Level 6 Spreadsheet 6N4089

Section 7 – Data Validation and Protection

Contents

RMN

1. DATA VALIDATION

Data Validation is used in Excel to ensure end users enter only the correct data into cells. For example it can be used to restrict data entry to a certain range of dates, limit choices by using a list or ensuring only positive number are entered. Essentially data validation is used to prevent user from entering data that is not valid, to provide messages to users and to give instructions to help users when incorrect data is entered.

It is also important to know that data validation should be used on input cells only and is not used on output cells.

Data Validation is particularly useful when sharing a workbook with other people especially if the data to be entered needs to be accurate and consistent.

## 2. ADD DATA VALIDATION TO A CELL OR RANGE

To apply **Data Validation** highlight the cell range where the validation will be applied, go to the **Data** tab to the **Data Tools** group and select **Data Validation**. This will open the **Data Validation** dialogue box (used for the following examples).

There are a variety of different methods of applying restrictions to cells, the following are six examples of different data validation methods.

3. RESTRICT DATA ENTRY TO THE FOLLOWING:

VALUES IN A DROP-DOWN LIST

Drop-Down List - in this example the names of the staff team will show in a drop down list from cell D8. The required cell range is selected. In the **Data Validation** dialogue box choose the **Settings** tab, under the **Allow:** drop down list choose the *List* option. For the **Source:** of the list select the range of cells holding the staff names, in this example these are cells F7:F12. Click **Ok**.
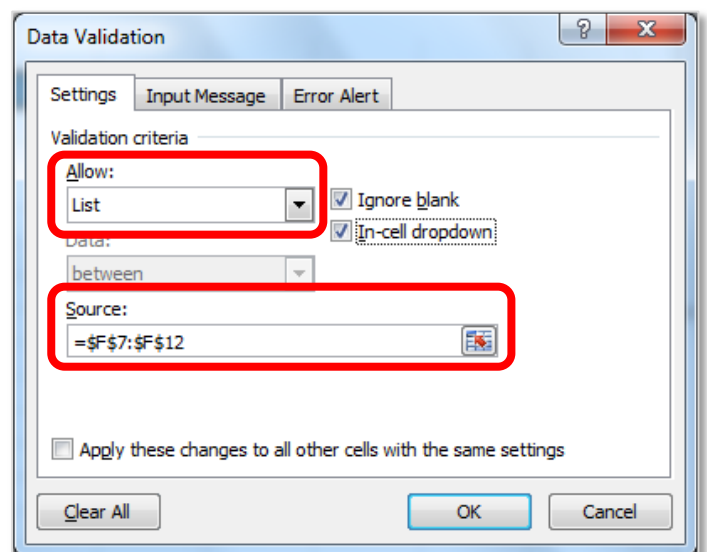
In cell D8 a drop down list will now display when the cell is clicked, any of the staff names on this list can be selected and the cell data.

Notice the **Ignore blank** and **In-cell dropdown** tick boxes are selected. These options are both very useful options and should be used.
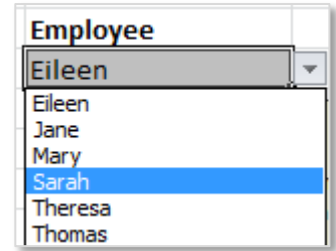
Source: An alternative to using the source as a range of cells is to type a list directly. In this example a Yes/No response is needed. The screen shot shows that values can be typed directly into the source separated by a comma, for example the following example simply needs a *Yes/No* answer.
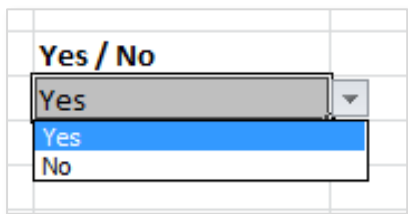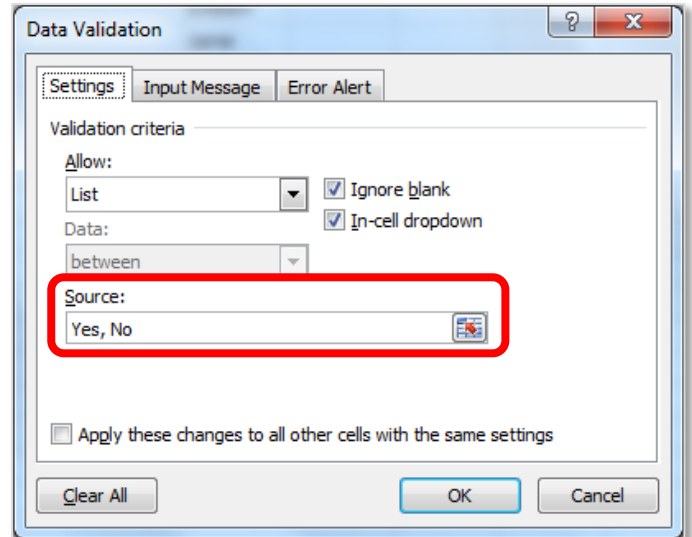
NOTES:

A WHOLE NUMBER WITHIN LIMITS

**Whole Number with Limits** – in this example data validation will be used to check a set of numbers are within the set range of 0 to 100. In the **Data Validation** dialogue box choose the **Settings** tab, under the **Allow:** drop down list choose the *Whole Number* option. Under the **Data:** drop down list choose *Between*. For the **Minimum:** and the **Maximum:** enter the required range in this example it is *0* to *101*. Click **Ok**.
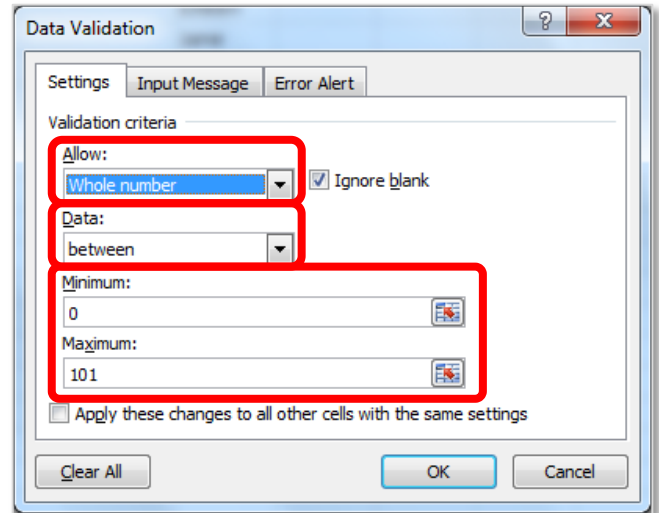
For this example it would also be very useful to include an **Input Message** and an **Error Alert** both of these options are available on the 2nd and 3rd tabs in the **Data Validation** dialogue and will be discussed in detail in point 4 and 5 of this section (see pages 8 and 9).

DATA: VALIDATION COMPARISON LIST

In the **Data Validation** dialogue box under the **Data:** drop down list there are a variety of options available these include the options shown in this screenshot.

When creating a data validation ensure all the comparison options are carefully considered to select the most suitable option.
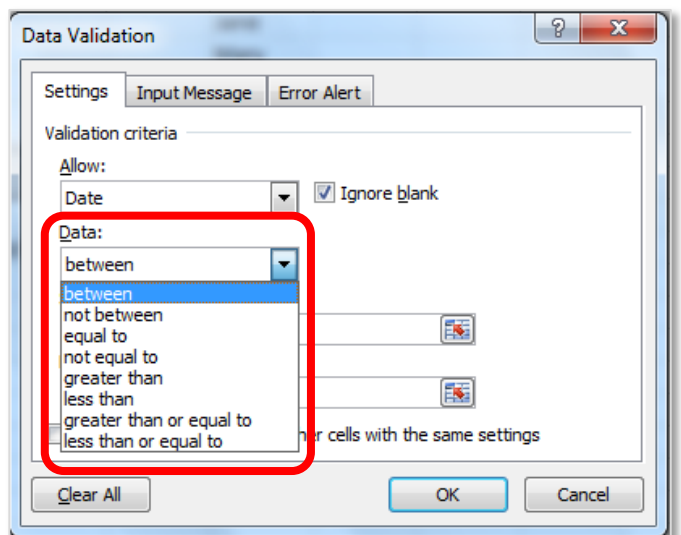
NOTES:

A DECIMAL NUMBER WITHIN LIMITS

Decimal Number within Limits - in this example data validation will be used to check a person's bonus payment is less than 6% of their salary. In the **Data Validation** dialogue box choose the **Settings** tab, under the **Allow:** drop down list choose the *Decimal* option. Under the **Data:** drop down list choose *Less Than*. For the 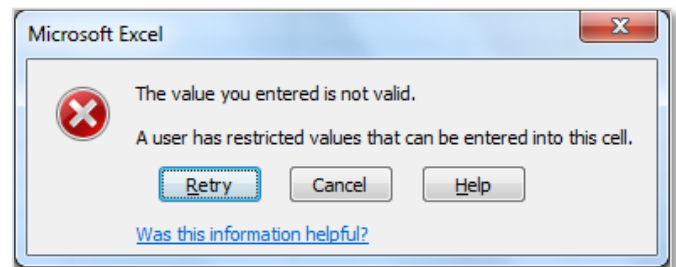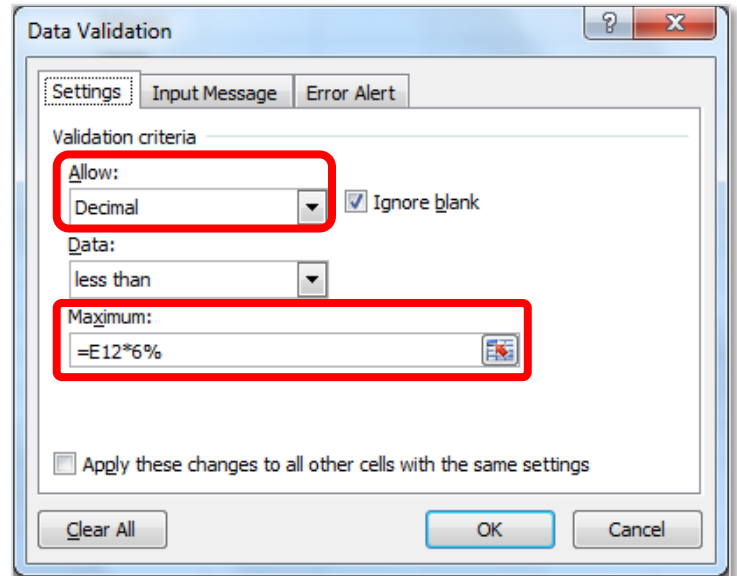**Maximum:** enter the required value, for this example a formula is used. The salary is €50,000 and is held in cell E12 by multiplying it by 6% the data validation calculates the maximum bonus from the salary. Click **Ok**.

Salary	€50,000.00
Bonus	200000

A DATE WITHIN A TIME FRAME

Date Within a Time Frame - it may be necessary to limit a range of cells to a date, for example in the case of products with a best before date etc. It is possible to set data validation to limit dates to a date before, after or between dates.

In this example data validation will be used to check that a date is no further than 3 days away. In the **Data Validation** dialogue box choose the **Settings** tab, under the **Allow:** drop down list choose the *Date* option. Under the **Data:** drop down list choose *Between*. For the **Start date:** enter the formula =TODAY() to represent todays date.
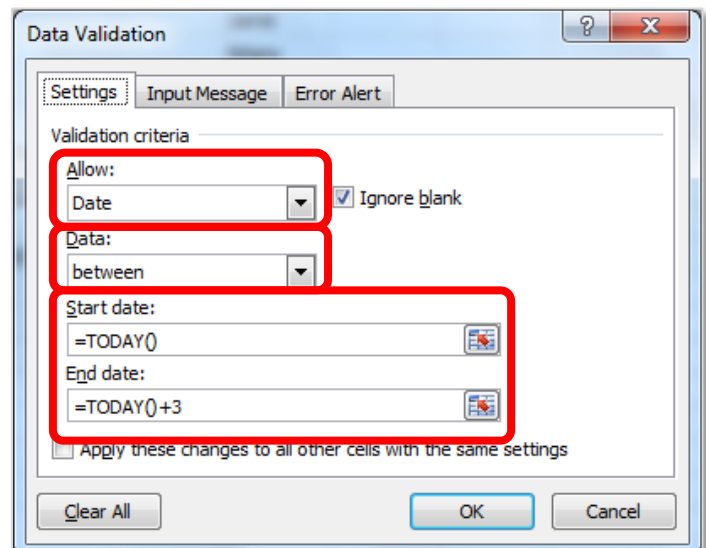
The **End date:** is calculated by the formula =TODAY()+3, indicating a date no further than three days' time. Click **Ok**.

If a date outside this set date range is entered the following error message is automatically displayed until an appropriate date is entered.
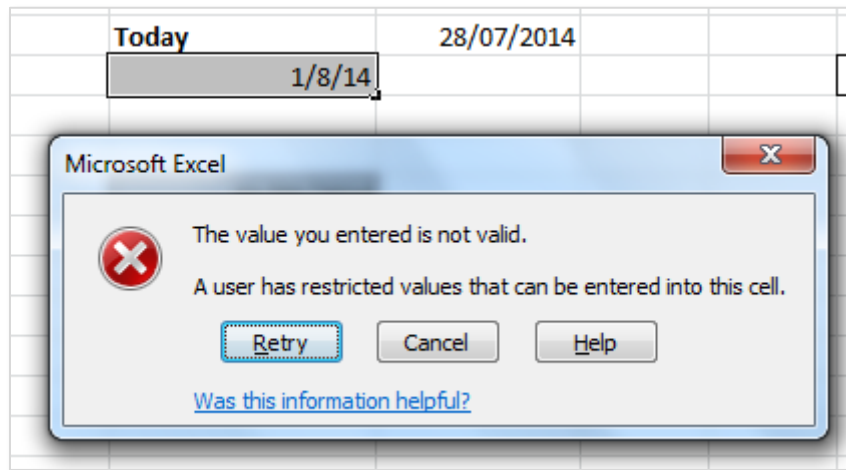
A TIME WITHIN A TIME FRAME

Time Within a Time Frame - it may be necessary to limit a range of cells to a time, for example if a timetable had a start time of before 9:00:00. It is possible to set data validation to limit times to a time before, after or between dates.

In this example data validation will be used to check that the start time is less than 9:00. In the **Data Validation** dialogue box choose the **Settings** tab, under the **Allow:** drop down list choose the *Time* option. Under the **Data:** drop down list choose *Less Than*. For the **End Time:** enter the value required, in this example the start time is in cell E21.
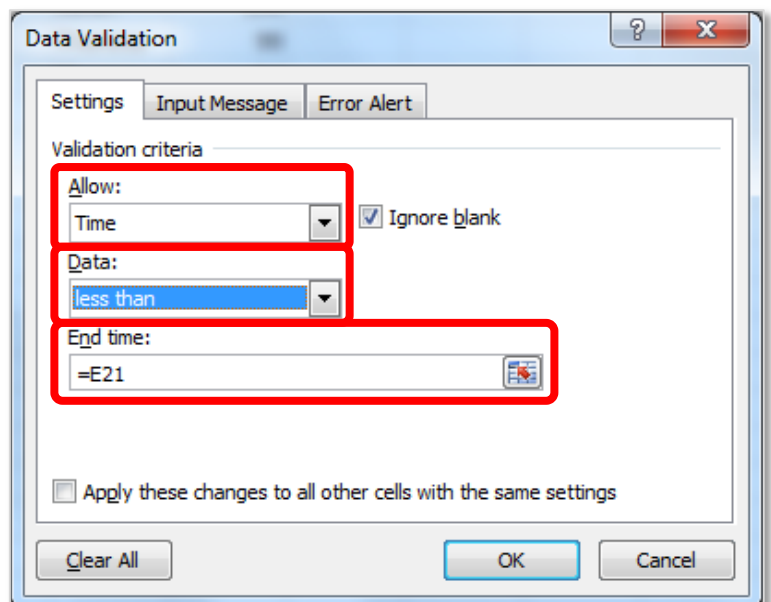
TEXT OF A SPECIFIED LENGTH

**Specify Length of Text in a Cell** - in this example data validation can be used to limit the number of characters allowed to be entered into a cell.

In the **Data Validation** dialogue box choose the **Settings** tab, under the **Allow:** drop down list choose the *Text Length* option. Under the **Data:** drop down list choose *Less Than or Equal To*. For the **Maximum:** enter the value required, in this example the length is 5 characters.
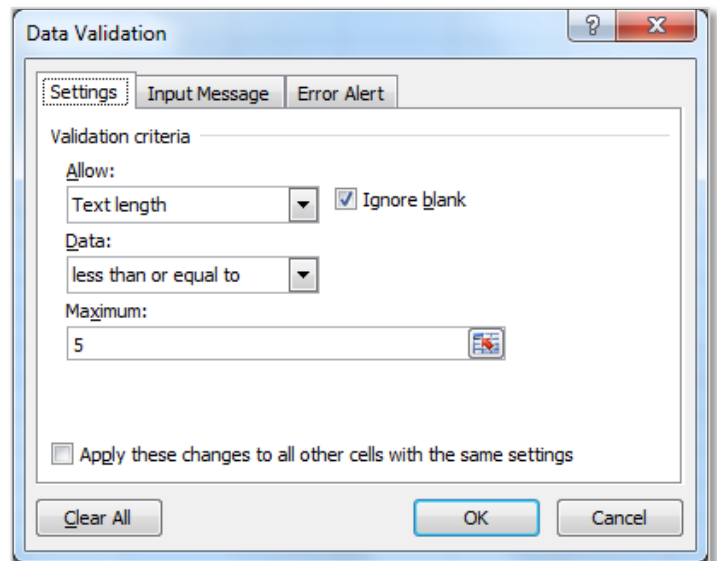
This will result in no greater than 5 letters being accepted into this cell.

CALCULATE WHAT IS ALLOWED BASED ON THE CONTENT OF ANOTHER CELL

The data validation examples used in the previous six examples all show different methods of calculating the result, some use cell ranges, some use whole numbers and other have been calculated using functions and formula.

Using another cell reference in the data validation is an example of basing the data validation on the content of another cell. In the following example our budget is €500 this figure is saved in cell J24, the data validation is set to **Maximum:** J24 preventing the user from entering a figure over the budget total.

By changing the figure in J24 to a higher or lower Maximum Budget, the rules of the data validation are changed.
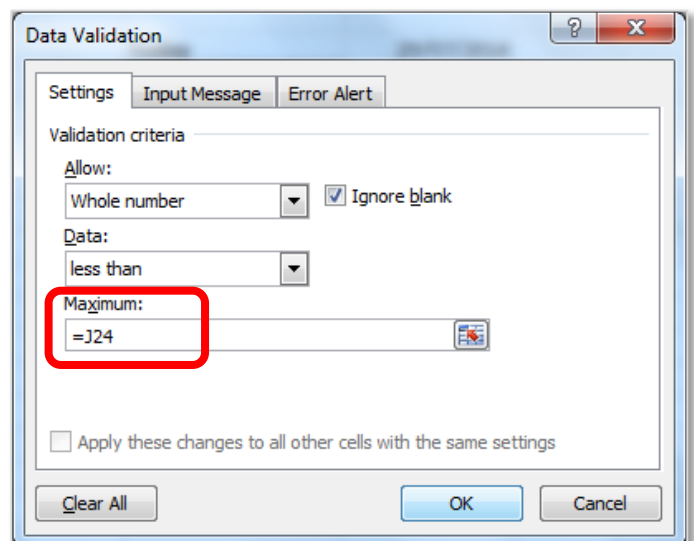
Maximum Budget	€500.00
Total Spent	450

USE A FORMULA TO CALCULATE WHAT IS ALLOWED

Formula can also be used to calculate what is allowed by the data validation. There is an example of this in the **Date within a Time Frame** data validation on page 4 of this section. To ensure the date is within 3 days from today the formula =TODAY()+3 was used. There is no limit to the functions and formula that can be used with data validation. Here are some examples take from Office.Microsoft.com. To apply any of these examples ensure **Allow:** is set to *Custom* in the **Data Validation** dialogue box.

| TO MAKE SURE THAT	ENTER THIS FORMULA
The cell that contains a product description (B2) only contains text.	**=ISTEXT(B2)**
For the cell that contains a projected advertising budget (B3), the subtotal for subcontractors and services (E1) must be less than or equal to $800, and the total budget amount (E2) must also be less than or equal to $97,000.	**=AND(E1<=800,E2<=97000)**
The cell that contains an employee age (B4) is always greater than the number of full years of employment (F1) plus 18 (the minimum age of employment).	**=IF(B4>F1+18,TRUE,FALSE)**
The cell that contains a product code name (B5) always begins with the standard prefix of ID- and is at least 10 characters long.	**=AND(LEFT(B5, 3) ="ID-",LEN(B5) > 9)**

NOTES:

4. DATA VALIDATION MESSAGES

Data Validation messages are essential alongside data validation and should always be used. There are two types the **Input Message** and the **Error Alert** message. An input message shows when the user selects the cell and offers the user guidance about the type of data that should be entered into the cell (it can be moved and remains until another cell is selected). An error alert message is a warning, information or a stop message given to the user only when the wrong data is entered into the cell.

DISPLAY A MESSAGE TO HELP DATA ENTRY - INPUT MESSAGE

The **Input Message** should be added when **Data Validation** is being applied in the **Data Validation** dialogue box click on the second tab **Input Message**.

There are two parts to the **Input Message** the **Title:** and the **Input Message:**, in the this example the message explains to the end user that a staff member should be selected from the drop down list.

The following input message is shown to the user:
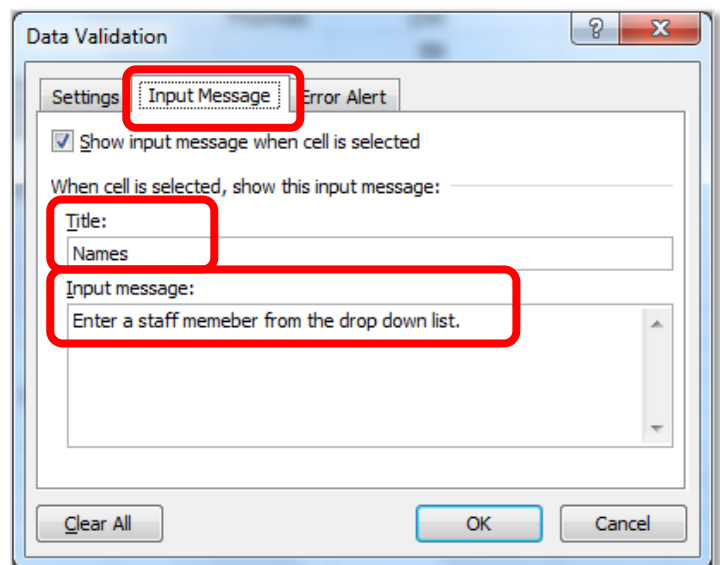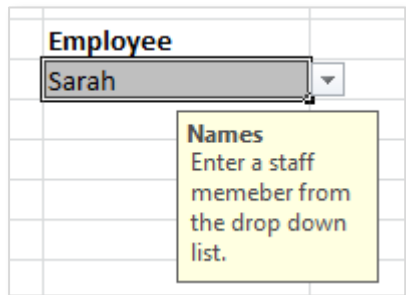
Remember to add an input message which explains what the data should be, to help prevent errors. The following are two more examples of input messages.

DISPLAY A MESSAGE WHEN VALIDATION IS NOT MET - ERROR ALERT

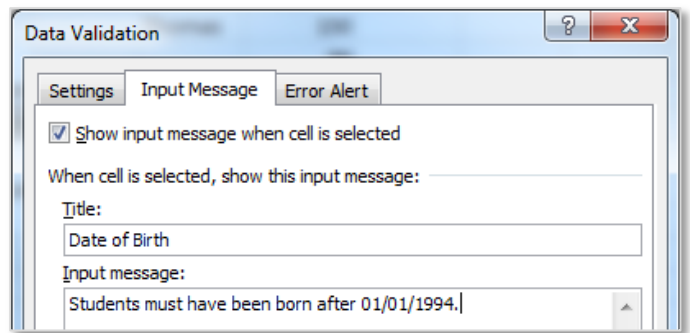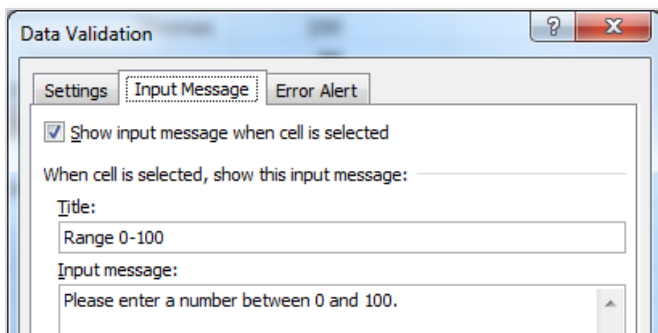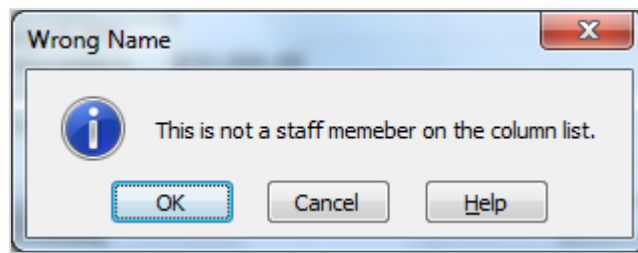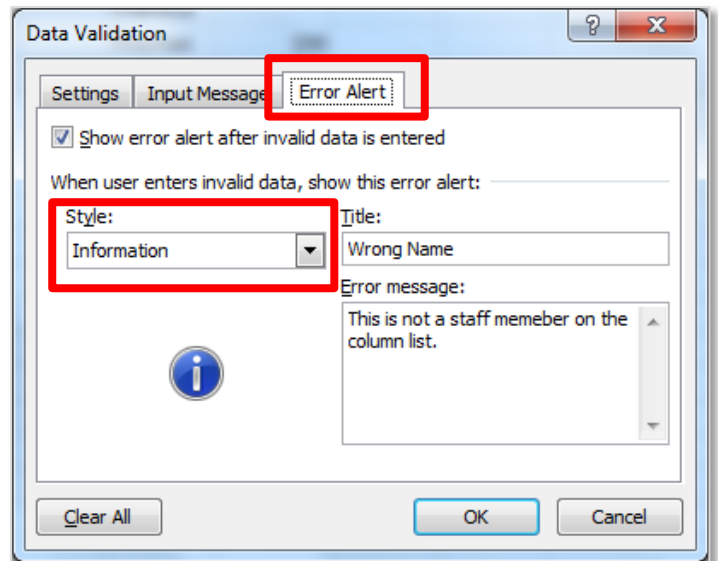The **Error Alert** message should also be added when **Data Validation** is being applied in the **Data Validation** dialogue box click on the third tab **Error Alert**.

There are three parts to the **Error Alert** the **Style:**, **Title:** and the **Error Message:**, in this example the message **Style:** is *Information* for the user. It explains to the end user that the *Wrong Name* has been entered and that the staff member is not on the list.

The following **Information** message is shown to the user when the wrong data is entered.

The **Error Alert** message should explain what the user should do in the case of an error with data entry. There are three different types of **styles** of error alert message to choose from:

ICON	TYPE	USE TO
❌	Stop	Prevent users from entering invalid data in a cell. A **Stop** alert message has two options: **Retry** or **Cancel**.
⚠️	Warning	Warn users that the data they entered is invalid, without preventing them from entering it. When a **Warning** alert message appears, users can click **Yes** to accept the invalid entry, **No** to edit the invalid entry, or **Cancel** to remove the invalid entry.
ℹ️	Information	Inform users that the data they entered is invalid, without preventing them from entering it. This type of error alert is the most flexible. When an **Information** alert message appears, users can click **OK** to accept the invalid value or **Cancel** to reject it.

The following are two more examples of **Error Alert** message showing the **Stop** and **Warning** styles.
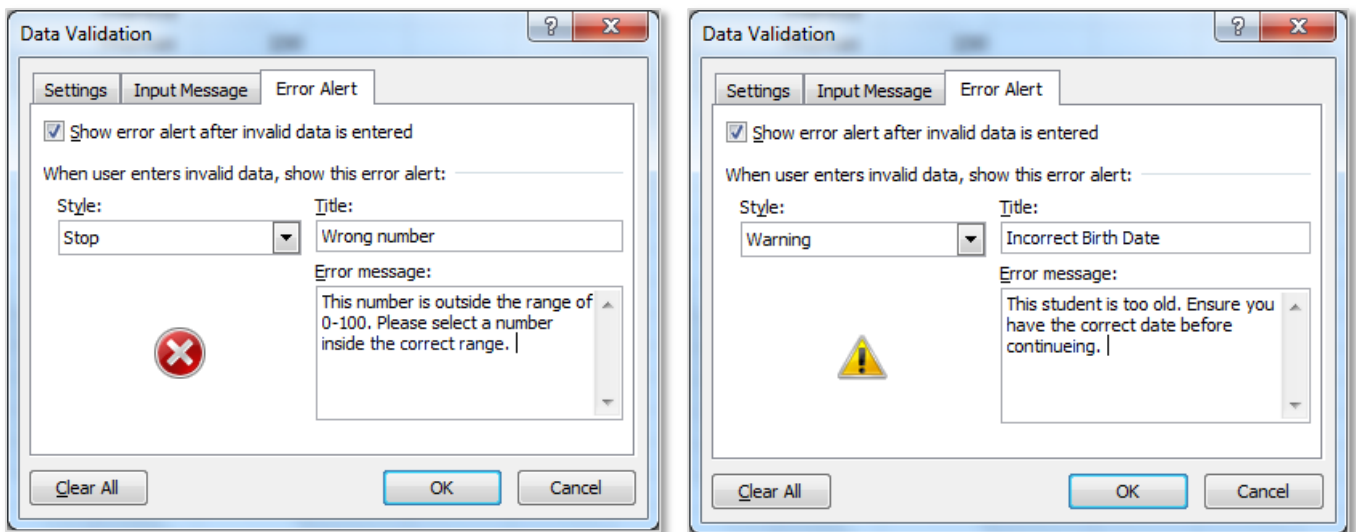
5. REVIEW VALIDATION ERRORS

CIRCLE INVALID DATA

While the error alert data validation messages show the user that incorrect data is being entered the **Warning** and **Information** alerts allow the user to continue entering the invalid data.

The **Circle Invalid Data** tool allows the user to review the worksheet to see where invalid data is entered. To access this tool go to the **Data** tab to the **Data Tools** group to the **Data Validation** drop down list. From the list select the **Circle Invalid Data** command button.
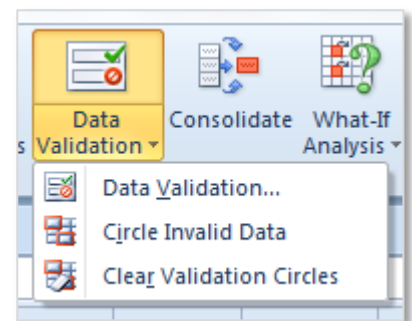
This will automatically every instance in the worksheet were data is breaking the data validation rule for that cell.

To remove the circles select the **Clear Validation Circles** command button.
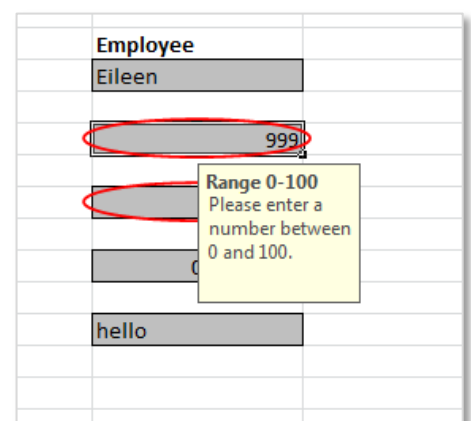
6. PROTECTION

APPLY CELL AND WORKSHEET PROTECTION

Protection is primarily added to a worksheet when the creator of the worksheet wants to pass it to other users. The creator of the worksheet can add cell and worksheet protection to prevent the users making mistakes, deleting formula or changing the worksheet. To prevent this from happening it is possible to lock or unlock certain cells and then to protect the worksheet, preventing users from using cells they shouldn't.

LOCK CELLS

By default the locked setting is turned on for every cell. Locked cells are not actually locked until the worksheet protection is activated.

In the following example this worksheet has been setup to calculate the profit on each item of furniture. This spreadsheet will be used by staff who have no knowledge of formula, in order to protect the formula in cells E9:E15 and G9:H15 these cells **will remain locked** and protection will be applied to the worksheet.

	Code	Furniture Item	Quantity Bought	Cost Price per Item	Total Cost Price per Item	Selling Price per Item	Total Selling Price per Item	Profit on Each Item
7								
8								
9	HG7654	Tables	60	€95.00	€5,700.00	€120.00	€7,200.00	€1,500.00
10	KL9876	Chairs	85	€88.00	€7,480.00	€130.00	€11,050.00	€3,570.00
11	LP9876	Cabinets	96	€56.00	€5,376.00	€80.00	€7,680.00	€2,304.00
12	YT9876	Dressers	52	€79.00	€4,108.00	€90.00	€4,680.00	€572.00
13	JT7654	Hall Tables	73	€51.00	€3,723.00	€77.00	€5,621.00	€1,898.00
14	KJ7654	Telephone Tables	55	€63.00	€3,465.00	€80.00	€4,400.00	€935.00
15	LO9808	Mirrors	90	€80.00	€7,200.00	€100.00	€9,000.00	€1,800.00
16								

However, the cells A9:D15 and F9:F15 need to be edited by the staff when prices change or new stock is entered, because changes will need to be made to these cells they will **not be locked**.

Lock or **unlock** cells must be done before the worksheet is protected. To do this highlight the cell ranges (use Ctrl to highlight non-adjacent ranges), **right click** on the selected cells and select **Format Cells**. This will open the **Format Cells** dialogue box. Go to the **Protection** tab and deselect the **Locked** tick box. Click **Ok**.

Note that this will turn off the lock for the selected cells only. All the other cells in the worksheet will remain locked.
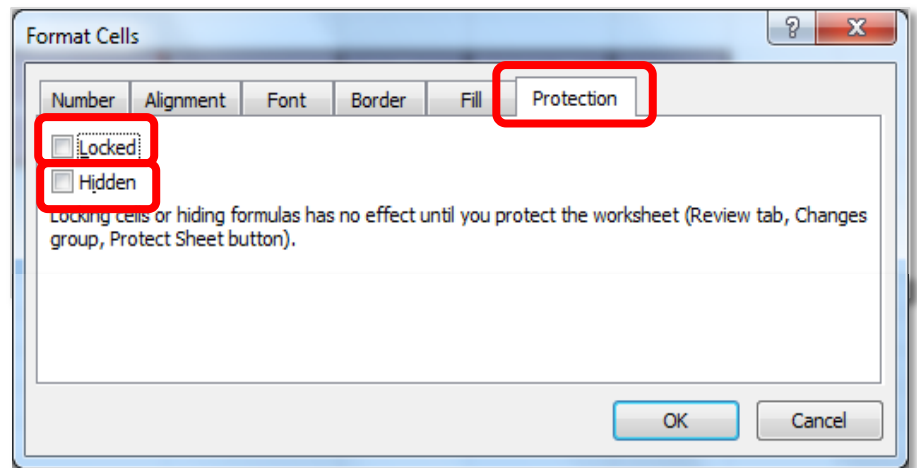
Note: When using cell locking and protection think carefully about which cells should be locked and unlocked - those that need to be changed by the end user should be **unlocked** and those that need to remain locked and safe should be **locked**.

HIDE CELLS

The formula in cells E9:E15 and cells G9:H15 could also be set to **Hidden** to hide the formula from the formula bar when the cells are selected. To do this highlight the cell ranges and go to the **Format Cells** dialogue box to the **Protection** tab as shown above, select the **Hidden** tick box to apply the setting. When protection is applied to the worksheet the formula in these cells will not be visible in the formula bar.

NOTES: Explain locked and hidden cells here in your own words.

PROTECT THE WORKSHEET

To protect the worksheet after the cells have been unlocked or locked go to the **Review** tab to the **Changes** group and select the **Protect Sheet** command button, this will open the **Protect Sheet** dialogue box.

In the **Password to unprotect sheet:** text box enter the password and click **Ok**. This will open the **Confirm Password** dialogue box re-enter the password and click **Ok**.
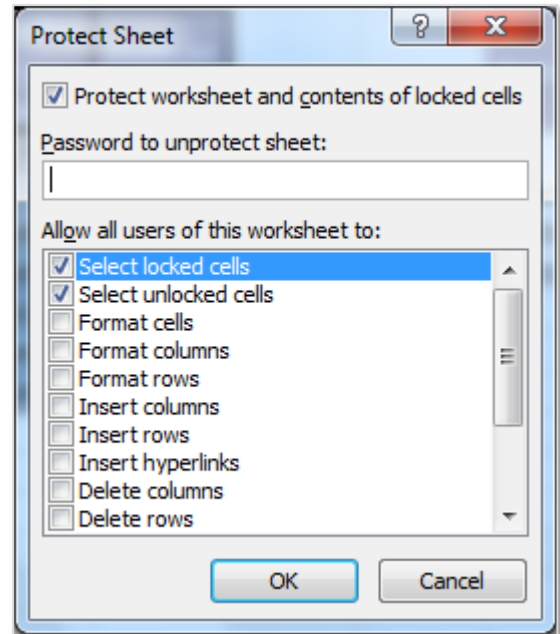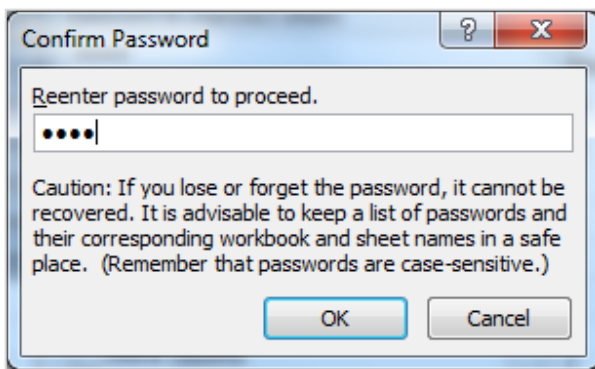
The worksheet is now password protected and only the **unlocked** cells can be edited.

REMEMBER: LOST PASSWORDS CANNOT BE RETRIEVED!!!

PROTECTION AND DATA VALIDATION

When using protection on a worksheet or workbook with data validation, protect it after specifying any validation settings. Make sure that any validated cells are unlocked before the worksheet is protected. Otherwise, users will not be able to type any data in the cells.

APPLY WORKBOOK PROTECTION

Applying **Workbook Protection** protects the structure of a workbook which prevents users from adding or deleting worksheets or from displaying hidden worksheets. It is also possible to prevent users from changing the size or position of worksheet windows.

To protect workbook elements go to the **Review** tab to the **Changes** group and click the **Protect Workbook** command button. This will open the **Protect Structure and Workbook** dialogue box. Click the appropriate tick boxes enter the password and click **Ok**. Confirm the password and click **Ok**.
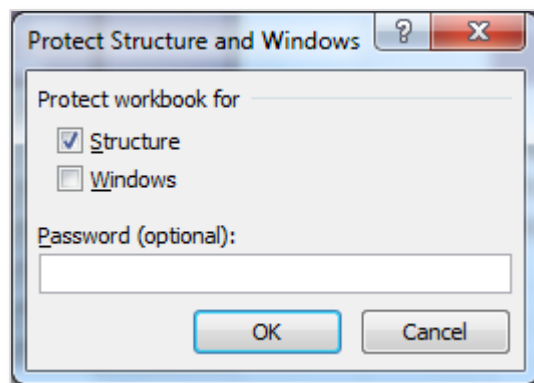
PROTECT WORKBOOK FOR STRUCTURE OR WINDOWS

SELECT THIS CHECK BOX	TO PREVENT USERS FROM
Structure	• Viewing worksheets that are have hidden. • Moving, deleting, hiding, or changing the names of worksheets. • Inserting new worksheets or chart sheets. **Note** Users will be able to insert an embedded chart in an existing worksheet. • Moving or copying worksheets to another workbook. • In PivotTable reports, displaying the source data for a cell in the data area, or displaying page field pages on separate worksheets. • For scenarios, creating a scenario summary report. • In the Analysis ToolPak, using the analysis tools that place results on a new worksheet.
Windows	• Changing the size and position of the windows for the workbook when the workbook is opened. • Moving, resizing, or closing the windows. **Note** Users will be able to hide and unhide windows.

USE OF PASSWORD PROTECTION

When protecting a worksheet or workbook by locking its elements, adding a password to edit the unlocked elements is optional. In this context, the password is only intended to allow access to certain users while helping to prevent changes by other users. This level of password protection does not guarantee that all sensitive data in the workbook is secure. For an additional layer of security, secure the workbook itself with a password to help safeguard it from unauthorized access.

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When protecting worksheet or workbook elements by using a password, it is very important that the password is remembered. Without it, it is not possible to unprotect the workbook or worksheet.

REMEMBER: LOST PASSWORDS CANNOT BE RETRIEVED!!!

Important

Use strong passwords that combine uppercase and lowercase letters, numbers, and symbols. Weak passwords don't mix these elements. Strong password: Y6dh!et5. Weak password: House27. Passwords should be 8 or more characters in length. A pass phrase that uses 14 or more characters is better.

It is critical that passwords are remembered. If a password is forgotten, Microsoft cannot retrieve it. Store the passwords in a secure place away from the information that they help protect. For more information on workbook protection visit Office.Microsoft.com.

7. REFERENCES

WEBSITES:

Data Validation – for more information visit Office.Microsoft.com.

Lock Cells in a Worksheet Protection - for more information visit Office.Microsoft.com.

Workbook Protection - for more information visit Office.Microsoft.com.

NOTES: