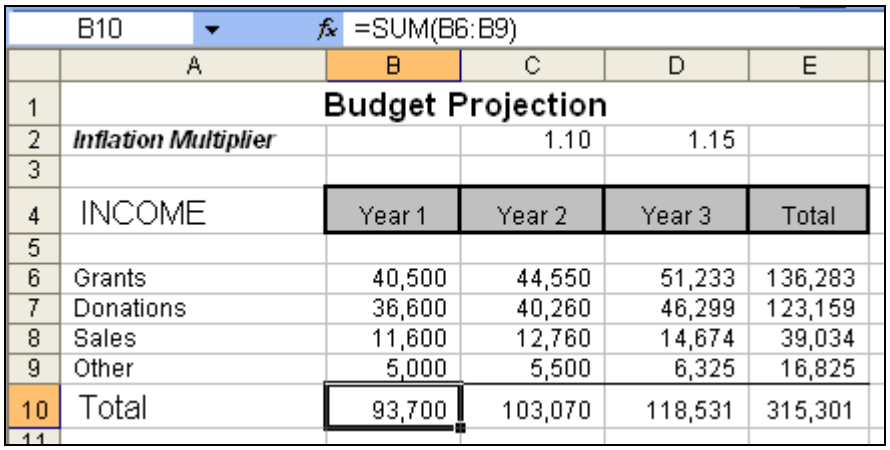
- Avoids typing errors which input the wrong cell reference. Clicking on the cell required better ensures that the correct cell reference is entered.

3. **Include a blank row and/or column in formulas.**

   a. Maintain a blank row or column between the cells containing figures used in a formula and the cell where the answer will appear.

   b. Always include these blank row/column cells in the formula.

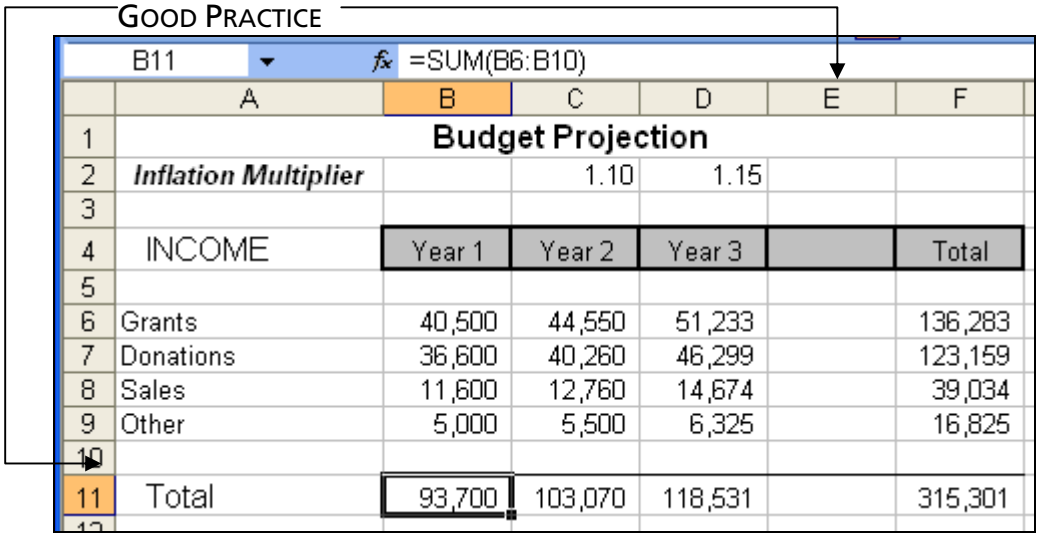
BAD PRACTICE



B10 =SUM(B6:B9)

	A	B	C	D	E
1	Budget Projection				
2	*Inflation Multiplier*		1.10	1.15	
3					
4	INCOME	Year 1	Year 2	Year 3	Total
5					
6	Grants	40,500	44,550	51,233	136,283
7	Donations	36,600	40,260	46,299	123,159
8	Sales	11,600	12,760	14,674	39,034
9	Other	5,000	5,500	6,325	16,825
10	Total	93,700	103,070	118,531	315,301

GOOD PRACTICE



B11 =SUM(B6:B10)

	A	B	C	D	E	F
1	Budget Projection					
2	*Inflation Multiplier*		1.10	1.15		
3						
4	INCOME	Year 1	Year 2	Year 3		Total
5						
6	Grants	40,500	44,550	51,233		136,283
7	Donations	36,600	40,260	46,299		123,159
8	Sales	11,600	12,760	14,674		39,034
9	Other	5,000	5,500	6,325		16,825
10						
11	Total	93,700	103,070	118,531		315,301

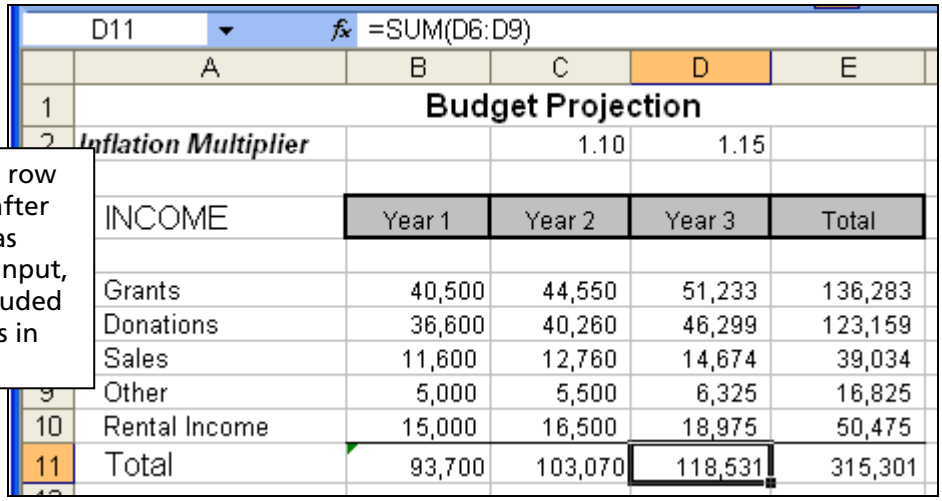
c. Insert any additional rows/columns between the columns/rows containing data and the blank column/row.

WHY IMPORTANT?

- By following this set of guidelines, you ensure that when additional rows or columns are inserted, the formulas will be adjusted automatically to include the new data.
- When these guidelines aren't observed, Excel formulas often ignore data inserted after the formulas have been input.

  Example: compare the Excel sheet on the top of the next page with the original file shown at the top of this page. After creating the original file, an additional row has been added to accommodate rental income. None of the figures in the new row have been added into the totals in the row below. The green triangle appearing in the upper left corner of cell B11 contains a warning that "the formula in this cell refers to a range that has additional numbers adjacent to it." However, if you are working to a tight deadline, it is easy to miss this warning. And there is not even a warning in cells C11-D11, which also have the same problem.

Numbers in row 10, added after the formulas have been input, are not included in the totals in row 11.



D11 =SUM(D6:D9)

	A	B	C	D	E
1	Budget Projection				
2	*Inflation Multiplier*		1.10	1.15	
3					
4	INCOME	Year 1	Year 2	Year 3	Total
5					
6	Grants	40,500	44,550	51,233	136,283
7	Donations	36,600	40,260	46,299	123,159
8	Sales	11,600	12,760	14,674	39,034
9	Other	5,000	5,500	6,325	16,825
10	Rental Income	15,000	16,500	18,975	50,475
11	Total	93,700	103,070	118,531	315,301

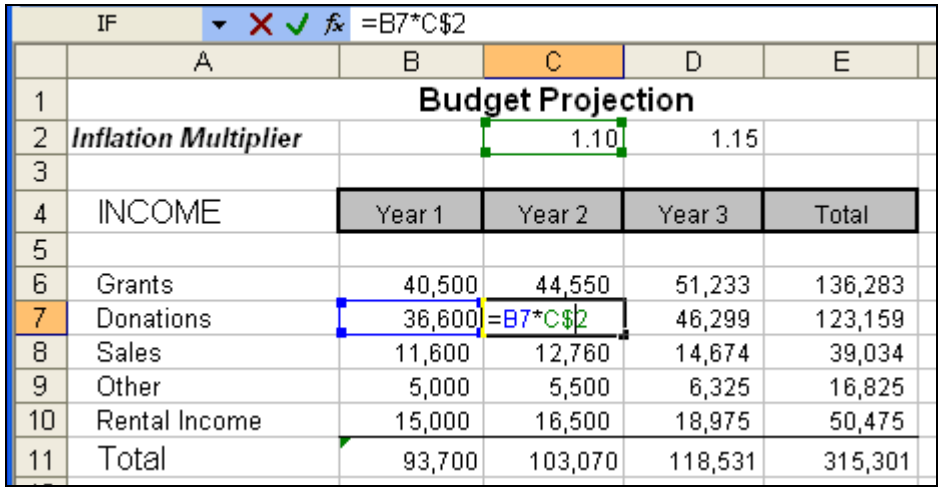
4. Formulas should be placed below and/or to the right of the cells referenced in the formula.

WHY IMPORTANT?

- Avoids errors in formulas, and generation of consequent Excel error messages.
- Transparency: makes all assumptions built into the formulas immediately obvious to everyone viewing the sheet (e.g. in the example above, the inflation rate is assumed to be 10% in year 2 and 15% in year 3).

5. Always spot check formulas when you copy them and whenever you insert or delete rows and columns above or to the left of them. This can be done by:

- Double-clicking on a cell containing a formula. Excel will display each cell reference in the formula with a different colour, and use that colour to outline the actual cell referred to.

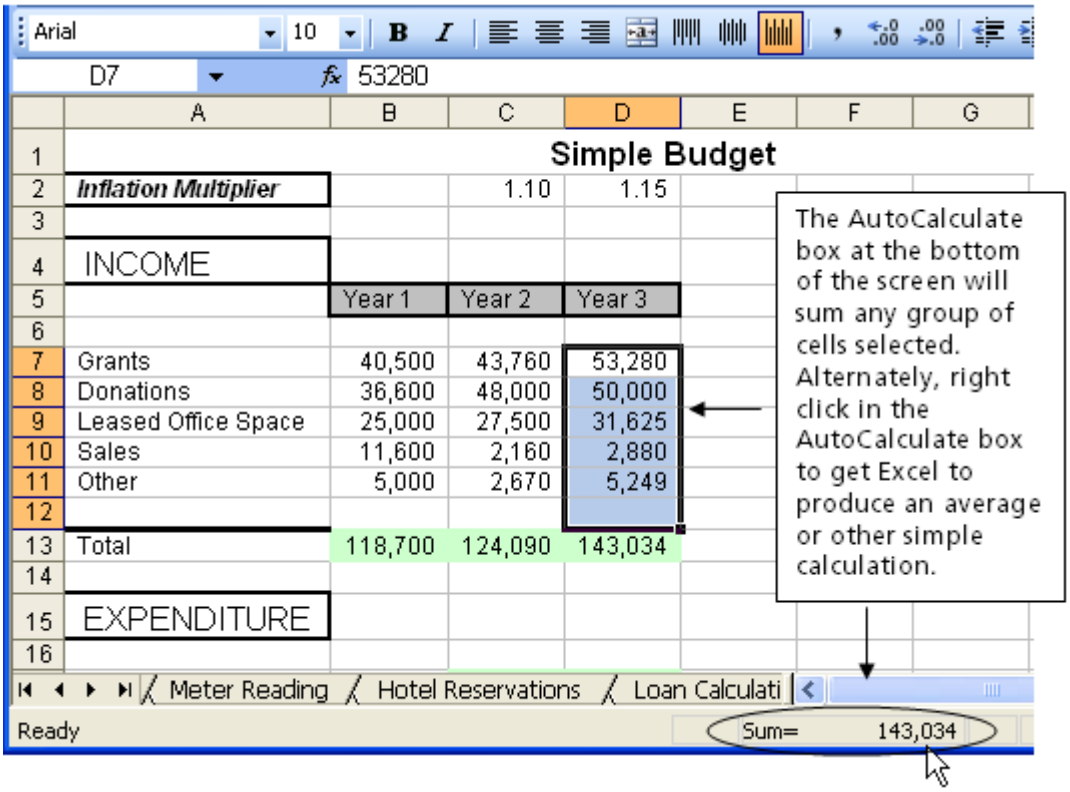


IF =B7*C$2

	A	B	C	D	E
1	Budget Projection				
2	*Inflation Multiplier*		1.10	1.15	
3					
4	INCOME	Year 1	Year 2	Year 3	Total
5					
6	Grants	40,500	44,550	51,233	136,283
7	Donations	36,600	=B7*C$2	46,299	123,159
8	Sales	11,600	12,760	14,674	39,034
9	Other	5,000	5,500	6,325	16,825
10	Rental Income	15,000	16,500	18,975	50,475
11	Total	93,700	103,070	118,531	315,301

- Checking that the cell references in randomly selected formulas have been adjusted correctly.

- Comparing answers provided in the AutoCalculate section of the Status bar with the calculated result shown on the worksheet (*see illustration below*).



WHY IMPORTANT?

- Although Excel has become 'smarter', formulas are not always updated to take into account changes made to areas of sheets that affect them.

6. Label all cells containing numbers or other data.

WHY IMPORTANT?

- Transparency: ensures that everyone who uses the sheet at any time will be able to understand all calculations and figures used.