

Spreadsheets: Dealing with that difficult spreadsheet



The small print

Prerequisites

Time in the workshop is precious – it is an opportunity for you to interact with the workshop leader and other participants through questions and discussions and to share your experiences and concerns. To make the most of this time we sometimes ask you to carry out learning activities ahead of the workshop so that everyone comes into the class with the same basic knowledge. We keep this prior learning to a minimum and often make use of online videos. Online videos provided through LinkedIn Learning can be accessed free of charge by University members anytime, anywhere, through a browser or app.

Your course booking will tell you if any prior learning activity is required. If you don't have an environment where you can do this learning, you can come along to one of our LinkedIn Learning sessions. These are a quiet space where you can work through videos or other workshop resources.

If you arrive for a workshop without having done the prior learning, the workshop leader may suggest that you come back on another session.

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About the workshop designer

Graham Addis started his first technology role in 1978 and has gathered decades of practical experience in industry. He has always been passionate about passing on his knowledge and undertook his first formal teaching position as a Customer Training Specialist for Intel back in 1984. Since that time his career has combined extensive real world experience with teaching and mentoring. In 2017 he joined the academic world at the University of Oxford and currently specialises in teaching spreadsheets, databases and programming.

Revision history

Version	Date	Author	Comments
3.0	January 2023	Graham Addis	Update to latest templates
2.2	June 2021	Graham Addis	Tidy up and rework
2.0	April 2020	Graham Addis	Convert to online format.
1.5	December 2019	Graham Addis	Rework course title
1.4	October 2019	Graham Addis	Update workbook references
1.3	August 2019	Duncan Young	Updates to small print
1.2	November 2016	Duncan Young	Adapted to new course design
1.1	October 2015	Steven Albury	Updates
1.0	January 2014	Steven Albury	Initial version

About this workshop

This session provides an introduction to effective tools and techniques for planning, creating and maintaining spreadsheets.

We will include pointers to other workshops and further resources that will help you go on later to analyse and organise your data.

What you will learn

You will learn how to find and solve existing errors as well as introducing procedures that prevent new errors arising. The session also explains how to evaluate and “tame” a spreadsheet that you inherit so that you can deploy it effectively.

What you need to know

The ideas and techniques covered in this workshop will apply to a range of tools. We will demonstrate using *Excel for Windows*, which is widely available. However, the concepts will be the same, whatever spreadsheet software you decide to use.

I will assume that you are reasonably confident in using the tool you have chosen to use to create your spreadsheets. With your chosen tool, you will need to be able to:

- open and navigate around a workbook using the mouse and scrollbars, save a workbook
- add data to cells, and select and amend such data
- create a formula that calculates using values found in other cells
- Navigate the commands and menus, using Help as necessary

If you need to review these activities, LinkedIn Learning is a great place to get guidance. There is an activity with relevant videos in the IT Learning Portfolio: visit skills.it.ox.ac.uk/it-learning-portfolio and search for “Spreadsheets: Dealing with that difficult spreadsheet (Activity)”.

The resources you need

Sample documents that you can use to experiment with will be made available, but you may like to bring along your own.

Unless you have been told otherwise, in classroom workshops there will be a computer available for you to use with *Excel for Windows* installed.

You can use your own computer with your preferred app installed if you want to – just bear in mind that I am not an expert in every app (although I am sure that between us we will be able to sort out most problems!).

Learning Objectives

This workshop has the following learning objectives:

Learning Objective One:.....**Inheriting a Spreadsheet**

Learning Objective Two:.....**Tidying up the data**

Learning Objective Three:.....**Designing a new spreadsheet**

Learning Objective One: Inheriting a Spreadsheet

This section explains how to evaluate and “tame” a spreadsheet that you inherit so that you can deploy it effectively.

We will look at a recommended general approach and then consider specific tactics that make use of Excel’s many and various capabilities to understand the inherited file as well as identifying and eliminating errors.

Analyse the workbook **Cars Ex1.xlsx**.

- Look for hidden / filtered /protected items
- Identify the formulas. Do they make sense?
- Is there a summary sheet? Does it work properly?
- Look for metadata (print preview, etc)
- Use arrows to map data flow



Learning Objective Two: Tidying up the data

When the inherited file has been understood and any errors discovered and rectified you can turn your attention to making sure that the data is organised effectively and formatted consistently.

Identify and fix the data untidiness in the workbook **Cars Ex2.xls**.

- Identify and fix the format untidiness in the “Cars” sheet of the “Cars Ex 2” workbook (the CELL function may help)
- Identify duplicate lines in the same sheet
- *If you have time, use the “Fuzzy” tab of “Cars Ex 2” to look also for very similar entries in the two tables on that sheet*

Optional: In a blank workbook, write formulae to extract the first and last names from a cell containing someone’s whole name (including any middle names). You may find the following functions useful:

LEFT, RIGHT, LEN, FIND, SUBSTITUTE



Learning Objective Three: Designing a new spreadsheet

The experience of dealing with an inherited spreadsheet leaves you in a good position to form a plan for designing your own new spreadsheets. You need to consider both your general approach and the specific Excel features that will help you to provide a reliable, resilient and effective spreadsheet.

- You have been asked to create a spreadsheet to record student results on a course that has ten students and three exams. Each student takes all the exams and is marked out of 100. Four people may work on this sheet.
- Each student and each mark must be visible as well as a total for each student and an average mark for all students. Student details include name and student ID number.
- Design a sheet that has the minimum risk for errors in data entry – what would be a good process to adopt when showing others to use the sheet and what are the risks



Further information

Getting extra help

The IT Learning Centre offers bookable clinics where you can get pre- or post-course advice. Contact us using courses@it.ox.ac.uk.

Study Videos from LinkedIn Learning

On our website, you will find our collection of self-service courses and resources. This includes providing LinkedIn Learning video-based courses free to all members of the University. Visit skills.it.ox.ac.uk/linkedin-learning and sign in with your Single Sign-On (SSO) credentials.

Some courses recommend pre- and/or post-course activities to support your learning. You can watch the online videos anywhere, anytime, and even download them onto a tablet or smartphone for off-line viewing.

About the IT Learning Portfolio online

Many of the resources used in the IT Learning Centre courses and workshops are made available as Open Educational Resources (OER) via our Portfolio website at skills.it.ox.ac.uk/it-learning-portfolio.

Find the pre-course activity for this course in the IT Learning Portfolio: visit skills.it.ox.ac.uk/it-learning-portfolio and search for “Spreadsheets: Dealing with that difficult spreadsheet (Activity)”.

About the IT Learning Centre

The IT Learning Centre delivers over 100 IT-related teacher-led courses, which are provided in our teaching rooms and online, and we give you access to thousands of on-line self-service courses through LinkedIn Learning.

Our team of teachers have backgrounds in academia, research, business and education and are supported by other experts from around the University and beyond.

Our courses are open to all members of the University at a small charge. Where resources allow, we can deliver private courses to departments and colleges, which can be more cost-effective than signing up individually. We can also customize courses to suit your needs.

Our fully equipped suite of seven teaching and training rooms are usually available for hire for your own events and courses.

For more information, contact us at courses@it.ox.ac.uk.

About IT Customer Services

The IT Learning Centre is part of the Customer Services Group. The group provides the main user support services for the department, assisting all staff and students within the University as well as retired staff and other users of University IT services. It supports all the services offered by IT Services plus general IT support queries from any user, working in collaboration with local IT support units.

The Customer Services Group also offers a data back-up service; an online shop; and a computer maintenance scheme. Customer Services is further responsible for desktop computing services – for staff and in public/shared areas – throughout UAS and the Bodleian Libraries.

Spreadsheets: Dealing with that difficult spreadsheet

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Resources for your learning

Activities for you to practice today

In the coursebook

Work at your own pace!

Be selective



Videos with today's topics

[LinkedIn Learning](#)

Follow-up work

Continue with exercises after the session

Bookable Course Clinics later

Session plan – 3 main topics

Inheriting a spreadsheet

Tidy data for effective analysis

‘Inoculate’ spreadsheets against problems

Inheriting a Spreadsheet (1)

Take a copy!

GOAL: To understand what the spreadsheet does and how it does it

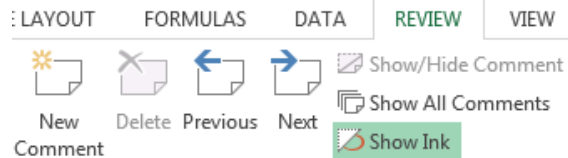
Look for documentation and cell comments

Ask as many questions as you can before starting

Mapping Data Flow

Start with the output and work your way back

- Contains most of the calculations / references
- Add cell comments as you make discoveries
- Consider adding and apply names
- Consider colour coding inputs and outputs



Go To, Special, Formulas

Ctrl + ` (backquote)

Total Price	MILEAGE	REGIS
£22,331.60		
£26,543.60		
£22,928.00		
£26,560.80		
£27,578.40	3,270	

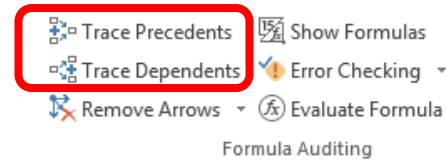
Comments
Duncan Young:
This total looks wrong

MAKE	MODEL	Base Price	Extras	Total Price
FORD	TRANSIT DIESEL 260 2.0 TD SWB 100 PS Panel Van	£11,161.00	£8.00	£22,331.60
FORD	GALAXY ESTATE 2.3 LX 5dr	£12,499.00	£1,288.00	£26,543.60
FORD	TRANSIT DIESEL 280 2.0 TD SWB 85 PS Panel Van	£11,161.00	£505.00	£22,928.00
FORD	MONDEO DIESEL SALOON 2.0TDCi 115 Ghia 4dr	£12,999.00	£469.00	£26,560.80
FORD	FOCUS C-MAX DIESEL ESTATE 1.6 TDCi Ghia 5dr	£12,999.00	£1,317.00	£27,578.40
FORD	KA HATCHBACK 1.6i Sportka SE 3dr	£8,999.00	£886.00	£19,061.20
FORD	FOCUS HATCHBACK 2.0 ST170 3dr	£12,299.00	£219.00	£24,860.80
FORD	FOCUS HATCHBACK 1.6 Ghia 5dr	£8,399.00	£784.00	£17,738.80
FORD	MONDEO DIESEL ESTATE 2.0TDCi 130 LX 5dr [6]	£11,599.00	£1,114.00	£24,534.80
FORD	MONDEO DIESEL ESTATE 2.0TDCi 130 LX 5dr [6]	£11,599.00	£1,488.00	£24,983.60
FORD	MONDEO DIESEL HATCHBACK 2.0TDCi 130 LX 5dr Auto	£11,499.00	£1,368.00	£24,639.60
FORD	MONDEO HATCHBACK 2.0 LX 5dr Auto	£8,999.00	£668.00	£16,799.60

Mapping Data Flow – Formula auditing

Identify the formulas

- Trace the formulas



DISTANCE (km)	Distance (Miles)
190.5	118.37
201	124.90
155	96.31
163.5	101.59
155.5	96.62
194	120.55
234.5	145.71
161	100.04
170	105.63
161.5	100.35
187.5	116.51
185.5	115.26
197.5	122.72
177	109.98
222	137.94
237.5	147.58
124.5	77.36
145.5	90.41
208.5	129.56
54	33.55
137.5	85.44
3526	2190.95

DISTANCE (km)	Distance (Miles)	Rank
190.5	118.37	8
201	124.90	5
155	96.31	17
163.5	101.59	13
155.5	96.62	16
194	120.55	7
234.5	145.71	2
161	100.04	15
170	105.63	12
161.5	100.35	14
187.5	116.51	9
185.5	115.26	10
197.5	122.72	6
177	109.98	11
222	137.94	3
237.5	147.58	1
124.5	77.36	20
145.5	90.41	18
208.5	129.56	4
54	33.55	21
137.5	85.44	19
3526	2190.95	

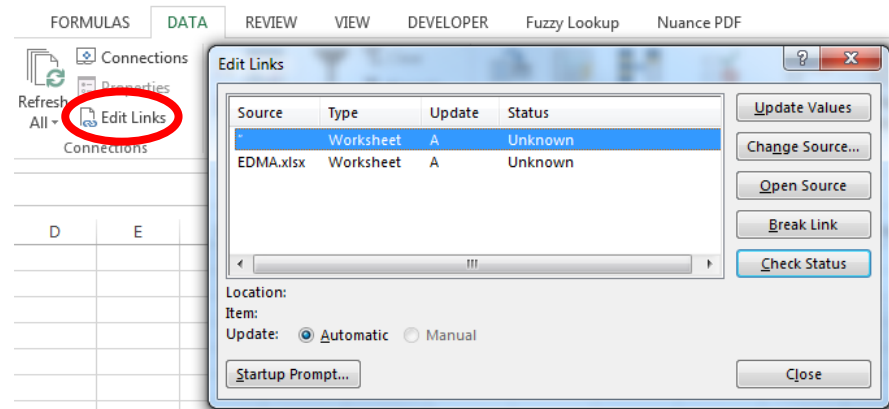
Inheriting a Spreadsheet - Approach

Look for metadata

- Advanced Properties
- Header / Footer

Look for references to other workbooks

- Ctrl + F, “[“ to find all external workbook refs
- Data->Connections->Edit Links



Inspect Workbook / Document Inspector

Check for Issues

Inspect Workbook

Before publishing this file, be aware that it contains:

- Document properties, printer path, author's name and absolute path
- Content that people with disabilities find difficult to read

Inspect Document
Check the workbook for hidden properties or personal information.

Check Accessibility
Check the workbook for content that people with disabilities might find difficult to read.

Check Compatibility
Check for features not supported by earlier versions of Excel.

Document Inspector

Review the inspection results.

- Comments and Annotations** Remove All
The following items were found:
* Comments
- Document Properties and Personal Information** Remove All
The following document information was found:
* Document properties
* Author
* Absolute path to the workbook
- Data Model**
No embedded data found in the Data Model.
- Content Apps**
We did not find any Content apps for Office.
- Task Pane Apps**
We did not find any Task Pane apps for Office.
- PivotTables, PivotCharts, Cube Formulas, Slicers, and Timelines**
No PivotTables, PivotCharts, cube formulas, slicers, or timelines were found.

Note: Some changes cannot be undone.

Reinspect Close

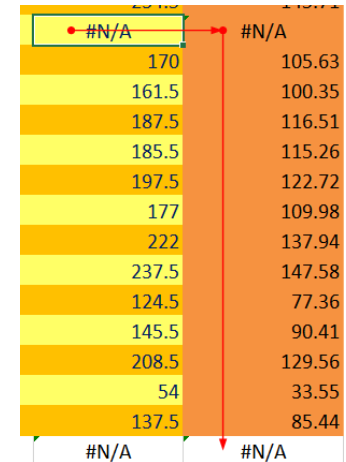
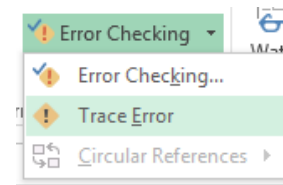
Inheriting a Spreadsheet - Tools

Watch out for manual recalculation [F9]

- Can be set on complex spreadsheets

Identify errors

- Trace errors

A screenshot of an Excel spreadsheet. The top row shows a cell with a red error indicator and the text '#N/A'. A red arrow points from this cell down to the cell below it. The rest of the spreadsheet contains numerical data in two columns. The bottom row shows the text '#N/A' under both columns.

#N/A	#N/A
170	105.63
161.5	100.35
187.5	116.51
185.5	115.26
197.5	122.72
177	109.98
222	137.94
237.5	147.58
124.5	77.36
145.5	90.41
208.5	129.56
54	33.55
137.5	85.44
#N/A	#N/A

Do the formula results look correct?

- Check the logic

Different Error Types

“Typos” in data entry

Copy/paste errors

- Wrong data; wrong target; inappropriate operation...

Incorrect formula logic

- Process or spreadsheet operation misapplied

Incorrect choice of function

- COUNT or COUNTA?

Omission

- Hardest errors to discover

Practical Session 1

Learning Objective	Workbook	Worksheet
One	Cars Ex 1.xlsx	Summary, Cars

Tidying Data

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Tidy Data for Effective Analysis

Data Cleansing

- The process of tidying up before analysis

Look for duplicates

Number formatting issues

- Including formatting inconsistency

Text extracting and concatenating

Data integrity as application grows

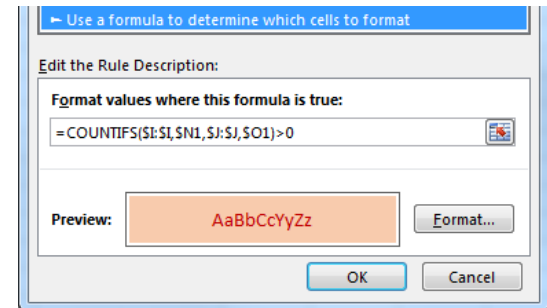
Look for Duplicates

An item might be added...
more than once to same list

to each of two combined lists

Duplicate Names?		
Adam	Radwick	3
Zoe	Domas	1
Adam	Domas	2
Zoe	Radwick	1
Adam	Radwick	3
Karl	Odin	1
Zoe	Johnson	1
Adam	Domas	2
Adam	Radwick	=COUNTIFS(\$A:\$A,A10,\$B:\$B,B10)

		Names in Both Lists?	
Adam	Radwick	Zoe	Gleghorn
Zoe	Domas	Jimmy	Radwick
Adam	Domas	Adam	Radwick
Zoe	Radwick	Zoe	Adam
Zoe	Kendal	Zoe	Domas
Adam	Heybrock	Adam	Kendal
Zoe	Heybrock	Adam	Heybrock



Microsoft Fuzzy Lookup Add-In

First Name	Surname	First Name	Surname
Adam	Radwick	Adam	Radwick
Zoe	Domas	Z	Domas
Adam	Domas	AR	Domas
Zoe	Radwick	Zoe	Maiden
Phil	Kendal	Philip	Kendal
Adam	Beraud	Adam	Béraud
Zoe van der	Berg	Zoe	van der Berg

First Name	Surname	First Name	Surname	Similarity
Adam	Radwick	Adam	Radwick	1.0000
Zoe	Domas	Z	Domas	0.4500
Adam	Domas	Adam	Radwick	0.4500
Zoe	Radwick	Adam	Radwick	0.6333
Phil	Kendal	Philip	Kendal	0.8791
Adam	Beraud	Adam	Béraud	1.0000
Zoe van der	Berg	Zoe	van der Berg	1.0000

Fuzzy Lookup

Left Table: Table1
Right Table: Table2

Left Columns: First Name, Surname
Right Columns: First Name, Surname

Match Columns:
Left Columns: First Name, Surname
Right Columns: First Name, Surname
Configuration: Default

Output Columns:
 Table1.First Name
 Table1.Surname
 Table2.First Name
 Table2.Surname
 FuzzyLookup.Similarity
 FuzzyLookup.SimilarityXml

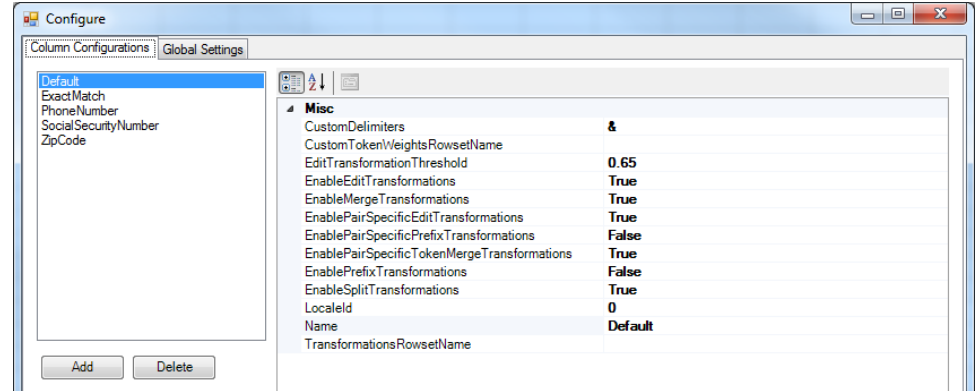
Number of Matches: 1
Similarity Threshold:

Microsoft Fuzzy Lookup Add-In: Notes

Not an exact science

May be best to start with a low value to gauge its responses

Can be configured



Number Formatting Issues

CELL format "C2" v "P0"

£6,299.00	£22.00
£10,399.00	£1,086.00
759900%	94300%

CELL format "C2" v "G"

£6,100.00	£642.00
8699	£221.00
£5,599.00	£545.00

23/09/2003	D1	=CELL("format",A50)
N/A	G	
11/28/03	D4	

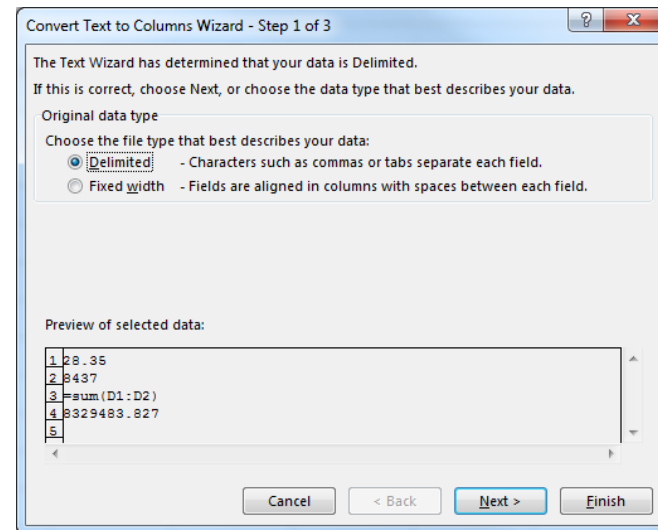
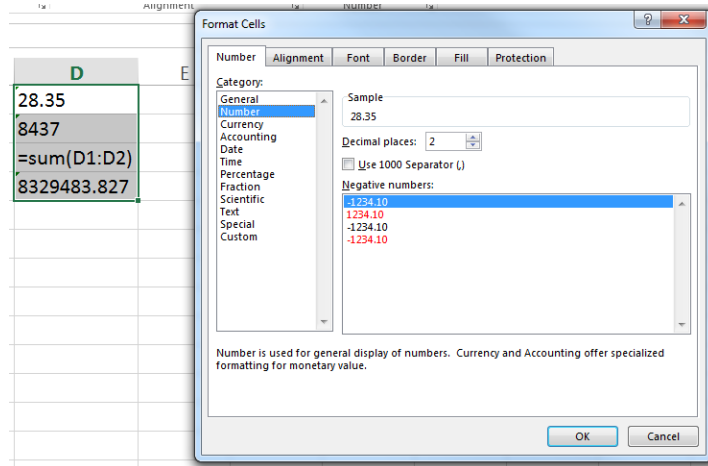
08/04/03	04/08/03	04/08/2003
03/21/03	=TEXT(A56,"dd/mm/yy")	=DATE(100+RIGHT(B56,2),MID(B56,4,2),LEFT(B56,2))
09/01/01	01/09/01	01/09/2001

29/05/2003
15/01/2002
31/12/2003
30.9.2004
30.9.2004
30.9.2004
13/03/2002
08/05/2003

£25,632.00	7,50	N/A
£9,906.00	27,890	20/09/2001
#N/A	33,840	10/10/2001

Working with Text: Text to Columns tool

Convert numbers in Text format to Number



Working with Text

	A	B	C
1	Hayden	Abbington	=A1&" "&B1

	A	B	C
1	Hayden	Abbington	Hayden Abbington

A
Hayden Abbington
Bradley Alkins
James H. Asner
Maureen Beachman
Udita Bhaskar
Ronnie Brearley
Maxine de Caronna
Mick Carthew
Seetha Chandrasekhar
Ed Cracknell
Mair Dawber

Convert Text to Columns Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

- Tab
- Semicolon
- Comma
- Space
- Other:

Treat consecutive delimiters as one

Text qualifier:

Data preview

Hayden	Abbington	
Bradley	Alkins	
James	H.	Asner
Maureen	Beachman	
Udita	Bhaskar	

Cancel < Back Next > Finish

Working with Text - functions

LEFT, RIGHT

MID, LEN

FIND, SEARCH

REPLACE, SUBSTITUTE

```
=RIGHT(A2,LEN(A2)-FIND(" ",SUBSTITUTE(A2," ","*",LEN(A2)-LEN(SUBSTITUTE(A2," ",""))))))
```

Data integrity as application grows

Spreadsheets receive 6/7 iterations on average

- Natural point where data “outgrows” them

Users love direct edit & immediate feedback of spreadsheets (‘live’ programming), but...

Database table and link structure allows for more control over data integrity

- Avoids “copy/paste” errors
- Makes it harder for links and flow to go wrong
- But, less flexible and...
- Takes time to set up

Practical Session 2

Learning Objective	Workbook	Worksheet
Two	Cars Ex 2.xlsx	Cars
Two (Optional)	Cars Ex 2.xlsx	Fuzzy
Two (Optional)	Blank Workbook	Blank Worksheet

Planning and Design

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Designing new spreadsheets (1)

Clear idea of purpose and intended users

- Saves a lot of time later

Adopt a lightweight design process

- Employ use cases to clarify development needs
- https://en.wikipedia.org/wiki/Use_case

Designing new spreadsheets (2)

Work out the maths before you start

Agree and document formulas

'Translate' them into Excel formulas

Refer back to documents to check accuracy

'Inoculate' Your Spreadsheet

Use Watch window to monitor distant formulas

Use Data Validation and formula protection

- Also consider hiding sheets and calculations

Use IFERROR...

- Graceful error handling

Watch Window

For cells you want to track working in a large spreadsheet

The image shows an Excel spreadsheet with columns F through N and rows 1 through 3. The data is as follows:

F	G	H	I	J	K	L	M	N
		Price	VAT	Total				
	Steel panel	53.75	10.75	64.5				

An 'Add Watch' dialog box is open, showing the formula `=Sheet1!J2` in the input field. The 'Add' button is highlighted.

A 'Watch Window' pane is open, showing a table with the following data:

Book	Sheet	Name	Cell	Value	Formula
EDMC.xlsx	Sheet1	Steel_Panel_Price	J2	64.5	=H2+I2

Data Validation

An Excel spreadsheet with columns A through F and rows 1 through 11. Column A contains a list of names: Hayden, Bradley, James, Maureen, Udita, and Ronnie. Column C is labeled 'Researcher'. A data validation dialog box is open over cell D1, showing the 'Settings' tab. The 'Allow' dropdown is set to 'List', and the 'Source' is '=SAS1:SAS6'. The 'Ignore blank' and 'In-cell dropdown' checkboxes are checked.

A dropdown menu for the 'Researcher' field. The menu is open, showing a list of names: Hayden, Bradley, James, Maureen, Udita, and Ronnie. The text 'Researcher' is visible in the header of the dropdown.

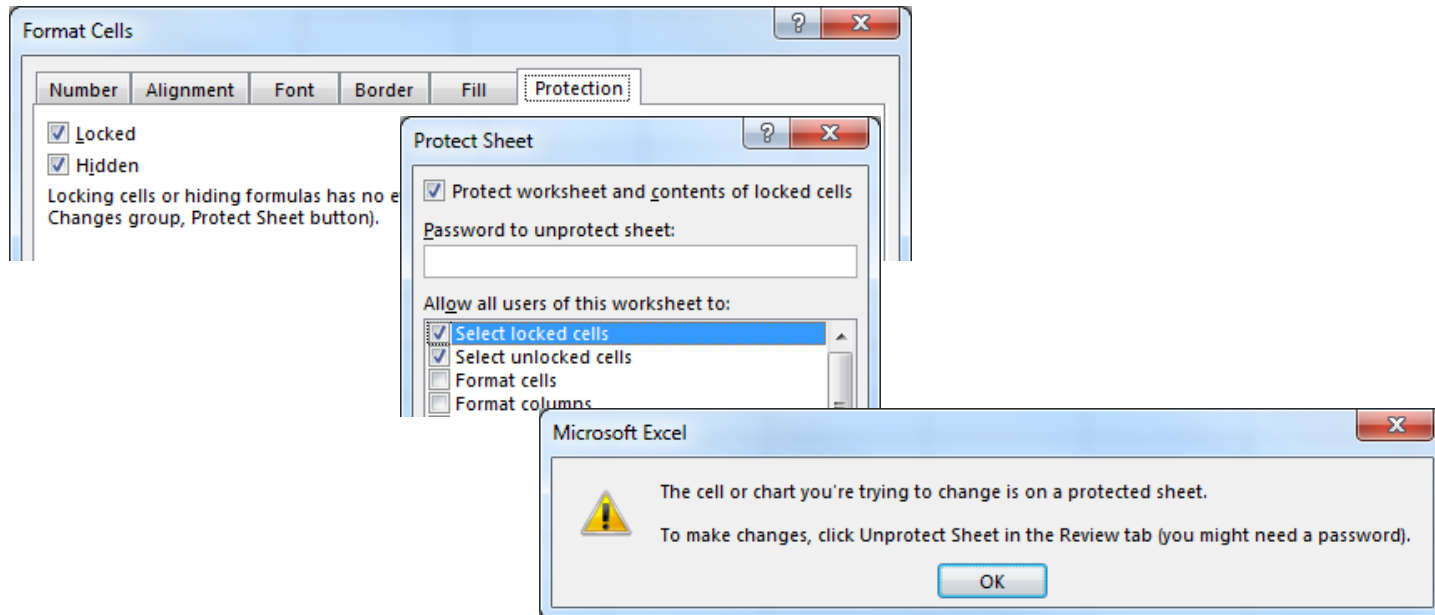
The 'Researcher' dropdown menu is shown with 'Phil' selected. A yellow tooltip message is displayed next to the dropdown, stating: 'Researcher Select the researcher for this project.'

The 'Data Validation' dialog box is shown with the 'Error Alert' tab selected. The 'Show error alert after invalid data is entered' checkbox is checked. The 'Style' is set to 'Stop'. The 'Title' is 'Invalid Selection'. The 'Error message' text reads: 'You can only choose a researcher from the list. Please select again.'

An 'Invalid Selection' error dialog box is displayed. It features a red 'X' icon and the text: 'You can only choose a researcher from the list. Please select again.' The dialog has 'Retry', 'Cancel', and 'Help' buttons.

Formula Protection

Everything locked by default



Formula Protection - Options

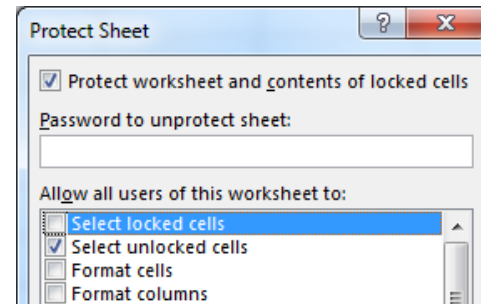
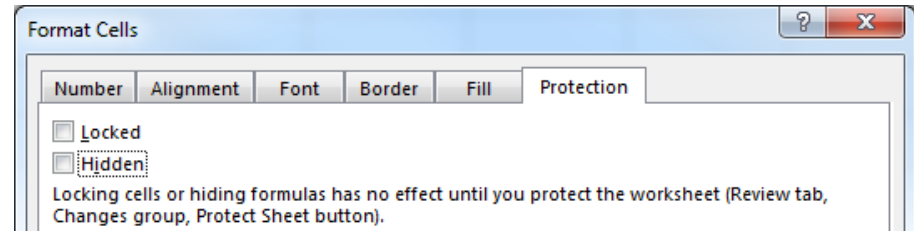
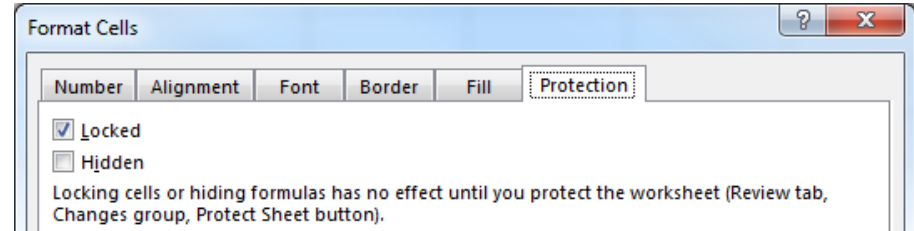
Formula cells

- Leave locked

Data entry cells

- Unlock

Don't allow selection of locked cells



IFERROR

Graceful recovery from error or omission

M	N	O	P	Q	R
Item	Number	Versions	Items per Type		
Red	34	3	=IFERROR(N2/O2,"Please enter no. of		
Blue	63	1	versions")		
Purple	55	2	27.50		
Green	37	0	Please enter no. of versions		
Yellow	21	2	10.50		

Tables

Tables are a more structured way of managing data in a sheet

	A	B	C	D	E	F	G	H
1	MAKE	MODEL	Base Price	Extras	VAT @ 20%	Total Price	MILEAGE	REGISTERED
2	SKODA	OCTAVIA HATCHBACK 1.6 Ambiente 5dr	£6,499.00	£11.00	£1,302.00	£7,812.00	28,270	18/07/2002
3	SEAT	TOLEDO SALOON 1.8 20V SE 4dr	£7,199.00	£336.00	£1,507.00	£9,042.00	14,000	30/06/2003
4	FORD	FOCUS HATCHBACK 1.6 Zetec 5dr	£7,699.00	£903.00	£1,720.40	£10,322.40	16,750	10/06/2003
5	FIAT	STILO HATCHBACK 1.6 16V Dynamic 5dr	£5,799.00	£166.00	£1,193.00	£7,158.00	17,100	31/01/2003
6	VOLKSWAGEN	BEETLE HATCHBACK 2.0 3dr	£9,899.00	£225.00	£2,024.80	£12,148.80	14,550	21/01/2003
7	FIAT	STILO HATCHBACK 1.2 16V Active 5dr [AC]	£6,199.00	£642.00	£1,368.20	£8,209.20	12,968	04/12/2003

	A	B	C	D	E	F	G	H
1	MAKE	MODEL	Base Price	Extras	VAT @ 20%	Total Price	MILEAGE	REGISTERED
2	SKODA	OCTAVIA HATCHBACK 1.6 Ambiente 5dr	£6,499.00	£11.00	£1,302.00	£7,812.00	28,270	18/07/2002
3	SEAT	TOLEDO SALOON 1.8 20V SE 4dr	£7,199.00	£336.00	£1,507.00	£9,042.00	14,000	30/06/2003
4	FORD	FOCUS HATCHBACK 1.6 Zetec 5dr	£7,699.00	£903.00	£1,720.40	£10,322.40	16,750	10/06/2003
5	FIAT	STILO HATCHBACK 1.6 16V Dynamic 5dr	£5,799.00	£166.00	£1,193.00	£7,158.00	17,100	31/01/2003
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Tables offer several benefits...

Tables - Benefits

Sorting and filtering – automatically added

Can always see table header – helps avoid entering data into wrong column

Easy to add new data – auto extends table

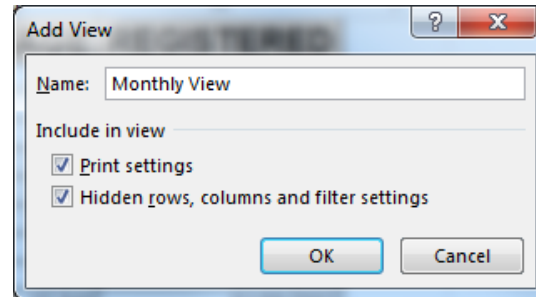
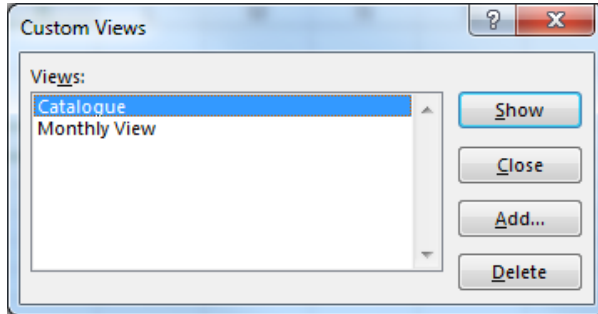
- Tab from end of last row

Formulas adjust to take account of new rows and columns

Auto-complete formulas – avoid accidentally not copying a formula correctly

Custom Views

Set up multiple screen and print layouts



'Inoculating' Your Spreadsheet

Keep empty row/column before totals

- New data is more likely to be included

Keep formulas below and to the right of data that they use

- Makes flow “cleaner” and more obvious

Click rather than type when making references

- Avoids typing errors

Use names to make formulas more readable

- Avoids 'magic numbers'

Consider 'How To' guides on the sheets

Designing new spreadsheets

Ongoing Process

- Spreadsheets often start small
- Building the spreadsheet reveals new goals
- Test at each stage (in teams where possible)
- Individual inspection finds only half of all errors!

Practical Session 3

Learning Objective	Workbook	Worksheet
Three	Blank Workbook	Blank Worksheet

Find the resources for this workshop in our IT Learning Portfolio

Download the files (and more) from the IT Learning Portfolio at

skills.it.ox.ac.uk/it-learning-portfolio



The screenshot shows the IT Learning Centre website. The header includes the logo and navigation tabs for Courses, Teaching Rooms, Services, Events, News, and About Us. The main heading is "IT Learning Portfolio". Below this, there is a welcome message and a list of resources. The resources are displayed in a table with columns for Audience, Category, Software, and Resource. Each resource entry includes a brief description and a right-pointing arrow icon.

Audience	Category	Software	Resource	Action
			3D modelling: Kick-off AND Blender - Up and running (Activity)	➔
			AR Effects: Animating texts and graphics (Activity)	➔
			Apps for education (Activity)	➔
			AR/VR: Augmented Reality for mobile devices (Activity)	➔
			AR/VR: Unity - a practical introduction (Activity)	➔
			AR/VR: Virtual Reality for desktop or mobile (Activity)	➔
			Audacity - Recording your voice (Toolkit Activity)	➔
			Audic: Recording the spoken word (Activity)	➔
			Beginners IT: Making the most of single sign on (Course pack)	➔
			C++ - A comprehensive introduction (Course pack)	➔
			Corpus - Why would I use a corpus (Toolkit Activity)	➔
			Create an online presence with WordPress (Activity)	➔
			Data analysis: ATLAS.ti (Activity)	➔
			Data analysis: Introduction to working with statistics (Course pack)	➔
			Databases: Building a database (Activity)	➔
			Databases: Building a database (Course pack)	➔
			Databases: Concepts for project managers (Activity)	➔
			Databases: Concepts for project managers (Course pack)	➔
			Databases: Concepts of database design (Activity)	➔
			Databases: Concepts of database design (Course pack)	➔

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