



BUSINESS ADVICE

EXCEL CUSTOM DEVELOPMENT

Video



Play video version

See the benefits of Excel for custom applications

Excel provides lots of features for developers to use

In the hands of a skilled professional, Excel is a powerful development tool. This article and associated video demonstrate those capabilities.

As a developer of custom applications, you have a huge range of sophisticated features to make use of, most of which would be impractical to emulate.

Many of those features you take for granted in Excel such as Freeze Panes. And there are so many features, including: filters, sorting, conditional formatting, charts, PivotTables, images, drawings, extensive formatting capabilities.

In addition, through macros, Excel has seamless integration with databases, email programs and most of the Windows environment.

Excel provides a ubiquitous, standardised environment

Excel is ubiquitous. Though there are minor differences among current versions, there is little or nothing a developer must do to enable an application to work in any version (including Mac). New versions appear only once every few years. Compare that to the environment of browser-based applications. There are various browsers with regular releases. The lack of standardisation is a major problem for developers in such an environment.

Excel programs the world's computers more than the rest put together

Excel expertise is also ubiquitous. For every programmer in the world, there are 1000 Excel users and even if those users average only 1 hour per week developing applications, that dwarfs the manpower of programmers. The world's computers are programmed more by Excel than by everything else put together.

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Let's now see some of Excel's capabilities.

Use dialog boxes to provide clear, reliable data input

See more data, more clearly at a glance

To get user input, rather than require input directly onto a sheet, provide a dialog box. The benefits are:

(A) More data can be seen at a glance than can be viewed of a wide spreadsheet row. Furthermore, the data can be arranged more clearly. Consider the example below. The user cannot edit data directly on the sheet, but can select a row and click the button that is on the sheet or alternatively click one in the custom ribbon.

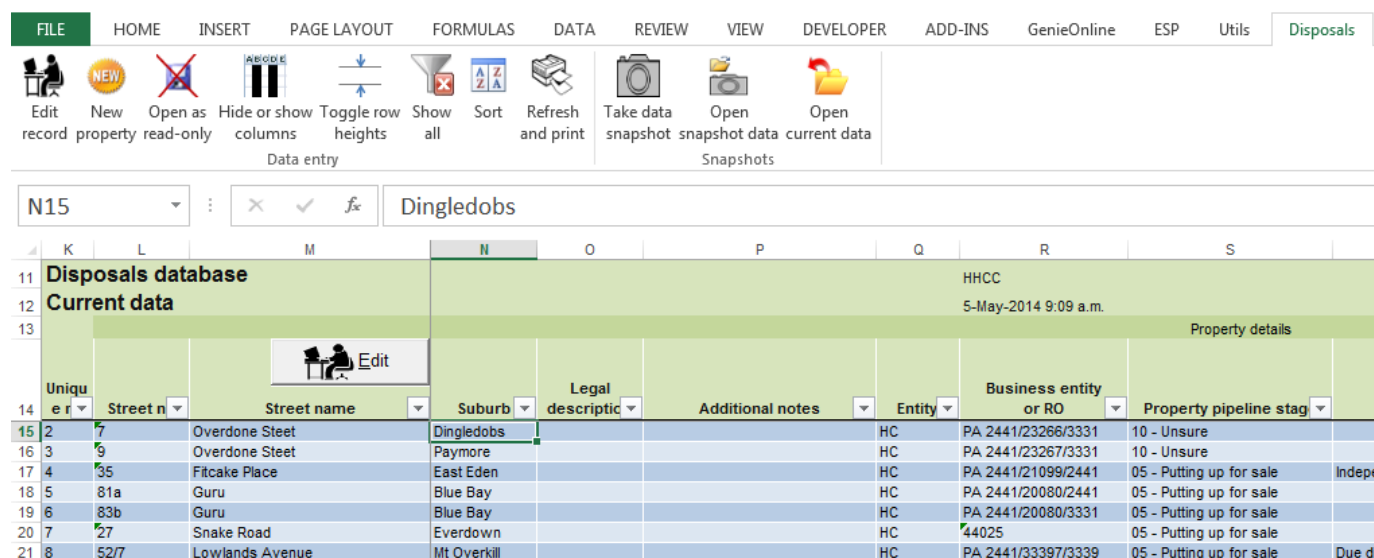


Figure 1 - Edit data by selecting a cell in the row and clicking a button to display the data in a dialog box

A dialog box appears. The dialog box has multiple pages, which arrange the data into logical groups. Each page shows the data clearly.

The screenshot shows a 'Disposal property' dialog box with the following data:

2: 7 Overdone Steet

Property | Rationalisation | Internal | Political 1 | Political 2 | Development assessment | Valuation | Disposal workstream | Sale

Unique: 2 | Team: Disposals

Street no: 7 | Team member: Frank Findlay

Street name: Overdone Steet

Suburb: Dingledobs

Entity / descriptor: HC | Legal description:

Business entity or RO: PA 2441/23266/3331

Pipeline stage: 10 - Unsure | Additional notes:

Sub-stage:

No of rental objects: 1 | Reason for removal from database:

Council ward: Fatchance

Local board: Sowhat

Use: Residential land

Land area (SqM): 675

Version: 02-Apr-2014B

New | Delete | Save | Next | Previous | Save & close | Close

Figure 2 - A dialog box arranges the data clearly, with more visible at glance than is possible across a row of a sheet

If you want to see multiple records in multiple dialog boxes, that possible too as shown below. You can move quickly from one dialog box to another and drag each one to the desired position on screen.

Figure 3 – Multiple records displayed in multiple dialog boxes

Avoid corruption that can occur with on-sheet entry

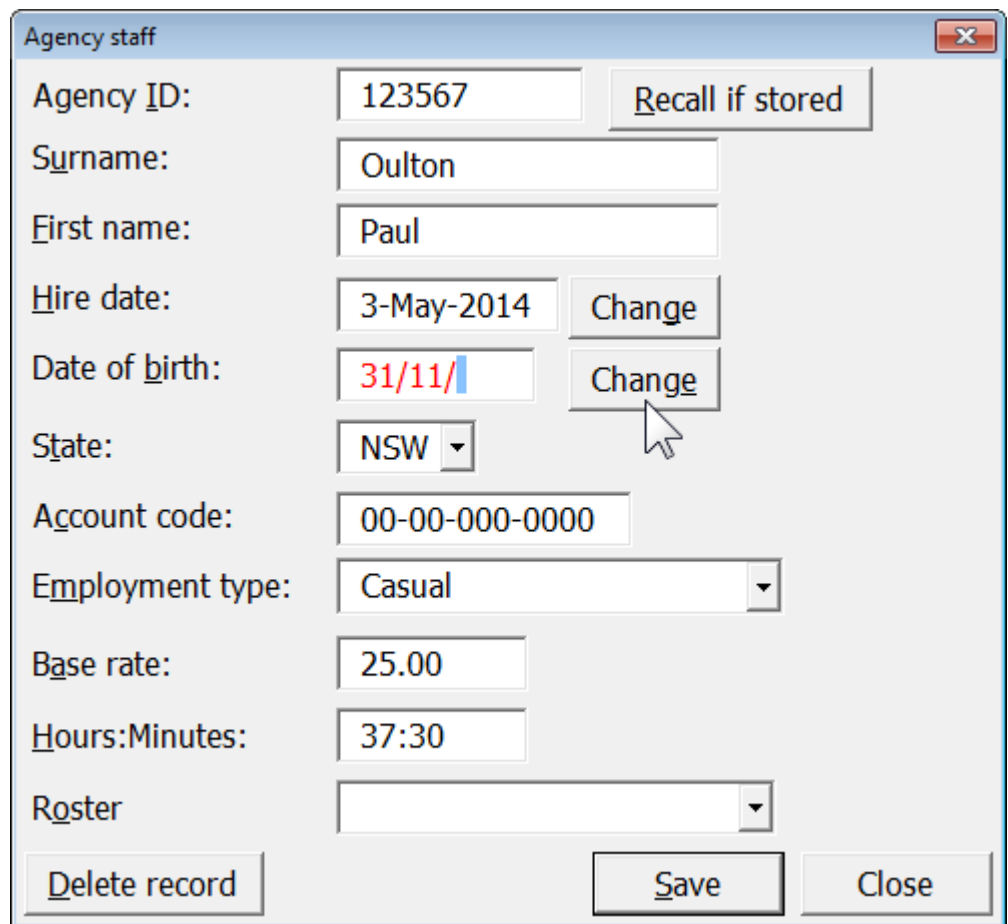
(B) The user can corrupt the sheet by dragging cells or cutting and pasting. Though you can protect cells on a sheet, it is hard to prevent cells being cut and pasted. Though there are certain steps you can take to mitigate corruption, the risk is still likely to remain.

Ensure correct entries and nothing missed

(C) The user cannot input invalid values or overlook entries. In a dialog box, you can tightly control what the user can enter and run checks before saving the data. You sometimes have the situation where, if the user chooses one option, one set of additional options appears, but if the user makes a different choice, a different set of options appears. That is hard to implement on a sheet.

In the dialog box below, the user can enter only numeric digits into the Agency ID box. Numeric digits cannot be entered into the Surname or First name boxes.

For a date such as that for the Date of birth, the user can type into the box, but if the date is not valid, the text appears in red as shown below. The user cannot save until all entries are valid.



Agency staff

Agency ID: 123567 Recall if stored

Surname: Oulton

First name: Paul

Hire date: 3-May-2014 Change

Date of birth: 31/11/ Change

State: NSW

Account code: 00-00-000-0000

Employment type: Casual

Base rate: 25.00

Hours:Minutes: 37:30

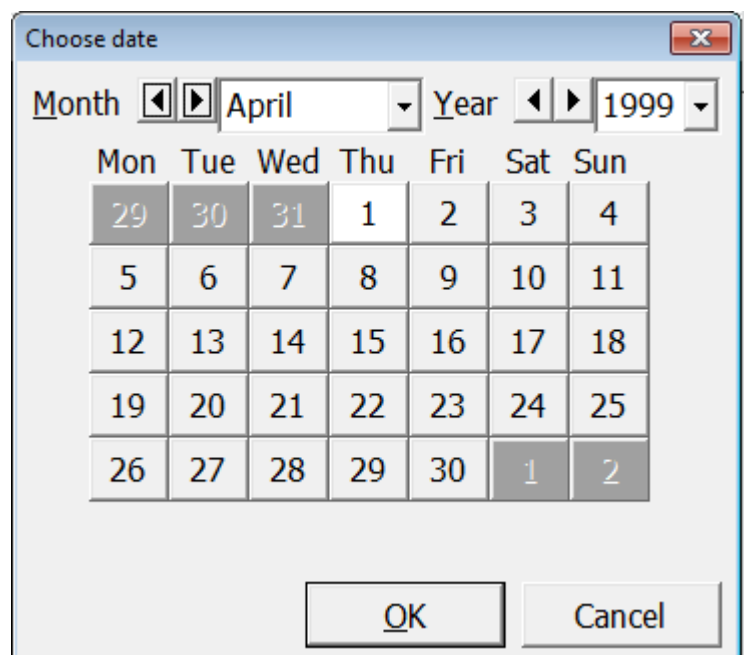
Roster

Delete record Save Close

Figure 4 - Example of a dialog box that ensures entry of a valid date

Instead of entering a date directly into a box, the user can select the date from a calendar. The user clicks the Change button to display a calendar as shown below.

The user can select a date and press Enter or double-click. The date then enters into the *Date of birth* box.



Choose date

Month April Year 1999

Mon	Tue	Wed	Thu	Fri	Sat	Sun
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2

OK Cancel

Figure 5 – Choose a date from a calendar

Minimum and maximum dates have been set. The maximum date is 8 May 1999 and, so, as shown right, the calendar blocks off later dates so they cannot be selected.

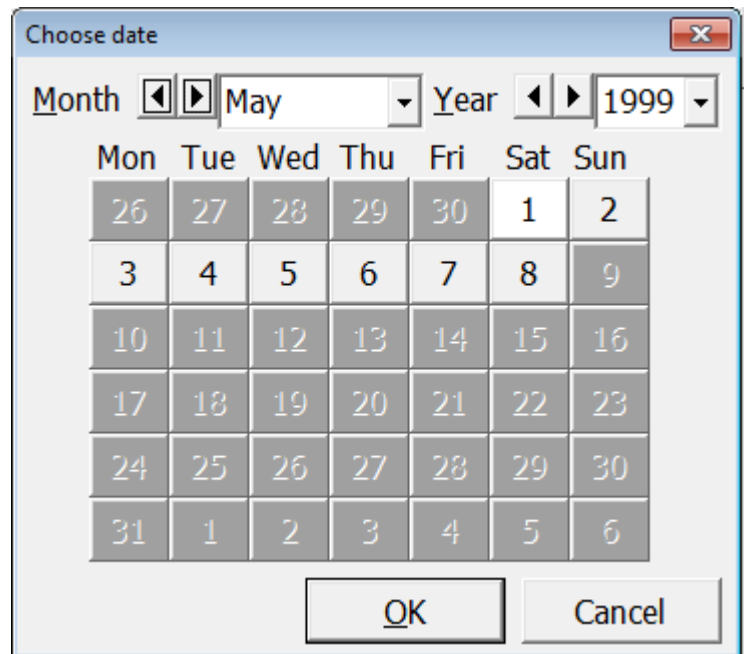


Figure 6 – Have a calendar block off invalid dates.

In the *Account code* box, the user can type only numbers, but in figure 4, note the format of the account code. Digits can only be typed where there are zeros; the user cannot type into any other position. If the user types, for example, 01234567890, the box then shows 01-23-456-7890.

In the *Base rate* box, the user can type only numeric digits, a decimal point and a minus sign. The box allows the entry of only one minus sign and one decimal point. Furthermore, if there is a minus sign, it must be entered as the first character.

The *Hours:Minutes* box has similar restrictions except that it allows a colon, but not a decimal point or minus sign.

Provide capabilities such as colour selection that cannot be achieved in cells ...

(D) The use of a dialog box provides other capabilities. For example, you can provide colours to select, which you cannot do in a cell. The screenshot below has what is called toggle buttons for selecting colours. The application applies those colours to a sheet set up as a calendar.

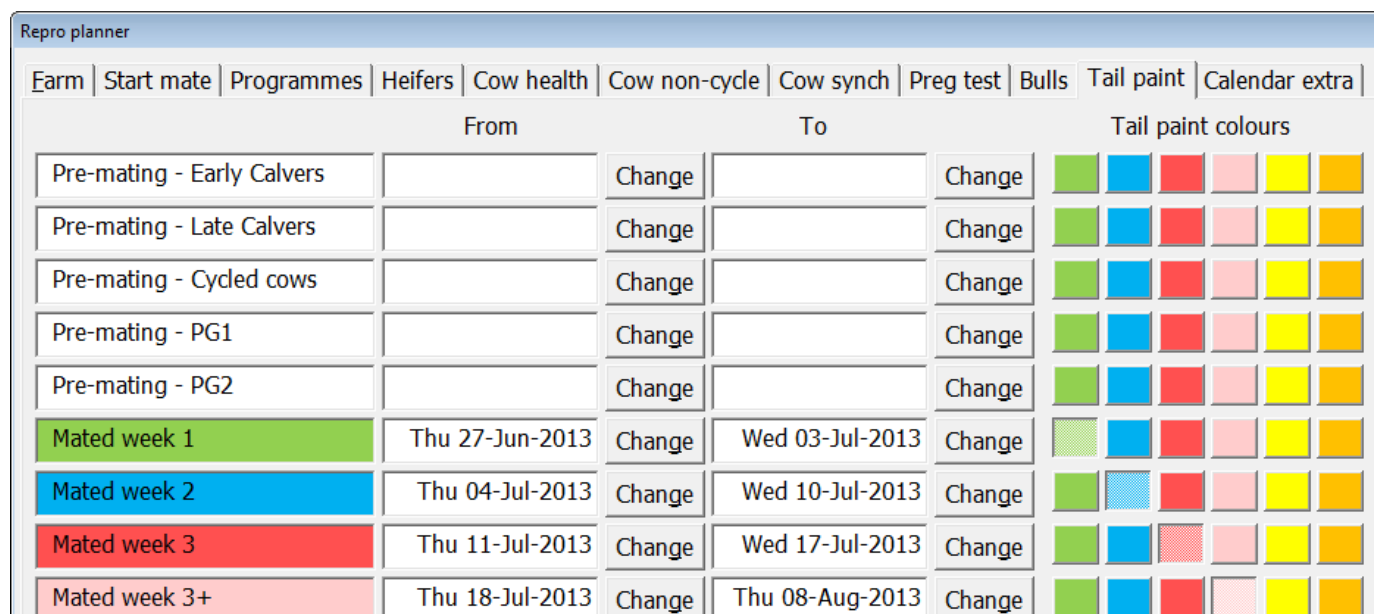


Figure 7 – Select colours

... or select and display images

You can also display images. In the example below, the user can load photo files into the application.

The 'Inpatient' window displays the following information for patient Ann Boleyn:

- Room:** 1W (Buttons: Move bed, Discharge patient)
- Name:** Ann Boleyn
- Status:** INPT
- DOB:** 23-Oct-1986 (Change)
- Age:** 27 (Under 23: No)
- Admission date:** 23-Aug-2013 (Change) **Days:** 259
- Diagnosis:** Needs sedation
- Upcoming O/L:** a
- Discharge date:** 24-Jul-1999 (Change)
- Leave status:** N (Special diet: Yes, Phone calls: Yes)
- Risk:** H (ITQ: Yes, Snoring:)
- MHNIP/ACT:**
- Doctor:** IP-Dr Iva Payne
- Nurse AM:** AGENCY (Nurse PM: AGENCY)
- Find photo file:** (Button)
- Comments:** Can lose her head sometimes.
- Version:** 12-Dec-2013A
- Buttons:** Next, Previous, OK, Cancel

Figure 8 – Display and load photos

Similarly, in the application below, the user can load scanned certificate images. After you load an image, the application retrieves the image from an SQL Server database. A certificate can be viewed full resolution on sheet and printed.

The 'Training certificates - Hamilton Yoke' window displays the following information:

- Certificates:**
 - Excel - Masterful manipulation & PivotTables
 - Excel - Automation & Robustness
 - Excel - Essential spreadsheets for accountants
 - Excel - More essential spreadsheets for account
- Certificate image:**
 - AbleOwl XL Limited**
 - Certificate of Completion**
 - Awarded to:** Yoke Hamilton
 - For attending the following courses:** Masterful manipulation & PivotTables
 - 12 March 2012 Wellington**
 - Paul Oulton, Managing Director**
- Buttons:** Delete, View on sheet, Add, Load from file, Clear, Close

Figure 9 – Scanned images loaded from file, stored in an SQL Server database and displayed. The user can place the full resolution image on sheet to view and print

Save data automatically on OK; there's no need to remember to save

(E) If the application data is in an external database such as Access or SQL Server, as soon as the user clicks OK in a dialog box, the application saves the data to the database. There is no need for the user to remember to save the workbook; there is no data in the workbook to save.

Create the reports you want

Excel has an enormous number of features to create all kinds of reports. From the dialog box of figure 7, the user can create a PDF calendar with the colours selected applied to the date ranges entered. The application also copies into the calendar, at the relevant dates, images of products selected by the user. See the product image at Thu 27-Jun below.

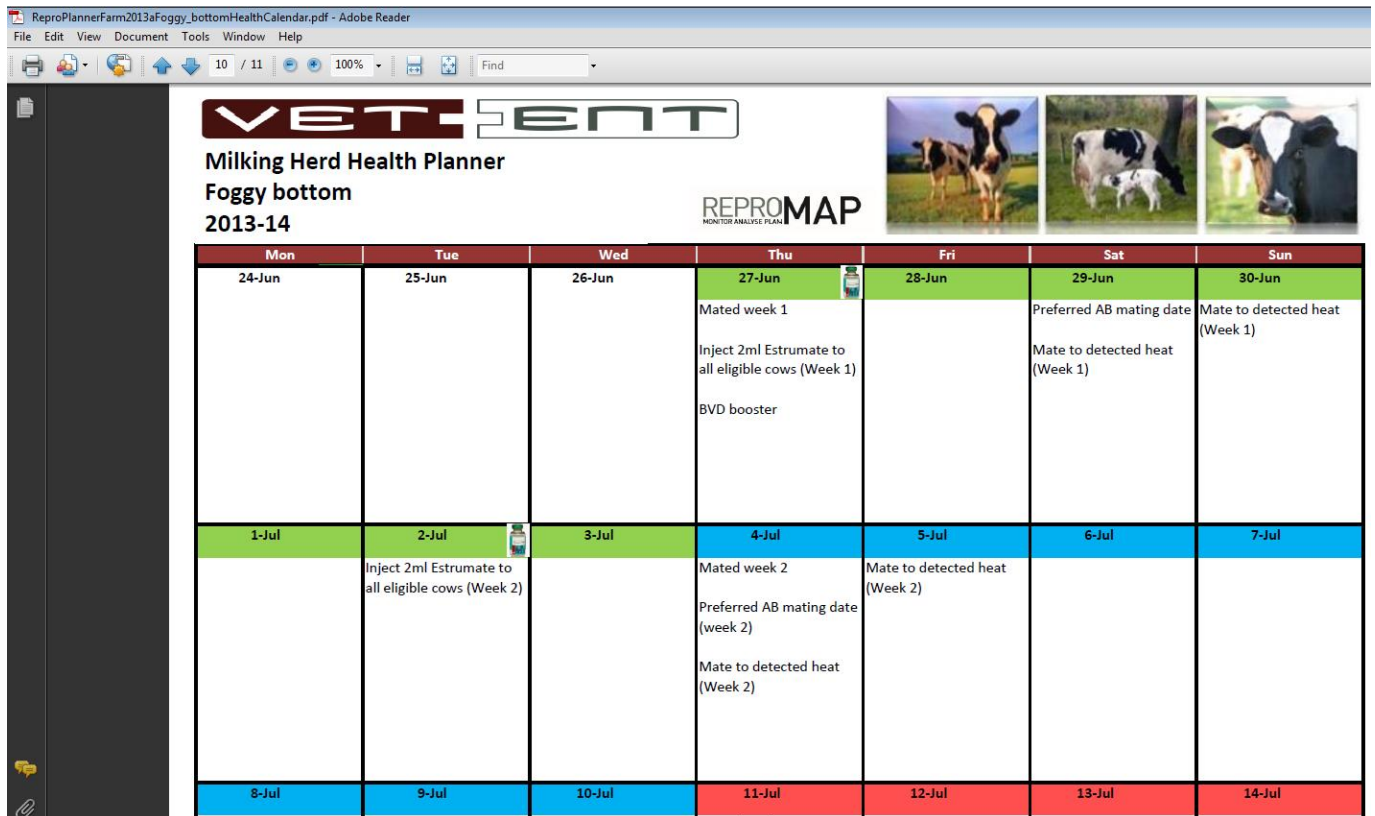


Figure 10 – A PDF calendar with colouring applied and product images put into place

Creating such reports would be difficult without Excel

The application also places a legend of images at the bottom of the PDF as shown below in figure 11. Achieving that with anything other than Excel would be difficult.

Furthermore, familiarity with Excel allows users to maintain their applications

Furthermore, the user can paste images of new products into a table on sheet. As users have a familiarity with Excel, they are well able to do that. The ability to allow users to maintain their own applications is another great advantage of Excel.

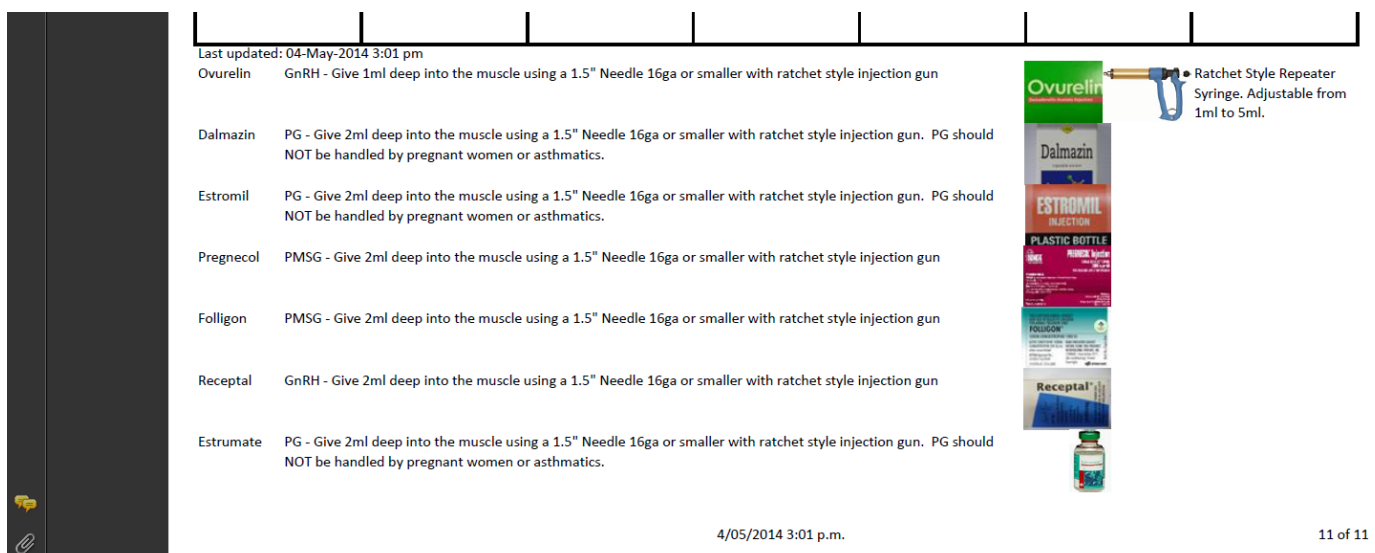


Figure 11 – Legend of images in PDF of products included in calendar. All easy work for Excel

Create multi-user database applications

All of the data is in a back-end database with none stored on Excel sheets

You can create multi-user applications with Excel as the front-end. There is no data stored in Excel sheets. Instead, all data is in a database such as Access or SQL Server. Figure 12 illustrates the point. The user can view data on a sheet, but to edit a record, the user must open a dialog box. When the user clicks OK, the application stores the data from the dialog box to the database and to the Excel sheet.

Such Excel database applications run very quickly for two main reasons:

(A) There aren't lots of what's called software layers between Excel and the database. Such layers inevitably slow performance.

(B) Only the bare data needs to be transferred between the database and Excel. Such data is usually a relatively small number of bytes. As Excel has the whole program installed on the PC, no other download is needed.

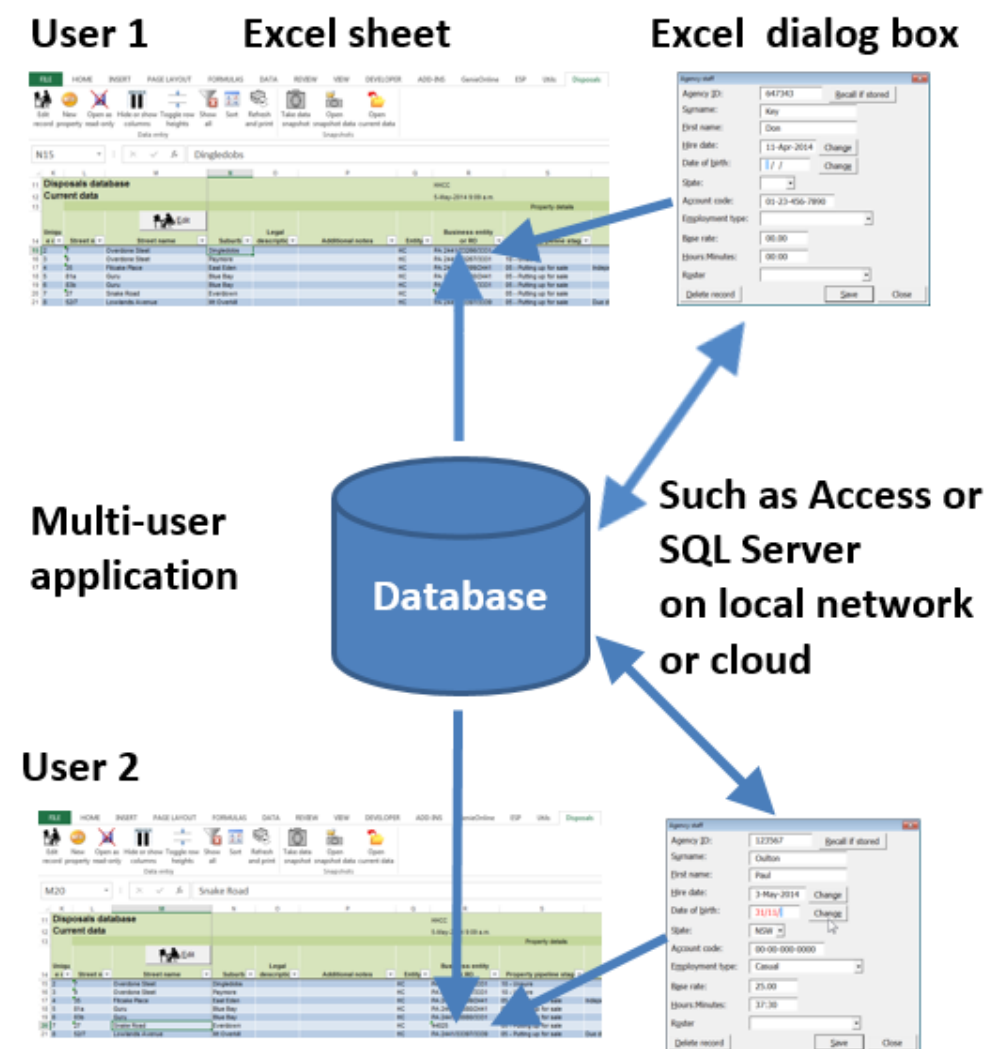


Figure 12 – A multi-user application in which there is no data stored in Excel sheets. Instead all data stores into a database such as Access or SQL Server.

If two users open the same record and both have write permission, the second user's record opens as read-only. The dialog box below indicates that with the words READ-ONLY and the pink background. So, that user can view the data but not update it.

Disposal property *** READ-ONLY ***

2: 7 Overdone Street

Property | Rationalisation | Internal | Political 1 | Political 2 | Development assessment | Valuation | Disposal workstream | Sale

Offer to market date: 16-May-2014 [Change](#)

Non-approved forecast settlement date: Q1 Jul - Sep '14

Sales strategy: Short link: [Browse](#) [No](#) [-](#)

Added value analysis: Short link: [Browse](#) [No](#) [-](#)

Real estate agent: Bashful and Bungly

DAR: Short link: [Browse](#) [No](#) [-](#)

\\hdf.com\shared\CCO\hccc\Acquisitions and Disposals\Disposals\Completed Sales 2013
 \\Balderdash St, 7, York (Batch 1)\2013 09 20

DAR date: 20-Sep-2013 [Change](#) Traffic light: ☐ Red ☐ Yellow ☒ Green ☐ No colour

Disposal comment: Negotiations started in January after the decision of postpone the project until the start of the next year.

Version: 02-Apr-2014B [New](#) [Delete](#) [Save](#) [v Next](#) [^ Previous](#) [Save & close](#) [Close](#)

Figure 13 – If a record is open with write access by another user, the next person to open the record gets read-only access, which the words READ-ONLY and the pink background indicate

Use Excel's ability to connect with everything

Excel can automatically send emails, update calendars and import and export data almost anywhere

If there is one program that every other program has connections to, it is Excel. For example, you can have Excel send out emails or update calendars automatically. Excel can extract data from the web. Via macros, Excel can import from almost any source. It can also export data to whatever needs the data.

Via SharePoint you can release dynamic Excel reports for viewing in browsers

You can place Excel files in a SharePoint folder and display selected sheets, which can also be viewed in web browsers and mobile devices such as iPhones and iPads. Certain functionality such as cell input and recalculation, filters, PivotTables and Slicers makes those reports dynamic in those browser environments.

Make use of Excel's features in custom applications

The developer can incorporate powerful features into an application with little work

Without too much work, developers of custom Excel applications can quickly incorporate powerful features that Excel provides such as filters, sorting, conditional formatting, charts, PivotTables, images, drawings and extensive formatting capabilities.

One common feature we at AbleOwl include in custom applications is report drill-down: if a reader wants a further breakdown of a value in a report, the person selects the cell and presses a shortcut. Figure 14 below shows a cell in a report. Figure 15 shows the source sheet of that value and a filter applied to show the breakdown items.

	K	L	M	N	O	P	Q	R	S	T	
11	Income statement	LawElbo									
12	Group consolidated	Last update 05-May-2014 01:56 PM									
13	AU\$000's	Actual	Forecast	Fin yr '15				Fin yr '16			
14		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	C
15	Income										
16	Project	16	288	288	288	288	288	288	288	288	
17	Product	132	1,156	1,759	1,724	6,471	10,075	11,395	9,174	6,497	6,
18	Licence fees	578	1,124	1,023	1,547	1,547	1,023	634	389	634	
19	Royalties	0	0	0	0	0	0	0	0	0	
20											
21	Total Income	726	2,569	3,070	3,559	8,306	11,386	12,317	9,851	7,419	7,
22											
23	Cost of goods sold										
24	Cost of product sales	40	249	428	445	1,737	2,618	3,110	2,580	1,925	1,
25	Project costs	0	0	0	0	0	0	0	0	0	
26	License costs	0	0	0	0	0	0	0	0	0	
27											
28	Total cost of goods sold	40	249	428	445	1,737	2,618	3,110	2,580	1,925	1,
29											
30	Expenses										
31	General expenses										
32	General expenses	671	765	533	484	407	461	405	421	414	
33	Outsourced project costs	35	0	0	2,200	2,200	0	0	0	0	
34	IP expenses	81	193	193	200	200	200	200	208	208	
35	Marketing expenses	21	62	116	119	119	119	119	168	168	
36	Travel expenses	57	104	112	116	123	129	148	137	168	
37	Employee expenses										
38	Employee expenses	946	2,593	2,426	2,822	2,581	2,922	2,586	2,995	2,651	2,
39	Contractors	88	216	0	0	0	0	0	0	0	
40											
41	Total expenses	1,808	3,022	3,370	5,041	5,620	3,821	3,458	3,028	3,608	4

Figure 14 – Report with cell selected to drill down upon

	K	L	M	N	O	P	Q	R	S	T	U	V	W
31	Database	LawElbo											
32		5-May-2014 2:38 p.m.											
33	AUS												
34	Description	DetailCode	SubCode	MainCo	Dept	Opening balance	Apr-1	May-1	Jun-1	Jul-1	Aug-1	Sep-1	
599	Public relations	6_6020	MarketingExp	Cost	AU Operations	5,500	5,500	5,500	5,500	5,500	5,500	5,500	
600	Trade shows	TradeShows	MarketingExp	Cost	AU Operations	0	0	0	0	0	0	0	
601	Entertainment	6_6040	MarketingExp	Cost	AU Operations	0	0	0	0	0	0	0	
602	Advertising	6_6050	MarketingExp	Cost	AU Operations	0	0	0	0	0	0	0	
603	Promotional expenses	6_6060	MarketingExp	Cost	AU Operations	0	0	0	0	0	0	0	
750	Public relations	6_6020	MarketingExp	Cost	US Detroit	6,111	6,111	6,111	6,111	6,111	6,111	6,111	
751	Trade shows	6_1800	MarketingExp	Cost	US Detroit	0	0	0	0	0	0	0	
752	Entertainment	6_6040	MarketingExp	Cost	US Detroit	0	0	0	0	0	0	0	
753	Advertising	6_6050	MarketingExp	Cost	US Detroit	0	0	0	0	0	0	0	
754	Promotional expenses	6_6060	MarketingExp	Cost	US Detroit	0	0	0	0	0	0	0	
794	Public relations	6_6020	MarketingExp	Cost	DE Munich	0	0	8,462	8,462	8,462	8,462	8,462	
795	Trade shows	TradeShows	MarketingExp	Cost	DE Munich	0	0	0	0	0	0	0	
796	Entertainment	6_6040	MarketingExp	Cost	DE Munich	0	0	1,692	1,692	1,692	1,692	1,692	
797	Advertising	6_6050	MarketingExp	Cost	DE Munich	0	0	8,462	8,462	8,462	8,462	8,462	
798	Promotional expenses	6_6060	MarketingExp	Cost	DE Munich	0	0	8,462	8,462	8,462	8,462	8,462	

Figure 15 – Drill-down of report cell value. Filter applied and cells selected. The status bar (not shown) sum value of 116,064 (units) corresponds to the report cell value of 116 (thousands)

There are so many features that most people are barely aware of

While most people are familiar with the Excel features mentioned in the first paragraph of this section, Excel has a vast number of other features that few seem to be fully aware of. To mention one, there are What-if tables. The example below uses the feature to run a model multiple times for different sales units and prices. The feature is not a new one.

	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
11	Debt sensitivity to product price and unit sales increases										LawElbo			
12											Press F9 to recalculate			
13	AU\$000's qtr end		Fin yr '15 ->				Fin yr '16 ->				5-May-2014 2:47 p.m.			
	Unit sales	Unit sales												
	increase	price												
14	%	%		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Max debt	
15														
16	0%	0%	1	761	340	(1,252)	(160)	1,971	4,239	5,260	6,369	6,520	(1,252)	
17	0%	10%	2	802	461	(1,052)	334	2,923	5,709	7,146	8,551	8,997	(1,052)	
18	0%	20%	3	844	583	(853)	827	3,874	7,178	9,031	10,732	11,473	(853)	
19	0%	30%	4	885	704	(654)	1,321	4,825	8,647	10,917	12,913	13,950	(654)	
20	5%	0%	5	774	377	(1,194)	(1)	2,291	4,727	5,876	7,068	7,302	(1,194)	
21	5%	10%	6	818	504	(984)	517	3,290	6,270	7,856	9,359	9,902	(984)	
22	5%	20%	7	861	632	(775)	1,035	4,289	7,813	9,836	11,649	12,502	(775)	
23	5%	30%	8	905	759	(566)	1,553	5,288	9,356	11,817	13,939	15,103	(566)	
24	10%	0%	9	788	413	(1,136)	157	2,612	5,215	6,492	7,767	8,083	(1,136)	
25	10%	10%	10	833	547	(916)	700	3,658	6,832	8,567	10,167	10,807	(916)	
26	10%	20%	11	879	680	(697)	1,243	4,705	8,448	10,641	12,566	13,531	(697)	
27	10%	30%	12	924	814	(478)	1,785	5,751	10,064	12,716	14,965	16,255	(478)	
28	15%	0%	13	801	450	(1,078)	315	2,932	5,703	7,109	8,466	8,865	(1,078)	
29	15%	10%	14	849	589	(848)	883	4,026	7,393	9,278	10,975	11,713	(848)	
30	15%	20%	15	896	729	(619)	1,450	5,120	9,083	11,446	13,483	14,560	(619)	
31	15%	30%	16	944	869	(390)	2,018	6,214	10,773	13,615	15,991	17,408	(390)	
32	20%	0%	17	815	486	(1,019)	473	3,252	6,191	7,725	9,165	9,646	(1,019)	
33	20%	10%	18	864	632	(780)	1,066	4,394	7,955	9,988	11,783	12,618	(780)	
34	20%	20%	19	914	778	(541)	1,658	5,536	9,718	12,251	14,400	15,590	(541)	
35	20%	30%	20	964	923	(302)	2,250	6,677	11,481	14,514	17,017	18,561	(302)	

Figure 16 – What-if tables for running a model with varying inputs is a feature many are not aware of

Use Excel for sophisticated, easy to use, fast, long-term and low-cost solutions

Excel provides high-quality, low-cost, long-term solutions

In summary, Excel provides solutions that:

- Have much greater capabilities than are available with other solutions.
- Are familiar and easy to use.
- Run quickly with rapid screen response. There isn't the constant display of Loading ... while screens refresh.
- Are long term. Excel isn't a program suffering from frequent updates. It has been around for about 30 years and is likely to be here for another 30.
- Provide wide use with few compatibility issues. A developer can easily accommodate minor differences among Excel versions including that of the Mac.
- Through the use of dialog boxes, have data entry as reliable as any other program's.
- Through the use of back-end databases, no longer have the issue known as "one version of the truth", that is, all reports get their data from the same source.
- Are low cost because of: the vast number of Excel features, the visual way it works, its familiarity, its standardised ubiquity and the economies of scale that entails.



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