Advanced Excel

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Contents

Naming Cells and Ranges 1
- *To name cells* 1
- *Making a name list* 2

Managing data with the form 3
- *Database components* 3
- *Form* 3
- *Data processing operations* 4

Filtering Data 5
- *Advanced Filter* 6
  - Before using Advanced Filter 6
  - Extracting records using Advanced Filter 6
- *Filter the list, in-place* 8

Consolidation 9

Subtotal records 11
- *Preparing a list for Automatic Subtotal* 11
- *Performing the subtotal function* 11
- *Preparing the second level subtotal* 12
- *Removing subtotal* 13

Document protection 14
- *Protecting Workbook* 14
- *Protecting Worksheet* 15
  - Locking or Unlocking cells 15
- *Protecting Excel file* 17

D function (database ,field ,criteria) 18
- *DSUM, DMIN, DMAX, DAVERAGE* 18

Array 20

Data Table 21
- *One-Input Tables* 21
- *Two-input tables* 22

Lookup functions 23
- *Lookup* 23
- *Vlookup* 26

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Pivot Table *27*

Linking *30*
Linking worksheets *30*

Working with large spreadsheets *31*
Using names in different areas *31*

Conditional Formatting *32*

Hyperlink *34*

Data Validation *35*
Define the data type of cells *35*
Define the warning/error message *35*

Scenario Manager *36*
Define the scenario *36*
Show the scenario result *37*

Creating and using Macros *38*
Recording a macro *38*
Running a macro *38*

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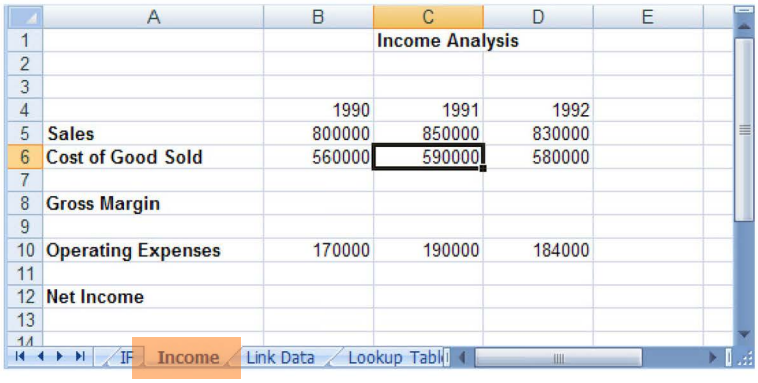
Naming Cells and Ranges

A name is an easy way-to-remember identifier you create to refer to a cell, a group of cells, or a formula. Formula using names are easier to read and to remember than formula using cell references. Let's taking below spreadsheet as an example, the formula on cell C8 should be entered as B5-B6 (i.e. the sales amount minus cost of good sold) but it will be more easier to read the formula if we can write Gross margin= Sales - Cost of Good. In fact, we can do this by creating names for the cells, then we can apply names to the formula.



	A	B	C	D	E
1			Income Analysis		
2					
3					
4		1990	1991	1992	
5	Sales	800000	850000	830000	
6	Cost of Good Sold	560000	590000	580000	
7					
8	Gross Margin				
9					
10	Operating Expenses	170000	190000	184000	
11					
12	Net Income				
13					

IF Income Link Data Lookup Tabl

To name cells

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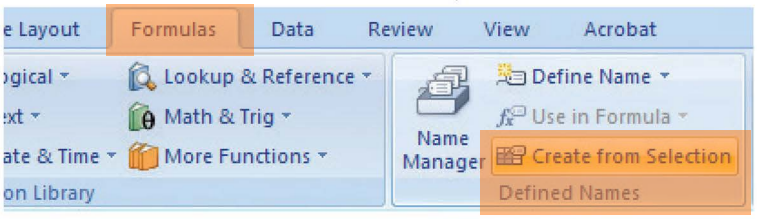
There are two ways to name cells. One is the **Define Name** and the other is the **Create from Selection.** Both commands are under Formulas.

To assign names to cells

- **Select row A5 through row D12.**
- **Choose Name from the Insert menu, then chose Create.**



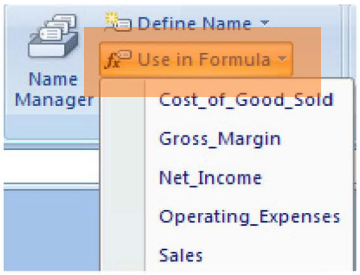
- **Click Left column then OK.**

To apply names

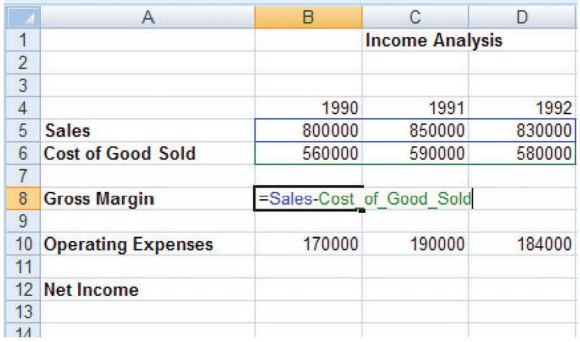
Suppose we want to minus the Cost of Good Sold (cell B6) by Sales (cell B5) and put the result in cell B8, instead of writing the formula =B5-B6 we can

- **Click to select the cell B8 and type "="**

- **Choose "Sales" from the Use in Formula**



- **Enter a minus sign**
- **Choose Cost_of_Good_Sold from Use in Formula**



	A	B	C	D
1			Income Analysis	
2				
3				
4		1990	1991	1992
5	Sales	800000	850000	830000
6	Cost of Good Sold	560000	590000	580000
7				
8	Gross Margin	=Sales-Cost_of_Good_Sold		
9				
10	Operating Expenses	170000	190000	184000
11				
12	Net Income			
13				

- **Press Enter key to confirm**

Making a name list

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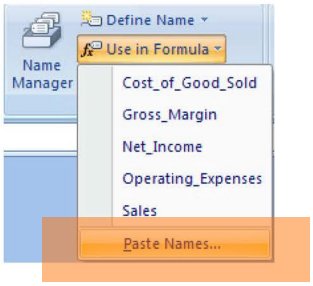
It is possible to generate a table to include all names used and their corresponding references.

- **Find an area in your spreadsheet in where the name list goes into.**
- **Choose Paste Name from the Use in Formula**



A list of names used with their references is listed.

1992			
830000			
580000			
		Cost_of_Goo	=Income!$B$6:$IV$6
		Gross_Margi	=Income!$B$8:$IV$8
		Net_Income	=Income!$B$12:$IV$12
		Operating_Ex	=Income!$B$10:$IV$10
		Sales	=Income!$B$5:$IV$5

Managing data with the form

Database components

In Excel, a database is two or more rows of cells that span at least one column and each row represents a single item or record.

You can put as many as 16832 records in an Excel database (the top must be used for the field names).

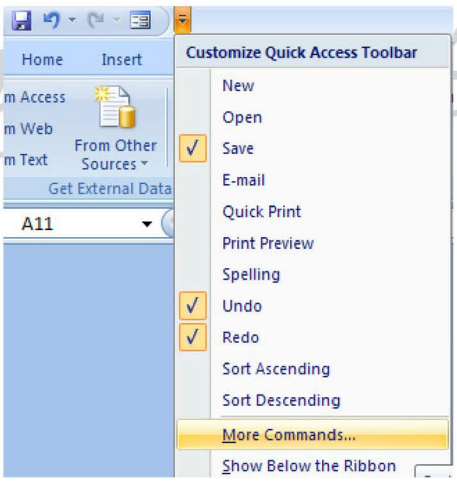
If a range of cells has already been defined as database, we can perform criteria searching or extracting data on that range (please see Advanced Filtering) .

Form

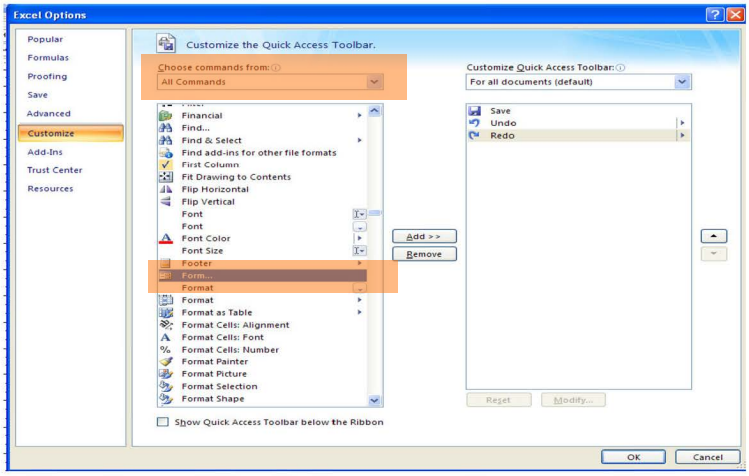
Form is a feature in which users can create, edit, view and search records inside a form-like window. It is an ideal method to create and edit records. Since the feature is not the Excel's default function, users are required to retrieve it and put it on the Quick Access Toolbar before they can use it.

To add the Form button

- **Go to Quick Access Toolbar and select More Commands...**



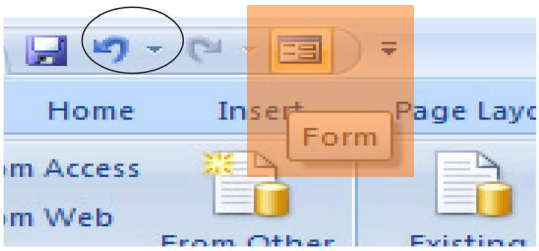
- **Choose Form under All commands list and click Add >> button to move it to the right window.**



Sample7

Database Data

- **After clicking the OK button. The Form button is appeared on the Quick Access Toolbar.**



To activate the Form

- **Select any cells inside the data area.**
- **Click the Form button from the Quick Access Toolbar**

You can see the following form and it displays the first record.

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Data processing operations

Users can perform various operations on the data range which include create or search etc.

To insert a new record

- **Click New button on the form**

Then you can type the new record information and advance to the next field by pressing Tab key, and quit the form by pressing Close button.

To search records

Criteria are rules by which records are judged. If a record meets the rules (or passes the test), it is accepted or said to match.

- **Click Criteria button**
- **Type <90000 in the Target field and press Enter key.**
- **Click Find Next button to advance to next matched record**

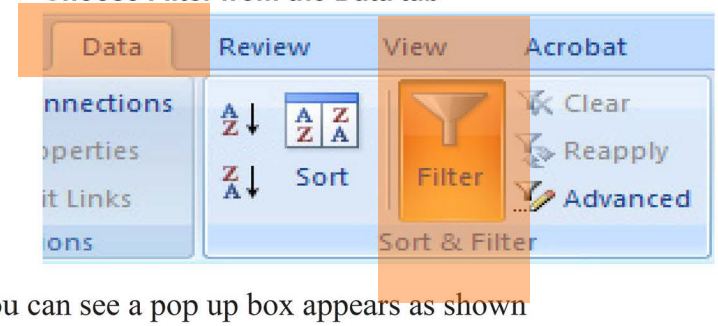
The above criteria instructs Excel to search for records with the target values are smaller than 90000

Filtering Data

Users can temporarily hide those data they don't want and show only the data they are interested on the screen. This is the concept of the Filter function.

- Click any cell inside the range you want to apply filter on.
  - **Choose Filter from the Data tab**

Sample7
Database Data



You can see a pop up box appears as shown

	A	B	C	D
10				
11	LAST	FIRST	TARGET	REGION
12	Kennedy	Sandra	135000	East
13	Ellis	Nancy	122000	East
14	Atkins	Lee	113000	East
15	Jackson	Robert	112000	East
16	Stevens	Carls	110000	East
17	Allen	Ellen	90000	East

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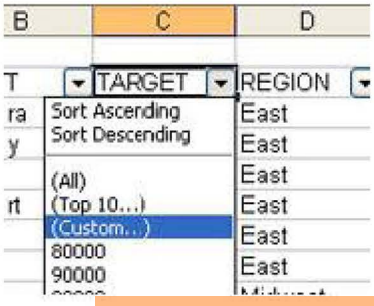
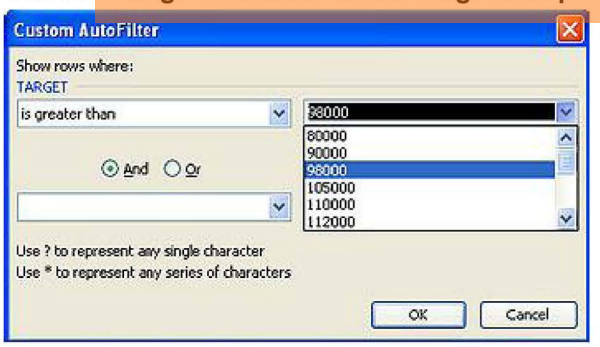
Suppose we want to see those records with target value greater then 98000, we can

- **Click the pop-up indicator in the Target column and choose (Custom..) as shown**



- **Choose "is greater than" under Target and pick up the option 98000 as shown.**



- **Click OK button to confirm.**

All records match the criteria are displayed as shown.

	A	B	C	D
10				
11	LAST	FIRST	TARGET	REGION
12	Kennedy	Sandra	135000	East
13	Ellis	Nancy	122000	East
14	Atkins	Lee	113000	East
15	Jackson	Robert	112000	East
16	Stevens	Carls	110000	East
18	Ford	Carl	191000	Midwest
21	Parker	Greg	196000	South
22	Adams	Chunk	118000	South
24	Harris	Ken	176000	West
25	Conners	Paul	142000	West
26	Keller	Janet	105000	West

Advanced Filter

The Filter function can filter unwanted records and display the useful records on their original location. If users want to filter and extract those records to another location, they can accomplish the task by using Advanced Filter.

Before using Advanced Filter

Users are required to prepare their criteria before executing the Advanced Filter function. The criteria is an area which consists of a header (can copy the field headers from the original data) and data

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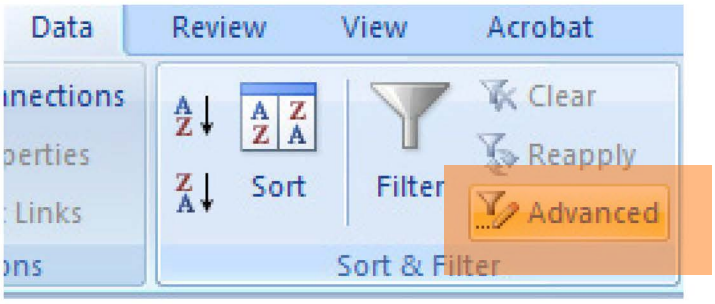
For example, below is a typical criteria area in which the first row contains the headers (exactly same as the headers of the original data) and the second row is the conditions to inform Excel to search records with values greater than 10000 and less than 15000 under the Target column.

	A	B	C	D	E
1		FIRST	TARGET	TARGET	REGION
2			>100000	<150000	
3					

The criteria here mean we want all records with the target values are greater than 100000 and is less than 150000

Extracting records using Advanced Filter

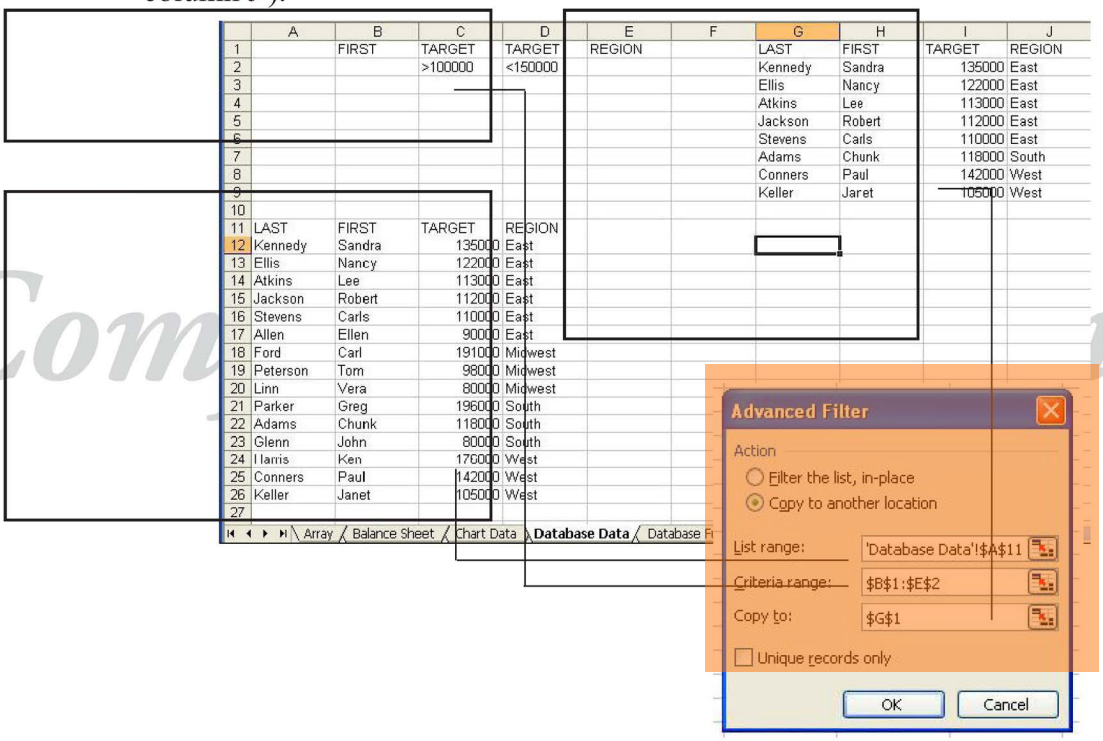
- **Choose Advanced from Sort & Filter under the Data tab.**



- **Choose Copy to Another Location under the Action**
- **Fill in the cell references for List Range : the Criteria Range and Copy to : as shown in the following picture.**

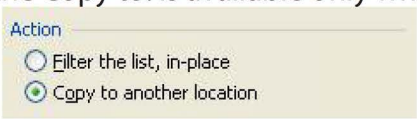
Click here to tell the Excel to extract the data (which match the criteria you specify) to the location you specify

Below picture summaries all the ranges and also extracted result (column G to column J).



You can set the range by click on the List range : field and drag an area on your worksheet. Excel will write down the address in the range box accordingly. Similarly you can perform the same operations on Criteria range and Copy to :

Also the Copy to: is available only when you choose Copy to Another Location.



Filter the list, in-place

If you want to filter the data and display them on their original location, you can choose Filter the list, in-place under the Action.

Below is the result of using the same criteria range but choosing the Filter the list, in-place option.

	A	B	C	D	E	F	G
1		FIRST	TARGET	TARGET	REGION		
2			>100000	<150000			
3							
4							
5							
6							
7							
8							
9							
10							
11	LAST	FIRST	TARGET	REGION			
12	Kennedy	Sandra	135000	East			
13	Ellis	Nancy	122000	East			
14	Atkins	Lee	113000	East			
15	Jackson	Robert	112000	East			
16	Stevens	Carls	110000	East			
22	Adams	Chunk	118000	South			
25	Conners	Paul	142000	West			
26	Keller	Janet	105000	West			

To display all records, we choose Clear from Data tab.

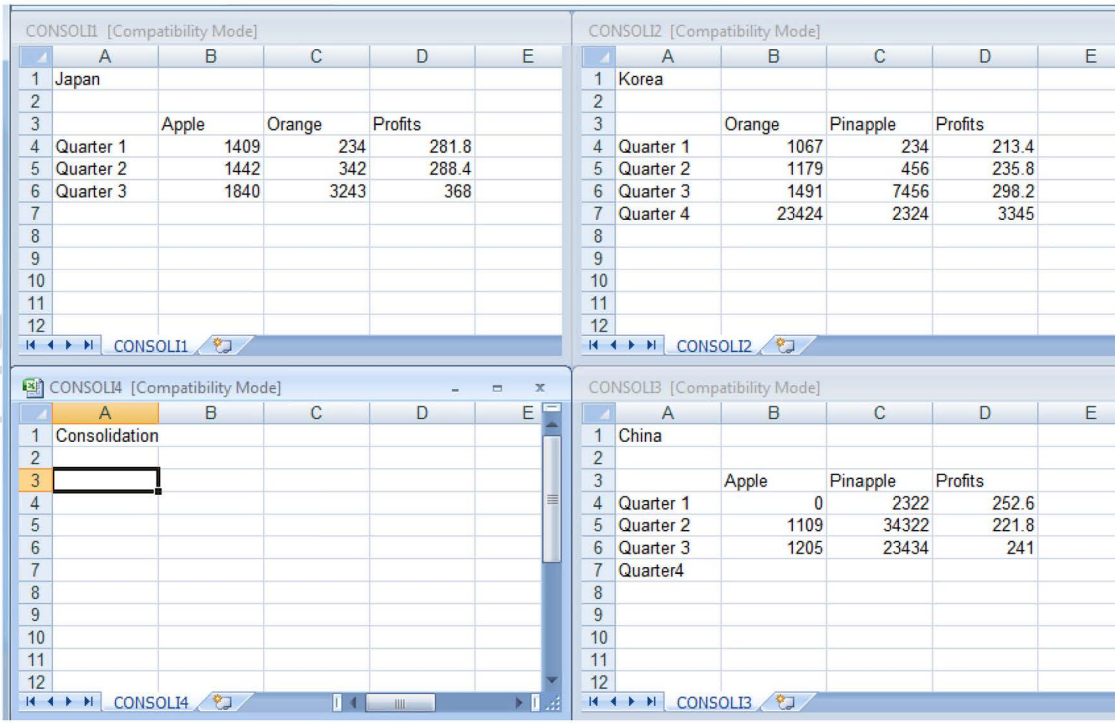
Consolidation

Consolidation function can help users to combine several similar worksheets into one. The data in each worksheet with the same column label and row label will be added (users can choose another operation) together and the result is put on the destination worksheet. Data with different labels will be copied into the destination worksheet without any modification.

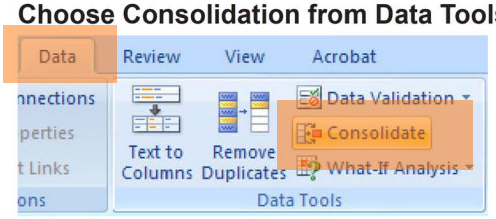
To consolidate worksheets

Suppose we have three workbooks - the consoli1, consoli2 and consoli3, and we want to combine them and put the result on another workbook consoli4. We can

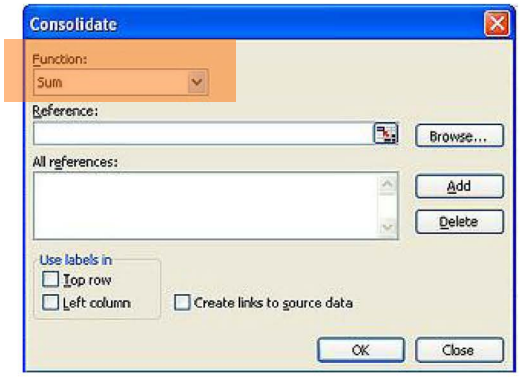
- Open Consoli1, Consoli2, Consoli3 and Consoli4 files from the training folder.
  - **Click on the Consoli4 as shown**



  - **Choose Consolidation from Data Tools under the Data tab**

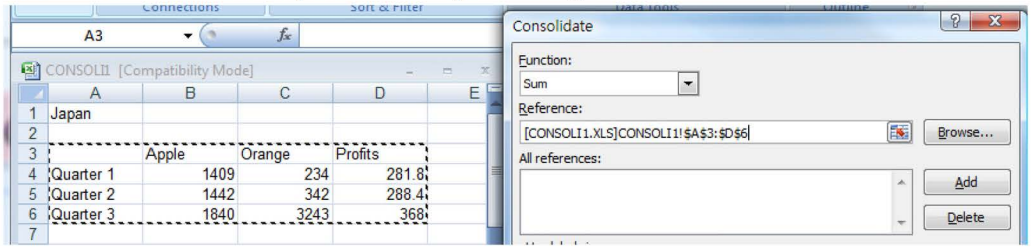


  - **Choose Sum from the Function.**

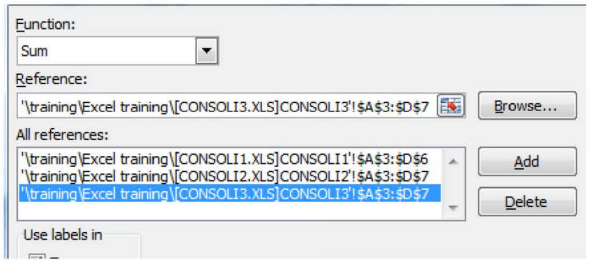


  - **Click on the Reference :**

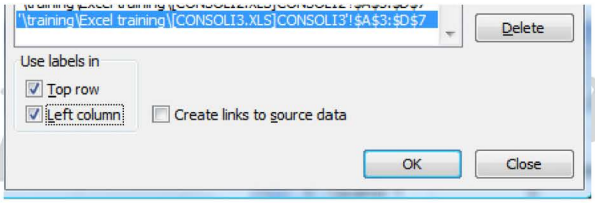
- **Click on the workbook (CONSOLI1) and drag the area as shown.**



- **Click the Add button to confirm your first selection.**
- **Click on the Reference again and select the next workbook**
- **Drag the area**
- **Click the Add button to confirm your second selection.**
- **Continue to select the data until you finish.**



- **Click Top row and Left column under Use labels in**



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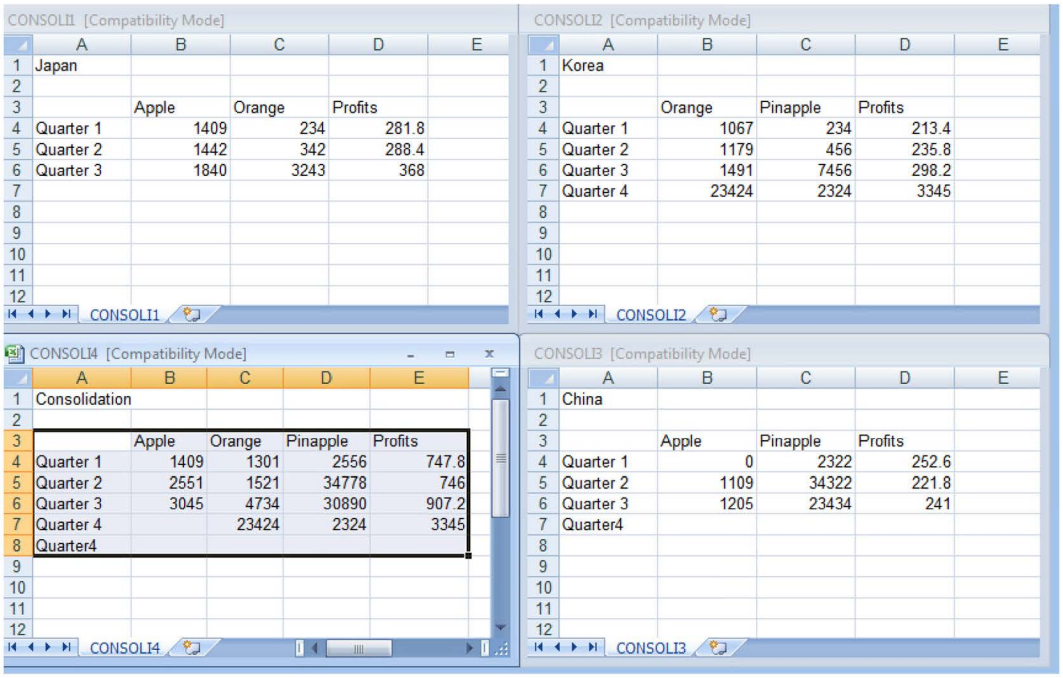
- **Click OK button to confirm.**

The result is shown on CONSOLI4.



CONSOLI1 [Compatibility Mode]

	A	B	C	D	E
1	Japan				
2					
3		Apple	Orange	Profits	
4	Quarter 1	1409	234	281.8	
5	Quarter 2	1442	342	288.4	
6	Quarter 3	1840	3243	368	

CONSOLI2 [Compatibility Mode]

	A	B	C	D	E
1	Korea				
2					
3		Orange	Pinapple	Profits	
4	Quarter 1	1067	234	213.4	
5	Quarter 2	1179	456	235.8	
6	Quarter 3	1491	7456	298.2	
7	Quarter 4	23424	2324	3345	

CONSOLI4 [Compatibility Mode]

	A	B	C	D	E
1	Consolidation				
2					
3		Apple	Orange	Pinapple	Profits
4	Quarter 1	1409	1301	2556	747.8
5	Quarter 2	2551	1521	34778	746
6	Quarter 3	3045	4734	30890	907.2
7	Quarter 4		23424	2324	3345
8	Quarter4				

CONSOLI3 [Compatibility Mode]

	A	B	C	D	E
1	China				
2					
3		Apple	Pinapple	Profits	
4	Quarter 1	0	2322	252.6	
5	Quarter 2	1109	34322	221.8	
6	Quarter 3	1205	23434	241	
7	Quarter4				

Exercise:

Ex3

Subtotal records

Using subtotal is a quick way to summarize data in a Microsoft Excel. You do not need to enter formulas on the worksheet to use automatic subtotal. Excel will perform the calculation you prefer on the column data (you have to group on that column first). Extra rows with the appropriate labels are inserted to display the total amount for each group. And the data will be outlined so that you can easily to expand or collapse it to display the details or the summary.

Sample7

Subtotal

SAMPLE6

	City	Office No	Date	Sales	In. #	Customer	Invoice total	State
30	**Atlanta Total**						35618.55	
57	**Boston Total**						27994.85	
58	Cleveland	8	8/5/2012	Sharon Gifford	1074	Calif Beauty Inc.	168.84	OH
59	Cleveland	8	8/5/2012	John Savage	1075	Print State TV	1709.86	OH
60	Cleveland	8	9/5/2012	John Miller	1087	Raymond Computing	644.17	OH
61	Cleveland	8	9/5/2012	John Miller	1088	KLK Pharr Systems Inc.	799.87	OH
62	Cleveland	8	10/5/2012	Bill Diaddigo	1097	Wright L. Tither & Sons.	2256.81	OH
63	Cleveland	8	10/5/2012	Bill Diaddigo	1109	Town Computer Systems	15.48	OH
64	Cleveland	8	10/5/2012	John Miller	1112	Wright L. Tither & Sons.	863.96	OH
65	Cleveland	8	11/5/2012	John Miller	1113	Maximal Computing Prosthesis	1890.75	OH
66	Cleveland	8	11/5/2012	Ned Auch	1117	Mixing Systems & Company	1085.32	OH
67	Cleveland	8	12/5/2012	Ned Auch	1127	P. Technology Incorporated	2048.88	OH
68	Cleveland	8	12/5/2012	John Savage	1130	SOFTWARE Computer Service	1132.30	OH
69	Cleveland	8	12/5/2012	John Miller	1134	Cox Rock SDA Systems	166.12	OH
70	Cleveland	8	12/5/2012	John Miller	1137	Vaultec Studies	3321.66	OH
71	Cleveland	8	14/5/2012	John Miller	1160	Custom Systems Trouble Forum	878.27	OH
72	Cleveland	8	14/5/2012	Ned Auch	1162	SOFTWARE Computer Service	328.88	OH
73	Cleveland	8	17/5/2012	Bill Diaddigo	1191	Vector Computer Inc.	2245.13	OH
74	Cleveland	8	17/5/2012	Ned Auch	1192	Rubber & Designs	1435.36	OH
75	Cleveland	8	17/5/2012	Bill Diaddigo	1193	Data White Truck Steel	774.58	OH
76	Cleveland	8	18/5/2012	Ned Auch	1208	Hearth & Color Farm	821.19	OH
77	Cleveland	8	18/5/2012	John Savage	1212	1st Data Reductions	512.45	OH
78	Cleveland	8	19/5/2012	John Savage	1215	Town Computer Systems	1367.38	OH
79	Cleveland	8	19/5/2012	Sharon Gifford	1223	SOFTWARE Computer Service	846.88	OH
80	Cleveland	8	21/5/2012	Ned Auch	1229	Farhill Films Gallery	1972.45	OH
81	Cleveland	8	21/5/2012	Sharon Gifford	1231	DPCS Produce	1720.17	OH
82	Cleveland	8	22/5/2012	John Miller	1236	Mike M. Business Equipment Cor	249.53	OH
83	Cleveland	8	22/5/2012	Sharon Gifford	1242	Ryan-givens Corp	494.82	OH
84	Cleveland	8	22/5/2012	Sharon Gifford	1248	Dinettes Ltd	127.24	OH
85	**Cleveland Total**						29878.35	
118	**Dallas Total**						43073.00	
149	**New York Total**						32161.75	
150	**Grand Total**						168726.50	
151								

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Preparing a list for Automatic Subtotal

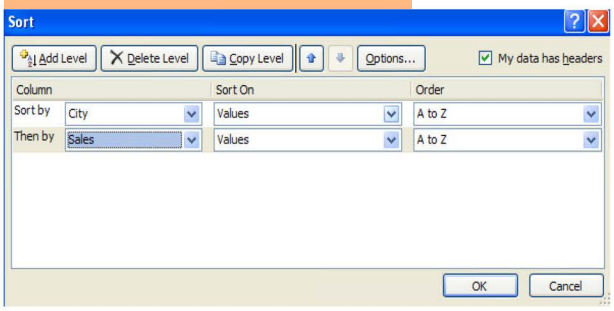
Before using subtotal, you need to group the items you want to have the subtotal. The most effective way to do it is by using the sort function of Excel.

Let taking the worksheet subtotal as an example, if you want to perform subtotal on invoice total for each salesperson under each city. You need to group the city and salesman. You can

- Choose Sort under the Data tab
- Sort the data by City and then by Sales

Sort by City first

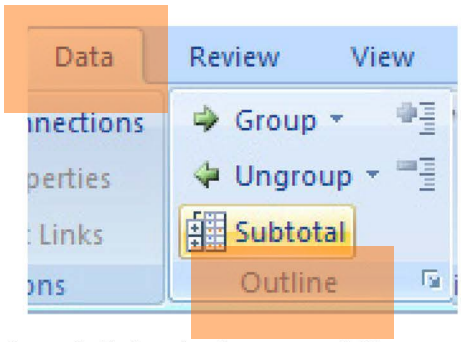
then sort by sales



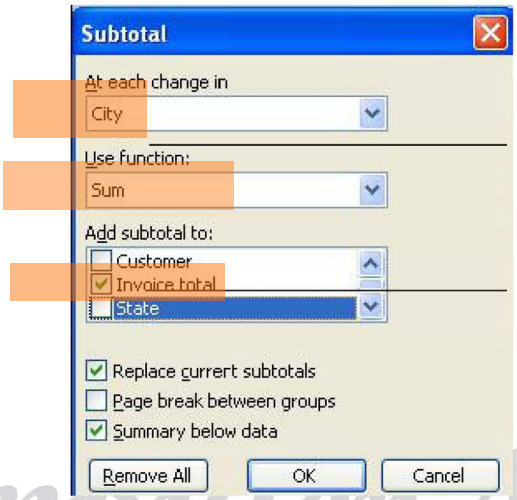
Performing the subtotal function

After grouping the items, we can perform subtotal

- **Click on the list**
- **Choose Subtotal from Outline under the Data tab**



A subtotal dialog is shown as follows



Click here to choose the subtotal you want to apply

Click here to choose the function you are interested in

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- **Choose City under At Each Change in**
- **Choose the Sum under Use Function :**
- **Check the Invoice total box Under Add subtotal To :**
- **Click the OK button.**

The list will be summarized as follows:

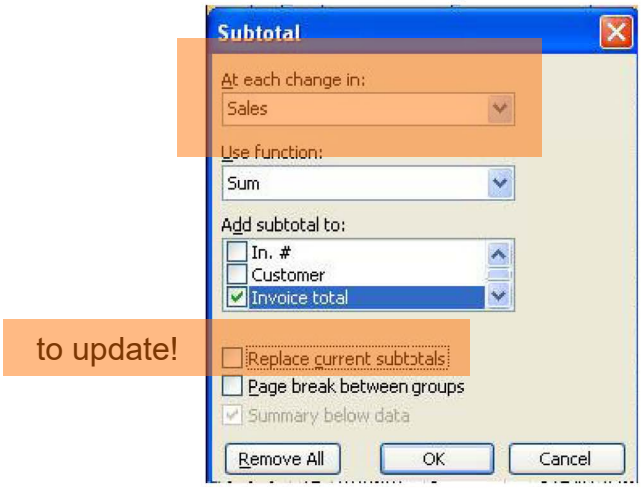
11	Atlanta	6	19/5/2012	Keith Sutherland	1222	Micro Test & Assembly Corporatic	1684.74	GA
12	Atlanta	6	23/5/2012	Keith Sutherland	1251	Data Inc.	1400.04	GA
13	Atlanta	6	8/5/2012	Kim Baer	1066	BoreMax Computer Thrills	784.64	GA
14	Atlanta	6	8/5/2012	Kim Baer	1073	Micro LTD.	970.27	GA
15	Atlanta	6	9/5/2012	Kim Baer	1077	Countryland Master	1626.49	GA
16	Atlanta	6	9/5/2012	Kim Baer	1079	Financial Computer Masters	1878.62	GA
17	Atlanta	6	10/5/2012	Kim Baer	1094	Comsof State DSSD	2726.63	GA
18	Atlanta	6	11/5/2012	Kim Baer	1125	PC Creations	739.36	GA
19	Atlanta	6	13/5/2012	Kim Baer	1152	Kirk Ease Types	840.39	GA
20	Atlanta	6	19/5/2012	Kim Baer	1217	Software Corporate Forms Systen	1131.14	GA
21	Atlanta	6	20/5/2012	Kim Baer	1226	Processing Tech. Times	984.23	GA
22	Atlanta	6	10/5/2012	Ned Hicks	1103	Deaufort Office Associates	1845.25	GA
23	Atlanta	6	11/5/2012	Ned Hicks	1119	JLS Consulting	1528.47	GA
24	Atlanta	6	12/5/2012	Ned Hicks	1135	LA Computer Associates	1386.26	GA
25	Atlanta	6	13/5/2012	Ned Hicks	1153	BoreMax Computer Thrills	1570.76	GA
26	Atlanta	6	16/5/2012	Ned Hicks	1184	Ski Computing & Systems	1253.50	GA
27	Atlanta	6	22/5/2012	Ned Hicks	1243	Memorial Data	1314.05	GA
28	Atlanta	6	10/5/2012	Robert Angelo	1099	R. Systems	759.90	GA
29	Atlanta	6	15/5/2012	Robert Angelo	1177	Daily Thorne	990.00	GA
30	**Atlanta Total**						35618.55	
31	Boston	2	10/5/2012	Doris Dupuy	1111	A. Arts Computers	1493.34	MA
32	Boston	2	13/5/2012	Doris Dupuy	1149	Award Ammonia Greenhouses	175.55	MA
33	Boston	2	18/5/2012	Doris Dupuy	1199	Print Mayo Consultation	1353.51	MA
34	Boston	2	9/5/2012	E. Faulkner	1082	Maguey Real Inc.	999.81	MA
35	Boston	2	12/5/2012	E. Faulkner	1142	First Computer	893.28	MA
36	Boston	2	16/5/2012	E. Faulkner	1180	International Business Solutions	159.67	MA
37	Boston	2	18/5/2012	E. Faulkner	1209	JLS Consulting	147.86	MA

Preparing the second level subtotal

The above subtotal is only show the total for each city. Since we want to summarize the total of each salesman in each city, we can repeat the subtotal function to include the salesman column.

- **Choose Subtotal from Data tab**

- **Follow below settings**



If we don't uncheck Replace Current Subtotals, Excel will replace the current subtotal.

The list will be summarized as following

	City	Office No	Date	Sales	In. #	Customer	Invoice total	State
2	Atlanta	6	9/5/2012	Jim Surbrook	1091	Min/Max Builders	1317.57	GA
3	Atlanta	6	10/5/2012	Jim Surbrook	1102	Graphic Chip Computing	785.44	GA
4	Atlanta	6	15/5/2012	Jim Surbrook	1168	Maguey Real Inc.	1095.63	GA
5	Atlanta	6	17/5/2012	Jim Surbrook	1196	LPS Films Products	1769.29	GA
6	Atlanta	6	18/5/2012	Jim Surbrook	1205	Dennis and Incorporated	753.18	GA
7				**Jim Surbrook Total**			5721.11	
8	Atlanta	6	10/5/2012	Keith Sutherland	1107	Hill Companies Of Marin	1711.40	GA
9	Atlanta	6	13/5/2012	Keith Sutherland	1155	Info Management MCS	846.62	GA
10	Atlanta	6	14/5/2012	Keith Sutherland	1163	Processing Tech. Times	1062.07	GA
11	Atlanta	6	18/5/2012	Keith Sutherland	1206	Systems Inc	862.61	GA
12	Atlanta	6	19/5/2012	Keith Sutherland	1222	Micro Test & Assembly Corporatic	1684.74	GA
13	Atlanta	6	23/5/2012	Keith Sutherland	1251	Data Inc.	1400.04	GA
14				**Keith Sutherland Total**			7567.48	
15	Atlanta	6	8/5/2012	Kim Baer	1066	BoreMax Computer Thrills	784.64	GA
16	Atlanta	6	8/5/2012	Kim Baer	1073	Micro LTD.	970.27	GA
17	Atlanta	6	9/5/2012	Kim Baer	1077	Countryland Master	1626.49	GA
18	Atlanta	6	9/5/2012	Kim Baer	1079	Financial Computer Masters	1878.62	GA
19	Atlanta	6	10/5/2012	Kim Baer	1094	Comsof State DSSD	2726.63	GA
20	Atlanta	6	11/5/2012	Kim Baer	1125	PC Creations	739.36	GA
21	Atlanta	6	13/5/2012	Kim Baer	1152	Kirk Ease Types	840.39	GA
22	Atlanta	6	19/5/2012	Kim Baer	1217	Software Corporate Forms Systen	1131.14	GA
23	Atlanta	6	20/5/2012	Kim Baer	1226	Processing Tech. Times	984.23	GA
24				**Kim Baer Total**			11681.77	
25	Atlanta	6	10/5/2012	Ned Hicks	1103	Deaufort Office Associates	1845.25	GA
26	Atlanta	6	11/5/2012	Ned Hicks	1119	JLS Consulting	1528.47	GA
27	Atlanta	6	12/5/2012	Ned Hicks	1135	LA Computer Associates	1386.26	GA
28	Atlanta	6	13/5/2012	Ned Hicks	1153	BoreMax Computer Thrills	1570.76	GA
29	Atlanta	6	16/5/2012	Ned Hicks	1184	Ski Computing & Systems	1253.50	GA
30	Atlanta	6	22/5/2012	Ned Hicks	1243	Memorial Data	1314.05	GA
31				**Ned Hicks Total**			8898.29	
32	Atlanta	6	10/5/2012	Robert Angelo	1099	R. Systems	759.90	GA
33	Atlanta	6	15/5/2012	Robert Angelo	1177	Daily Thorne	990.00	GA
34				**Robert Angelo Total**			1749.90	
35	**Atlanta Total**						35618.55	
36	Boston	2	10/5/2012	Doris Dupuy	1111	A. Arts Computers	1493.34	MA
37	Boston	2	13/5/2012	Doris Dupuy	1149	Award Ammonia Greenhouses	175.55	MA
38	Boston	2	18/5/2012	Doris Dupuy	1199	Print Mayo Consultation	1353.51	MA

Blank / Array / Balance Sheet / Chart Data / Database Data / Database Function / drop down box / Hlookup / IF / Income / Link

Removing subtotal

To remove the subtotal

- **Click to select the data range**
- **Select Subtotal from Data tab**
- **Click Remove All button**

Document protection

There are several levels of protection which can avoid documents from being altered. They are

- Protect Workbook

  Users are prevented from altering the structures and windows of the workbook.

- Protect Sheet

  Users are prevented from changing, formatting data or altering columns or rows etc.

- Protect Excel File

  Users are not allowed to open the file or restricted to read only.

Protecting Workbook

Users are prevented from changing, formatting data or altering columns or rows etc. There are two types of information in a workbook can be protected. They are

- Structure

  Under this level of protection, users cannot insert, delete, move, hide or unhide worksheets.

- Window

  Users are not allowed to move or resize a workbook window.

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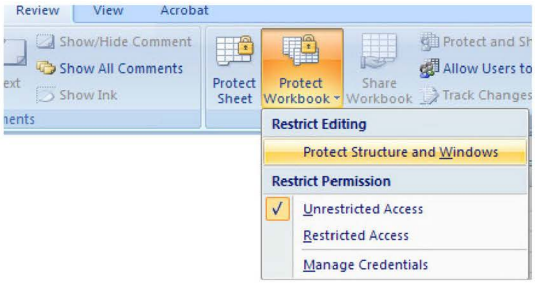
To protect a workbook

- **Choose Protect Structure and Windows from Changes under Review tab**



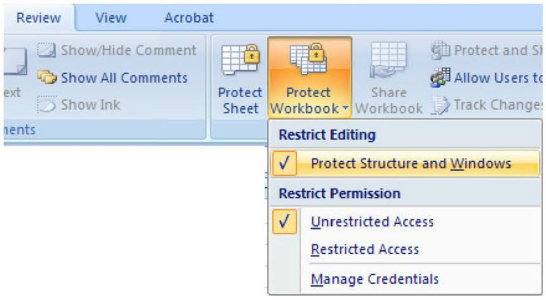
- **Enter the password in the space provided and click OK button**

- **Confirm the password by entering it again in the following box and click OK button.**

Now we see the window of the protected workbook is fixed on the screen and we cannot move it. Also you cannot insert or delete the worksheet inside the work book.

To unprotect the workbook

- **Choose Protect Structure and Windows from Changes again**



- **Type the password and type OK button**

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Protecting Worksheet

Locking or Unlocking cells

We can protect the worksheet so cells in the are prevented from being altered. Before using the protect worksheet, users have to select which cells (locked) are going to be protected or which ones (unlocked) aren't. Therefore, we may have to lock or unlock these cells.

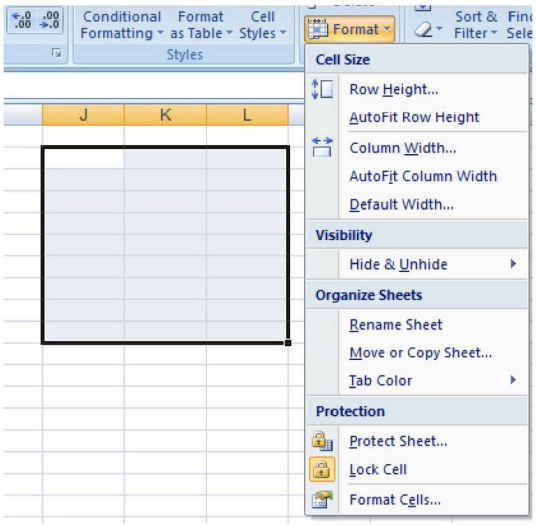
To lock or unlock cells

- **Select the cells**
- **Choose Lock Cell from Format under Home tab**

e.g.

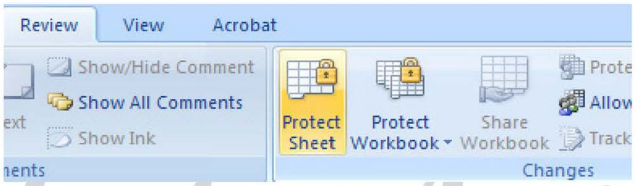
Sample7

mortage



To protect a worksheet

- Choose Protect Sheet from Review tab (or Protect Sheet... under the Format from Home tab)



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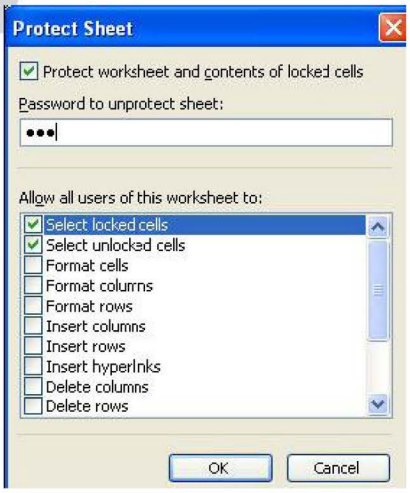
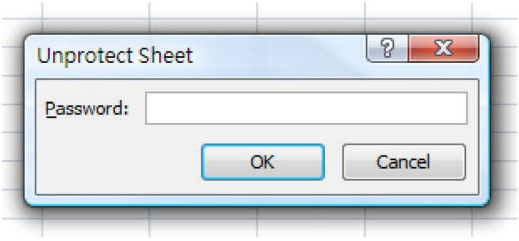
- **Check the items that you allow the users to do and type the password in the space provided, click OK button to confirm.**



- **Re-enter the password in the box provided and press OK button to confirm.**

To unprotect a worksheet

- Choose Unprotect Sheet from Review tab (or Unprotect Sheet... under the Format from Home tab)
- Type in password and click OK button to confirm.

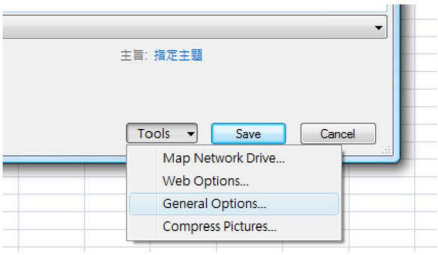


Protecting Excel file

You can protect your excel files from unauthorized person to open or update it.

To protect Excel file

- **Choose Save As**
- **Select General Options... from Tools**



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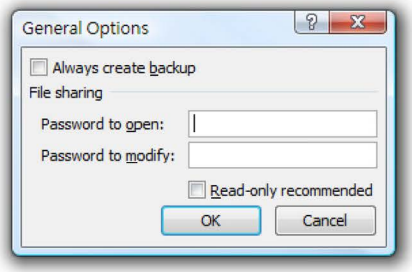
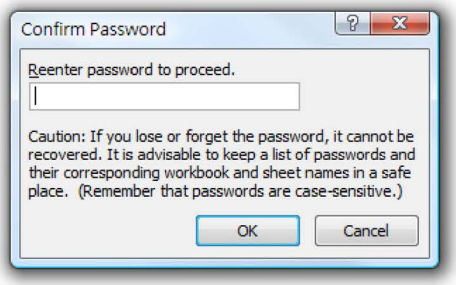
- **Enter the passwords in the below box.**



- **Re-enter the password for each of the following box**



Password to open : This is the password users are required to open.

Password to modify : After users have entered the password to open, they have to supply the password to modify if they want to modify the workbook, or otherwise they will be restricted to Read Only.

D function (database ,field ,criteria)

The database functions perform calculations on fields in a database according to the criteria you define. For example you can find the employee who sold the most overseas airline tickets in the month of March by using the DMAX function to locate the record that has the largest number of overseas airline ticket sold.

DSUM

In the worksheet Database Function, there is a small database (A11:D26) and a criteria range (A1:D2).

Sample7

Database Function

	A	B	C	D	E	F	G
1	LAST	FIRST	TARGET	REGION			
2				east			
3					**Database function**		
4							
5					Dsum()		
6					Dmax()		
7					Daverage()		
8							
9							
10							
11	LAST	FIRST	TARGET	REGION			
12	Adams	Chunk	118000	South			
13	Allen	Ellen	90000	East			
14	Atkins	Lee	113000	East			
15	Conners	Paul	142000	West			
16	Ellis	Nancy	122000	East			
17	Ford	Carl	191000	Midwest			
18	Glenn	John	80000	South			
19	Harris	Ken	176000	West			
20	Jackson	Robert	112000	East			
21	Keller	Janet	105000	West			
22	Kennedy	Sandra	135000	East			
23	Linn	Vera	80000	Midwest			
24	Parker	Greg	196000	South			
25	Peterson	Tom	98000	Midwest			
26	Stevens	Carls	110000	East			
27							
28							
29							

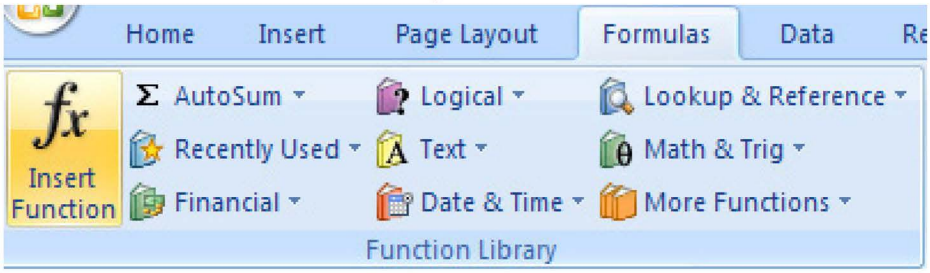
Suppose we are going to sum all the target values with the region is east and put the result in cell F5, instead of grouping records and sum them manually, we use the database function.

- **Open Database function file**
- **Select cell F5**
- **Type=Dsum(A11:D26,C1,A1:D2)**

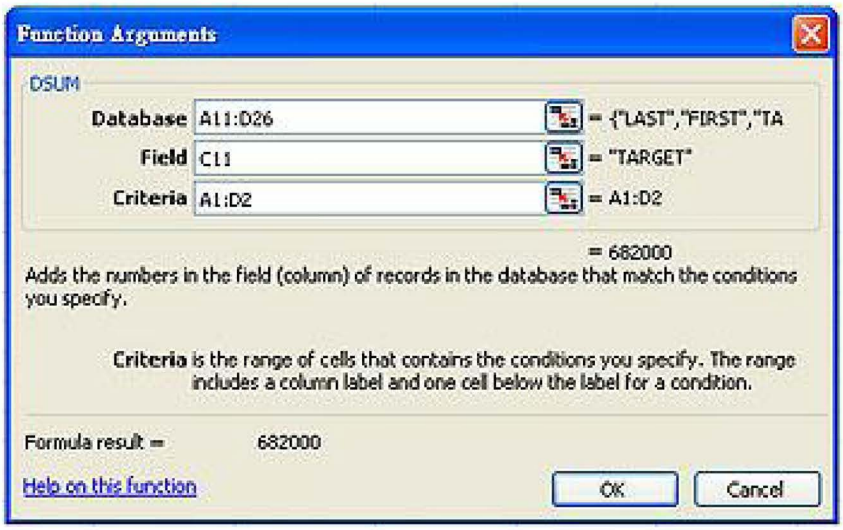
C11

or

- **Insert DSUM from Function Library under Formulas tab**



The following dialog box appears



Follow below settings to complete the dialog box

- In the Database , select range A11:D26,
- In the Field , select range C1,
- In the Criteria , select range A1:D2

Press Enter key after completing the settings.

Computer Academy

You can see the value

F5 =DSUM(A11:D26,C11,A1:D2)

	A	B	C	D	E	F	G
1	LAST	FIRST	TARGET	REGION			
2				east			
3					Database function		
4							
5					Dsum()	682000	
6					Dmax()		
7					Daverage()		
8							
9							
10							
11	LAST	FIRST	TARGET	REGION			
12	Adams	Chunk	118000	South			
13	Allen	Ellen	90000	East			

Exercise:
Ex 2

City	Sales	Invoice total
Boston	Mark Kalbfell	>1500
Boston	Jay Kennedy	>1500
Boston	Howard Schneic	>1500
Boston	Tom Caravello	>1500
Boston	Stan Pipe	>1500
Boston	Ken C Dutcher	>1500
Boston	Kim Baer	>1500
Boston	Sharon Gifford	>1500
New York	Mark Kalbfell	>1500
New York	Jay Kennedy	>1500
New York	Howard Schneic	>1500
New York	Tom Caravello	>1500
New York	Stan Pipe	>1500
New York	Ken C Dutcher	>1500
New York	Kim Baer	>1500
New York	Sharon Gifford	>1500

Similarly, we can enter below formulas for finding maximum value for the order in region East and the average order amount as well.

- **On cell F6, enter the formula =dmax(A11:D26,C11,A1:D2) to calculate the maximum value**
- **On cell F7, enter the formula =daverage (A11:D26,C11,A1:D2) to calculate the average value**

The result are shown as followings :-

REGION		
east		
	Database function	
	Dsum()	682000
	Dmax()	135000
	Daverage()	113666.7

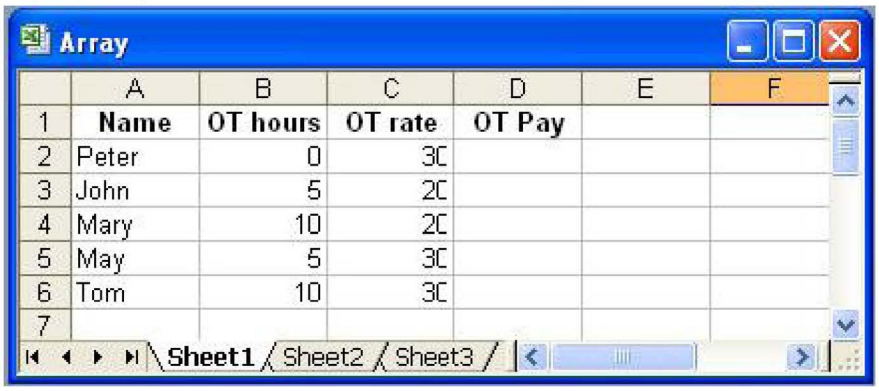
Array

In some worksheets, you may want to use multiple values as an argument for a function or you may want a function to produce multiple values. Such a list of multiple values is called an array. For example {1,4,10} *{2,3}=2,8,20,3,12,30.

Suppose we want to calculate the OT pay for each individual staff on the basis of their OT hours and OT rate, which are in two separate columns. Instead of using the traditional method to build equation on D2 and copy it to the rest of cells, we can apply the array concept to it.

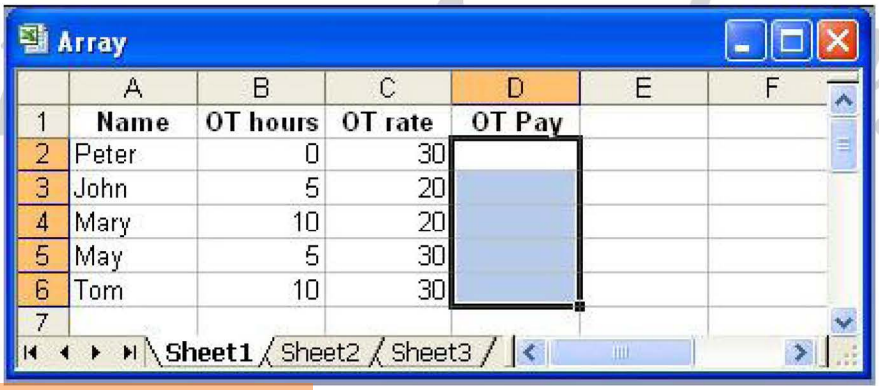
- **Open Array data file**

(if array doesn't work) Formulas Tab > Calculation Option > Manual



	A	B	C	D	E	F
1	Name	OT hours	OT rate	OT Pay		
2	Peter	0	30			
3	John	5	20			
4	Mary	10	20			
5	May	5	30			
6	Tom	10	30			
7						

- **Select D2:D6**



	A	B	C	D	E	F
1	Name	OT hours	OT rate	OT Pay		
2	Peter	0	30			
3	John	5	20			
4	Mary	10	20			
5	May	5	30			
6	Tom	10	30			
7						

- **Type=B2:B6*C2:C6**
- **Press Ctrl + Enter key**

Ctrl + Shift + Enter

	A	B	C	D
1	Name	OT hours	OT rate	OT Pay
2	Peter	0	30	0
3	John	5	20	100
4	Mary	10	20	200
5	May	5	30	150
6	Tom	10	30	300

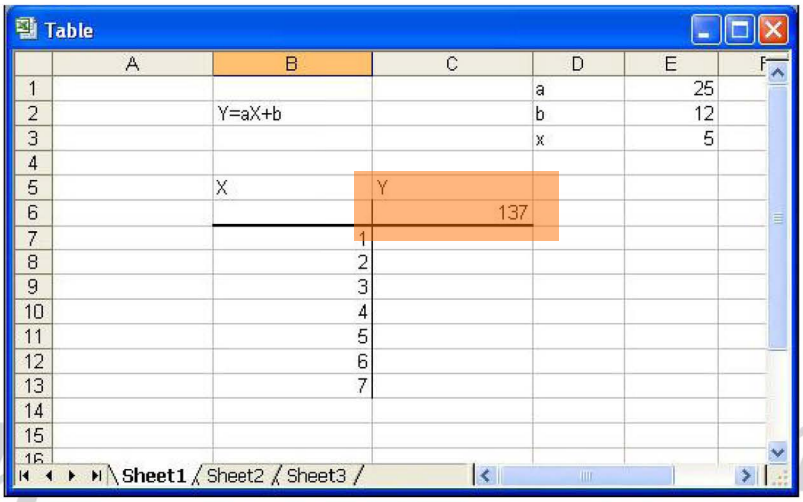
Data Table

The Data Table feature should be used whenever you need to apply a series of input values to one or two cells (variables) of an equation (formula) in a worksheet or create a series of output values in one or more columns or rows.

One-Input Tables

If you want to see the result of an equation by changing one variable with different values. One-input table should be used.

- Open Table Data file



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Suppose we would like to calculate values of Y according to different values in X using the formula below

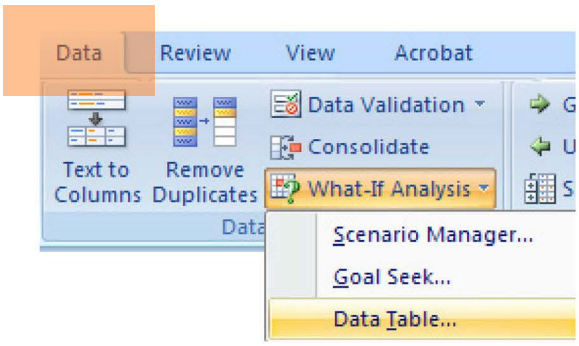
$Y = aX + b$

The first step is to write the above equation into a formula which Excel can understand. Hence we

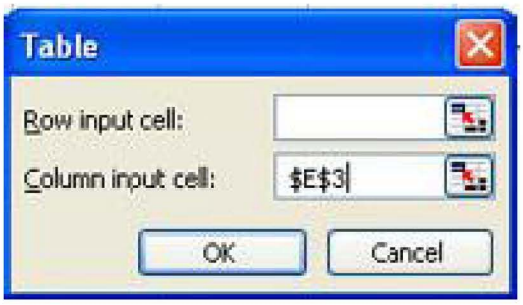
- **Click on C6 and enter the formula "=E1*E3+E2"**

Then we can execute the one-input table feature

- **Select B6:C13**
- **Choose Data Table... from What-If-Analysis under Data tab**



- **Click the Column input cell**
- **Select cell E3 (it tells Excel value in E3 should be substituted by values in range B7:B13 each time) and click OK button**



Two-input tables

In a one-input table, a single input cell is used to calculate the values for one column or row. In a two-input table, two input cells are used to calculate the values for one or more columns or rows.

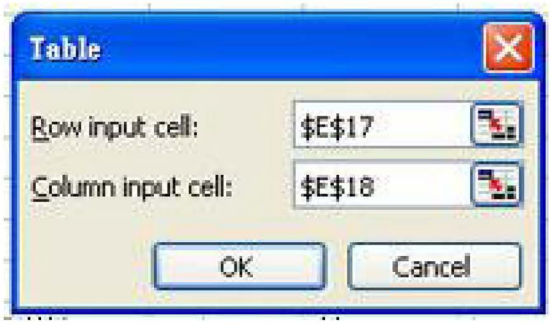
Suppose we would like to calculate the value Y according to the variable X and Z, we have to write the formula in Cell B first.

- **Click B19 and enter the formula =E15*E18+E16*E17**
- **Select B19:F26**

	A	B	C	D	E	F
13						
14						
15				a	25	
16				b	12	
17		Y=aX+bZ		z	1	
18				x	1	
19		37	15	20	25	30
20		1				
21		2				
22		3				
23		4				
24		5				
25		6				
26		7				

Computer Academy

- **Choose Data Table... from What-If-Analysis under Data tab**
- **Click cell E17 under Row Input Cell**



- **Click cell E18 under Column input Cell**
- **Click OK button.**

Sample7

mortgage 1,2

p.36 -> Scenario Manager

Adv Exercise

What if analysis

Lookup functions

You can use a lookup functions to find pieces of information that is based on another piece of information. For example, you can use a lookup function to enter the product name into your invoice according to the item number you input.

Lookup

The format of the function is look like

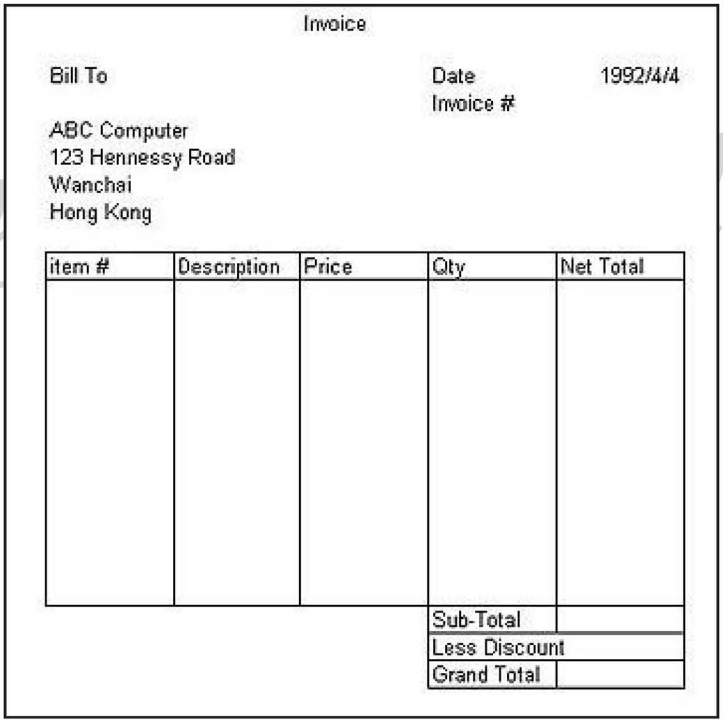
Lookup (lookup value, compare vector, result rector)

The function compares vector for largest value less then or equal to lookup value. It returns the corresponding value of result vector. The values in compare vector can be text number or logical, but they must be in ascending order

We will create an invoice by using a lookup function, so that when user inputs the item #, Excel will search the item # in the product database and return the description and price if the item # exists.

Sample 7

Look up table


Invoice

Bill To

Date 1992/4/4

Invoice #

ABC Computer
123 Hennessy Road
Wanchai
Hong Kong

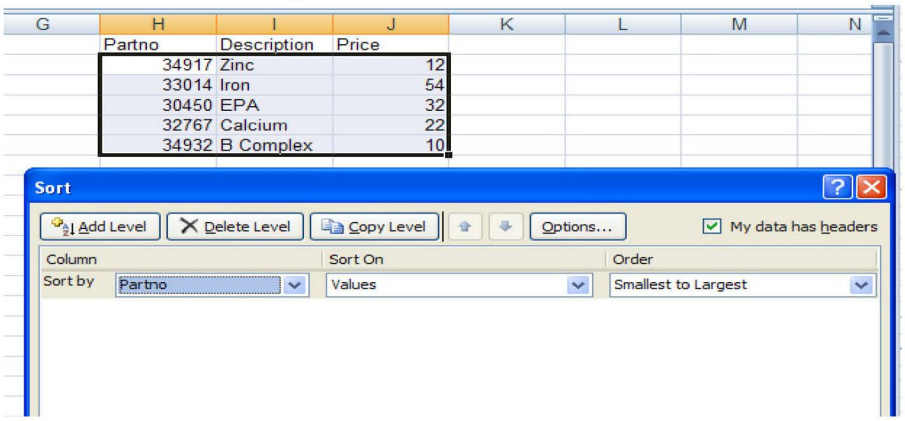
item #	Description	Price	Qty	Net Total
			Sub-Total	
			Less Discount	
			Grand Total	

- **Choose the worksheet Lookup table**

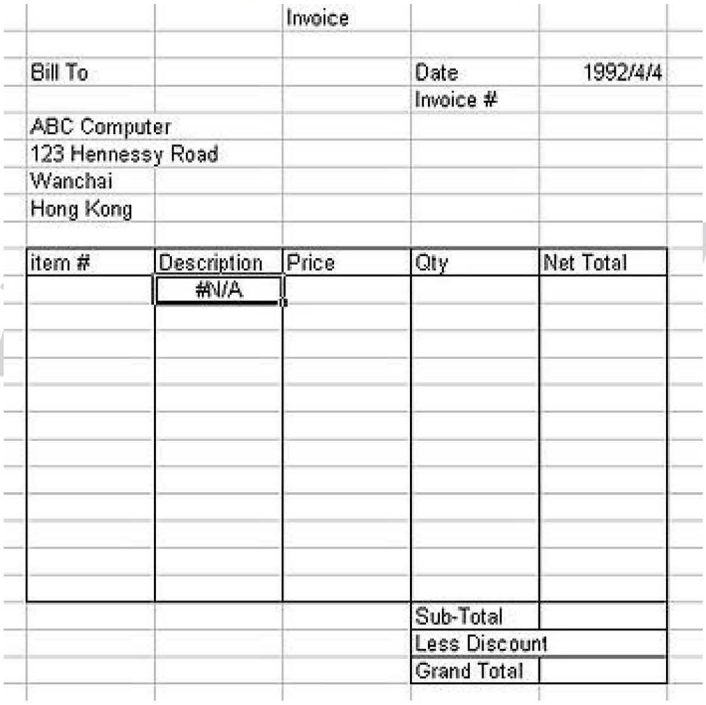
In the worksheet, there is a product database and invoice form and the products

database (compare vector) has to be sorted (ascending) before we can use it.

- **Name the range H1:J6 (the products database)Partdata**
- **Sort H1:J6 in ascending order.**



- **Type =Lookup(B11,$H$2:$H $6,$I$2:$I$6) in cell C11**



- **Type =Lookup(B11,$H$2:$H$6,$J$2:$J$6) in cell D11**
- **Copy the above formula down to the bottom**

		Invoice		
Bill To			Date	1992/4/4
			Invoice #	
ABC Computer				
123 Hennessy Road				
Wanchai				
Hong Kong				
item #	Description	Price	Qty	Net Total
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
			Sub-Total	
			Less Discount	
			Grand Total	

- **Type=SUM(F11:F23)**

	#N/A	
	#N/A	
	#N/A	
Sub-Total	=SUM(F11:F22	
Less Discount	SUM(**number1**, [number2], ...)	
Grand Total		

- **Type =F23-F24 in cell F25**

#N/A		#N/A
	Sub-Total	#N/A
	Less Discour	=F23-F24
	Grand Total	

After setting up the formulas, we can try some inputs on the invoice

- **Try enter 30450 in cell B11(Excel will fill in the description and price ascending to the item, Enter the item# here)**

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Adv Exercise
Ex6 Look up

		Invoice		
Bill To			Date	1992/4/4
			Invoice #	
ABC Computer				
123 Hennessy Road				
Wanchai				
Hong Kong				
item #	Description	Price	Qty	Net Total
30450	EPA	32		0
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
	#N/A	#N/A		#N/A
			Sub-Total	#N/A
			Less Discour	0
			Grand Total	

In the above example, lookup function can return the correct answer if users can write the item # correctly (i.e. the number can be found in the database). However, it may not be able to give the right answer in the above example if user enters an non-existence product (e.g. 30451). Excel will return EPA in the description and 32 in the Price column instead. The reason for that is because lookup function should be used to search for a value in a range (approximate match) and not for exact value (exact match). Since 30451 is a number in between the range 30450 ~ 32766, Excel will treat it as 30450 and return EPA and 32 (please refer the products database below).

Partno	Description	Price
30450	EPA	32
32767	Calcium	22
33014	Iron	54
34917	Zinc	12
34932	B Complex	10

Vlookup

Vlookup can be performed exactly the same as lookup except it provides approximate match and exact match. Below is the format of the vlookup function

VLookup (lookup value, Table_array, Col_index_num, Range_lookup)

We can use the same invoice form in the previous section to illustrate the application of the Vlookup function.

- Type=Vlookup (B11,Partdata,2,false) in cell C11 (Partdata is the name of the database and 2 refers the second column.)
- Type=Vlookup (B11,Partdata,3,false) in cell D11

Since we have specified not using range_lookup (the fourth values - false) in the above two formula, Excel will return #N/A instead of EPA and 32 if the item # is 30451 as in the case of using lookup function.

Pivot Table

PivotTable is a powerful tool which can easily turn the raw data into a report by sorting, grouping, summing or counting the data.

In the following example, you will use the worksheet subtotal to create a pivot table report in showing the total invoice amount for each salesperson under each city.

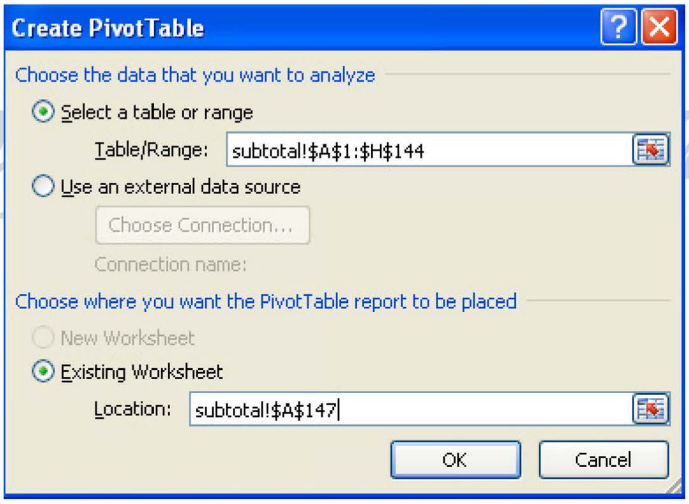
To create a pivot table

Sample 7

Subtotal

- **Select the subtotal worksheet in our sample file.**
- **Choose PivotTable from Tables under Insert tab.**

- **Select the range of the data A1:H144 and choose the location A147 as shown in below box.**



AAdvdv Exercise

Ex4

- **Click OK**

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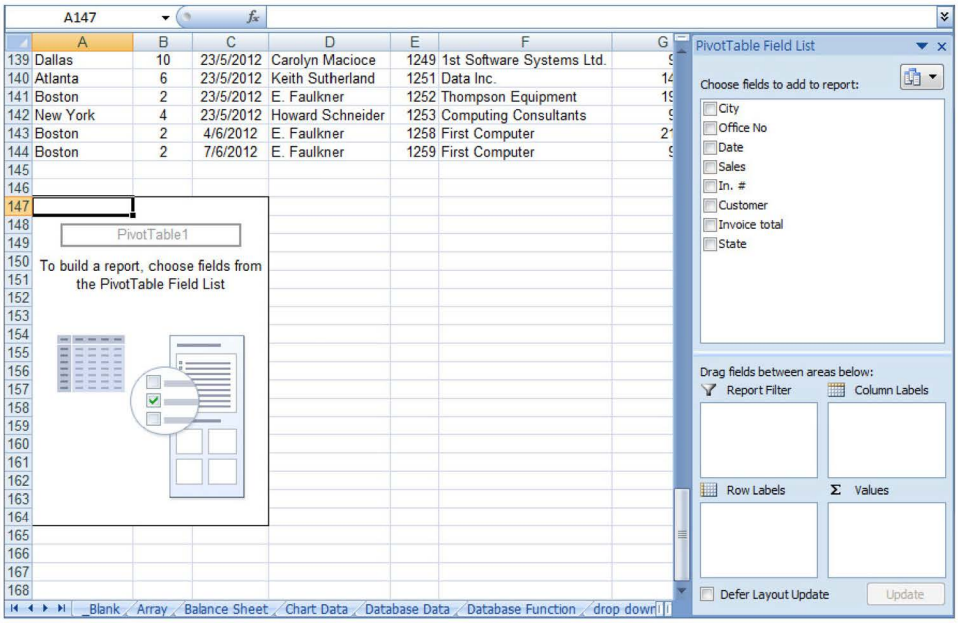
Then we will come to the following screen



- **Drag the Sales field from the right pane to Row Labels area**
- **Drag the City field from the right pane to Report Filter area**
- **Drag the invoice field from the right pane to Values area**

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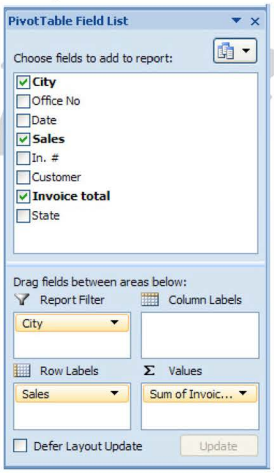

The report is generated showing the total invoice for each salesperson.

City	(All)
Row Labels	**Sum of Invoice total**
Bill Diaddigo	5292
Carolyn Macioce	7330.24
Doris Dupuy	3022.4
E. Faulkner	7216.84
Fuji Retell	8037.14
Howard Schneider	11110.85
Janet A. McCarthy	202.22
Jay Kennedy	11447.51
Jim Surbrook	5721.11
John Hodge	3855.19
John Miller	8814.33
John Savage	4721.99
Keith Sutherland	7567.48
Ken C Dutcher	10985.12
Kim Baer	11681.77
Mark Kalbfell	12601.45
Ned Auch	7692.08
Ned Hicks	8898.29
Paul Powell	917.81
Robert Angelo	1749.9
Robert Watters	1919.39
Sharon Gifford	3357.95
Stan Pipe	9736.55
T Staziola Townsend	2952.55
Tom Caravello	5748.2
Tony Baer	6066.14
Grand Total	**168726.5**

The above report shows the result from all cities, if users want to focus on specific cities, they can

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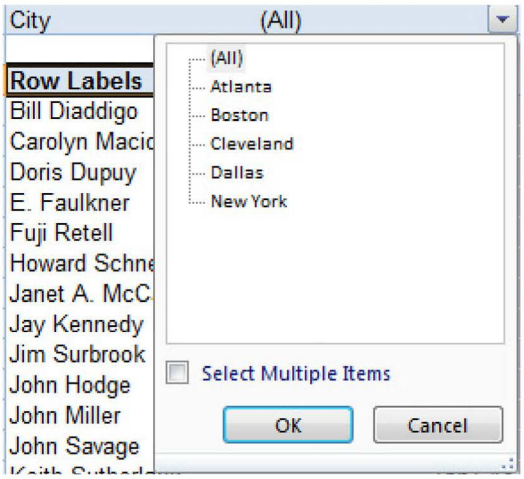
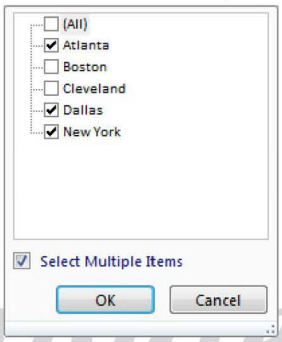
- **Click the down arrow to bring up the city list**



- **Click Select Multiple Items option, then check the cities you want.**



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- **Click OK button to confirm**

Below is the result from the cities Atlanta, Dallas and New York.

City	(Multiple Items)
Row Labels	**Sum of Invoice total**
Carolyn Macioce	7330.24
Fuji Retell	8037.14
Howard Schneider	11110.85
Jay Kennedy	11447.51
Jim Surbrook	5721.11
John Hodge	3855.19
Keith Sutherland	7567.48
Ken C Dutcher	10985.12
Kim Baer	11681.77
Ned Hicks	8898.29
Paul Powell	917.81
Robert Angelo	1749.9
Stan Pipe	9736.55
Tom Caravello	5748.2
Tony Baer	6066.14
Grand Total	**110853.3**

Adv Exercise

Ex4

Linking

Linking documents creates a relationship in which a change in one document will automatically update the cells in the other worksheets.

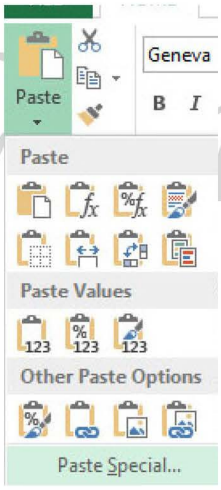
Linking worksheets

When you link cells in different worksheets the values in one will change whenever you change the values in the other. This is an easy way to ensure the associated worksheet is updated without having to enter new data into each one. You can link a cell of worksheet or range of cells.

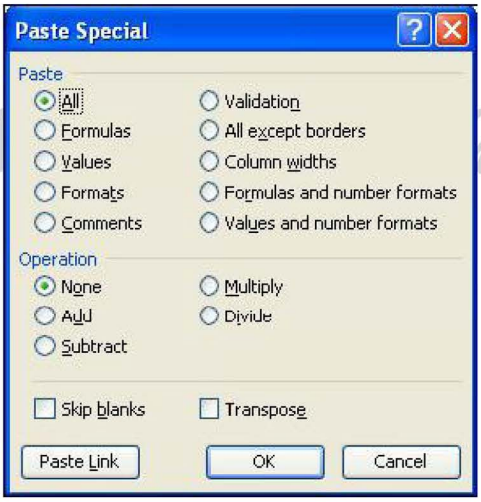
- Open Link Data file (supporting document)
- New a Worksheet (dependent worksheet) and type the labels (Jan. Feb, Mar, Qtr1) on B1

	A	B	C	D	E
1		Jan	Feb	Mar	Qtr 1
2					

- Activate the supporting document and copy A7:E7
- Activate the dependent worksheet and select cell A2.
- Choose Paste Special and click Paste Link button



OR



- Similary, copy A13:E13 into cell A3

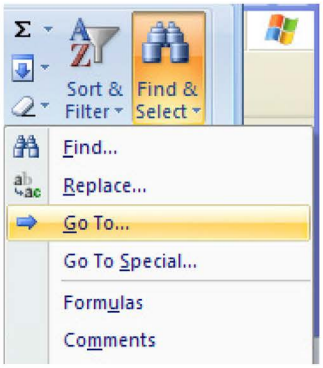
You have just completed the linking of two worksheets. If you change the figures in the supporting document, the value in the dependent worksheet will be changed as well.

Working with large spreadsheets

The followings are some suggestions for those people working with a large spreadsheet.

Using names in different areas

You may find it is quit time consuming to scroll from one work area to another area. If a name is given to a work area we can go there by using either Go To command, which is under Home tab.



- Choose Go To from Edit menu
- And then click the work area you want to go

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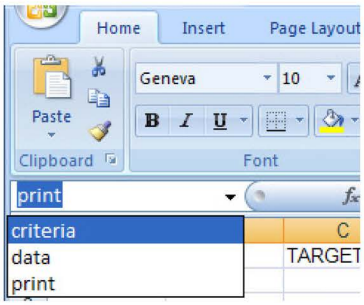
- Or even we can go to the area by clicking the corresponding names as shown.



Conditional Formatting

With that function, users can format cells to the way they want if their values can match the certain criteria. For example, changing the cells to red colour if their values are greater than a certain value, e.g. 10.

Suppose we want to highlight the top 10 items with the background colour with red. We can follow below steps to do so

- **Select the worksheet subtotal**
- **Highlight the column "Invoice total"**

	C	D	E	F	G	H	I
1	Date	Sales	In. #	Customer	Invoice total	State	
2	7/5/1990	Mark Kalbfell	1056	Mixing Systems & Company	2615.58	MA	
3	7/5/1990	Jay Kennedy	1058	Torey L. Bogg Inc	121.48	NY	
4	7/5/1990	Howard Schneider	1059	Znanie Inc.	1673.21	NY	
5	7/5/1990	Tom Caravello	1060	Glen C Data Centre Technologies	253.98	NY	
6	8/5/1990	Stan Pipe	1061	Dr. Softlight Corp	476.27	TX	
7	8/5/1990	Ken C Dutcher	1062	Dr. Softlight Corp	946.37	TX	
8	8/5/1990	Stan Pipe	1065	I & S Programming	1076.32	TX	
9	8/5/1990	Kim Baer	1066	BoreMax Computer Thrills	784.64	GA	
10	8/5/1990	Mark Kalbfell	1067	Software White Truck	859.01	MA	
11	8/5/1990	Howard Schneider	1069	Paretta Center	874.41	NY	
12	8/5/1990	Ken C Dutcher	1070	Eaton Of Association	1167.17	TX	
13	8/5/1990	Kim Baer	1073	Micro LTD.	970.27	GA	
14	8/5/1990	Sharon Gifford	1074	Calif Beauty Inc.	168.84	OH	
15	8/5/1990	John Savage	1075	Print State TV	1709.86	OH	
16	9/5/1990	Stan Pipe	1076	Letters Computing & Associates	1249.09	TX	
17	9/5/1990	Kim Baer	1077	Countryland Master	1626.49	GA	
18	9/5/1990	Mark Kalbfell	1078	Software Associates	2407.79	MA	
19	9/5/1990	Kim Baer	1079	Financial Computer Masters	1878.62	GA	
20	9/5/1990	Fuji Retell	1080	PC Works	528.27	TX	
21	9/5/1990	E. Faulkner	1082	Maguey Real Inc.	999.81	MA	
22	9/5/1990	Tom Caravello	1083	Douglas Inc.	1315.58	NY	
23	9/5/1990	T Staziola Townse	1085	Boehringer PCA	1282.23	MA	
24	9/5/1990	Stan Pipe	1086	Spectrum Computer	2148.61	TX	

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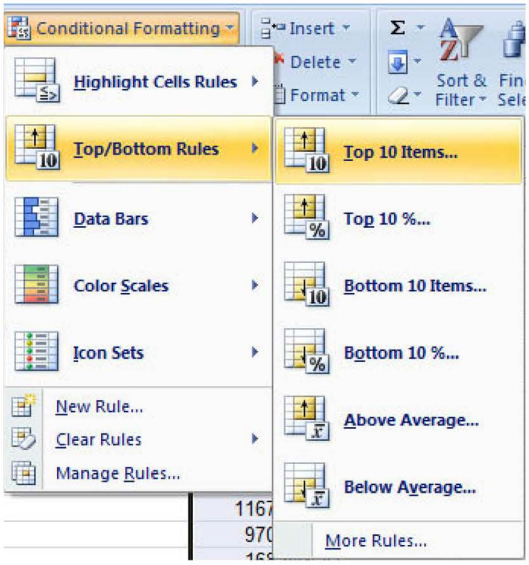
- **Choose Conditional Formatting from Styles under Home tab**
- **Select Top/Bottom Rules -> Top 10 items**

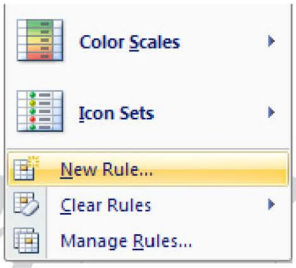


- **Type in 10 in the field and choose the colour as shown in below**

The top 10 items are highlighted as shown

F	G	H
	Invoice tota	Sta
ystems & Company	2615.58	MA
Bogg Inc	121.48	NY
nc.	1673.21	NY
ata Centre Technologies	253.98	NY
ght Corp	476.27	TX
ght Corp	946.37	TX
gramming	1076.32	TX
Computer Thrills	784.64	GA
White Truck	859.01	MA
enter	874.41	NY
Association	1167.17	TX
D.	970.27	GA
uty Inc.	168.84	OH
e TV	1709.86	OH
omputing & Associates	1249.09	TX
nd Master	1626.49	GA
Associates	2407.79	MA
Computer Masters	1878.62	GA
	528.27	TX
Real Inc.	999.81	MA
nc.	1315.58	NY
er PCA	1282.23	MA
Computer	2148.61	TX
Computing	644.17	OH
r Systems Inc.	799.87	OH
rvices	1664.67	TX
Builders	1317.57	GA
l Furniture	171.15	TX
tate DSSD	2726.63	GA
Tither & Sons.	2256.81	OH
ns	759.90	GA
nc.	952.05	NY
Chip Computing	785.44	GA
Office Associates	1845.25	GA
mated Associates	2538.18	TX
aze & Pool	1052.81	TX
	1080.39	NY
panies Of Marin	1711.40	GA

To create your own rules, user can choose New Rule from Conditional Formatting



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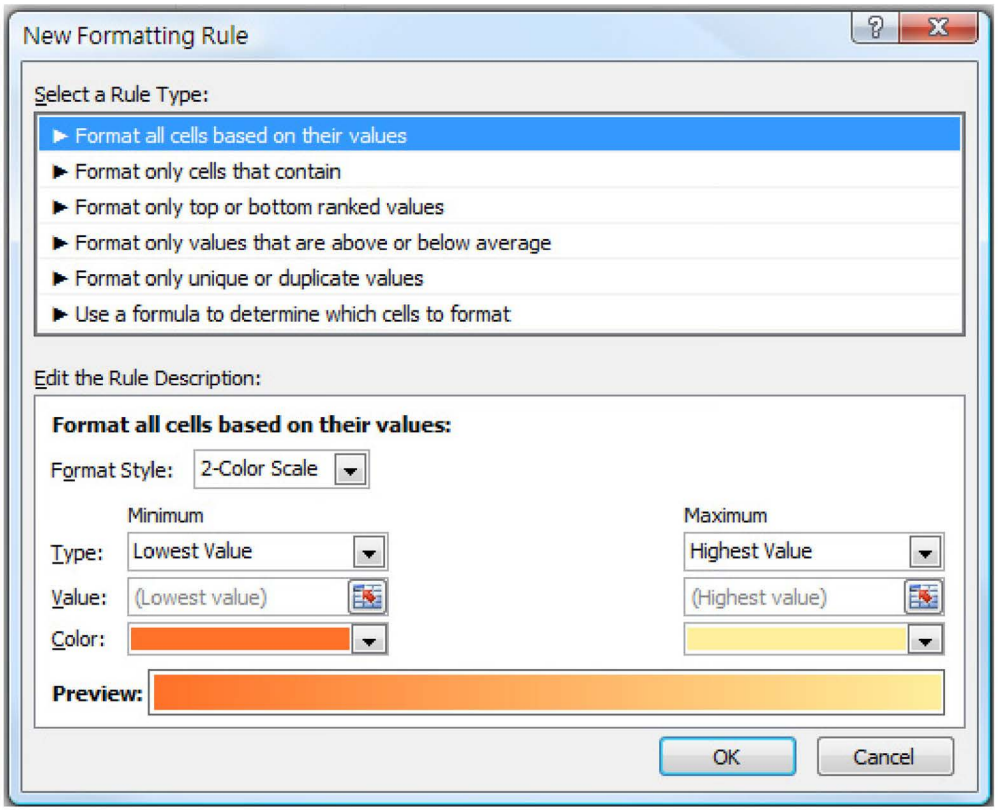
and choose the rule type and then edit the rule description in the box provided.



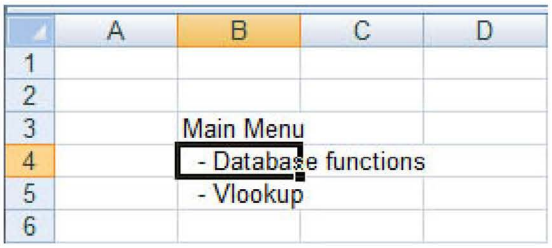
Hyperlink

Users can insert link onto their excel's text or object to provide the convenience switching to other files or going to other locations. The links can be a website, a file or a worksheet or objects as defined in the insert hyperlink dialog box.

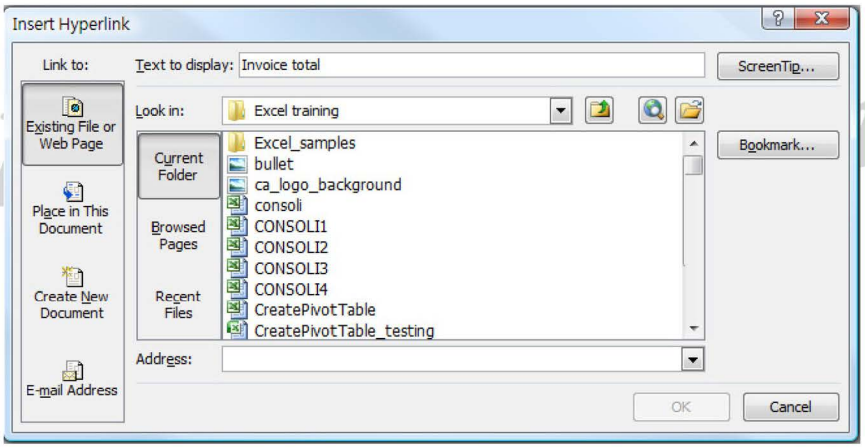
To create a link

Assuming we want to create a menu on the first worksheet of our workbook to allow users navigate to other worksheet (e.g. Database functions) inside the workbook.

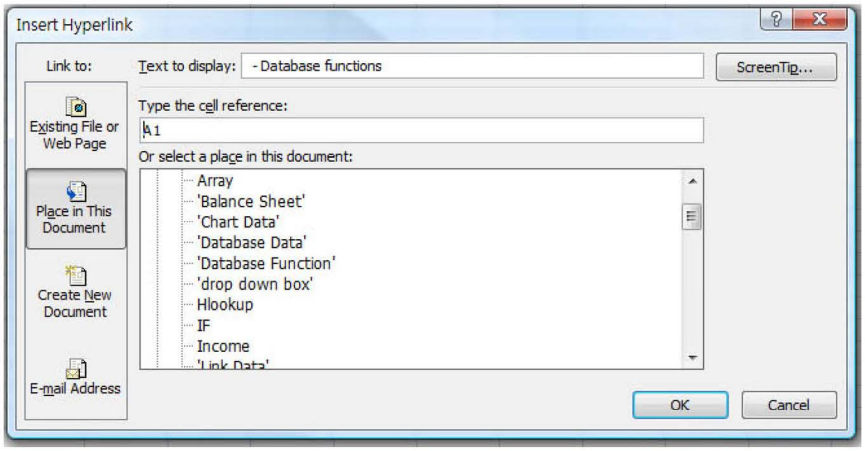
- **Prepare the menu by typing the worksheet names and select the cell with "- Database functions"**



- **Click the Hyperlink button under the Insert tab**
- **Choose Place in this Document from below box**



Excel will display the names or worksheets in the workbook and shown as follows



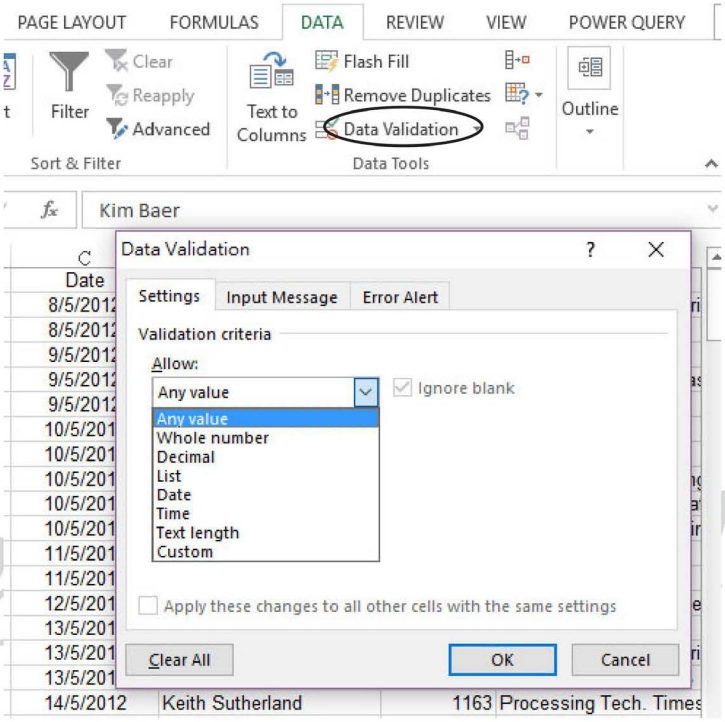
- **Choose "Database Function" (assuming we want to create a link switching to a worksheet named "Database Function")**
- **Click OK button to confirm.**

Data Validation

You can set the data type of the cells for data inputing. In the case of wrong data type, Excel will alert error messge to you.

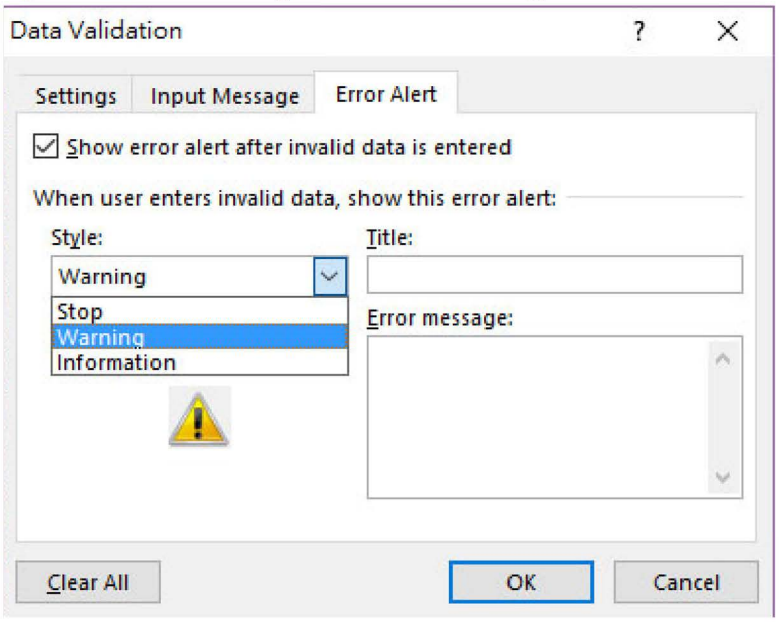
Define the data type of cells

- **Select the cells**
- **Go to DATA tab and click Data Validtion under the Data Tools**



Define the warning/error message

- **Click Error Alert tab**
- **Under Style > Warning**
- **Input the error message into Error message box**



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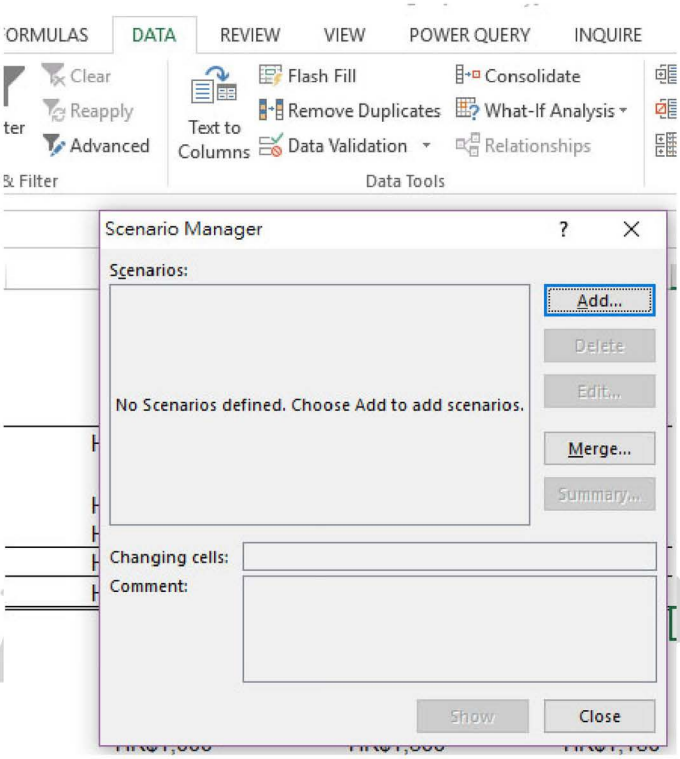
Scenario Manager

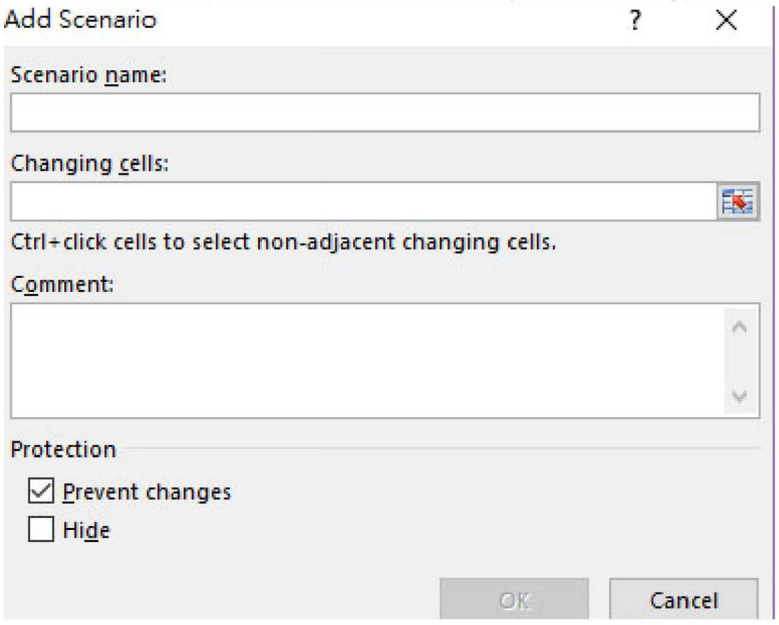
You can set different scenario for showing different result in your worksheet by Scenario Mangaer.

Define the scenario

- **Go to DATA tab and select Scenario Manger under What-If-Analysis**

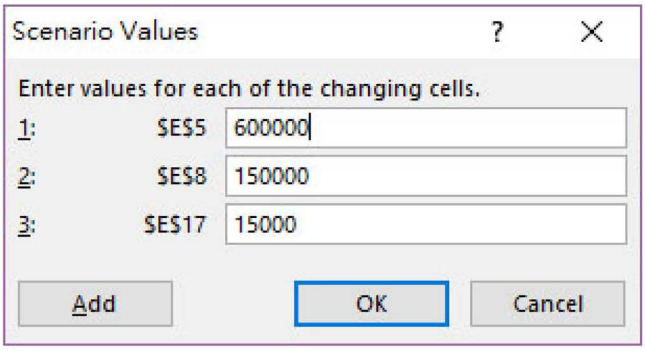


- **Click Add button to add scenario**
- **Giving name into Scenario name box**
- **Select the cells (hold down the CTRL key if necessary) into Changing cells box**



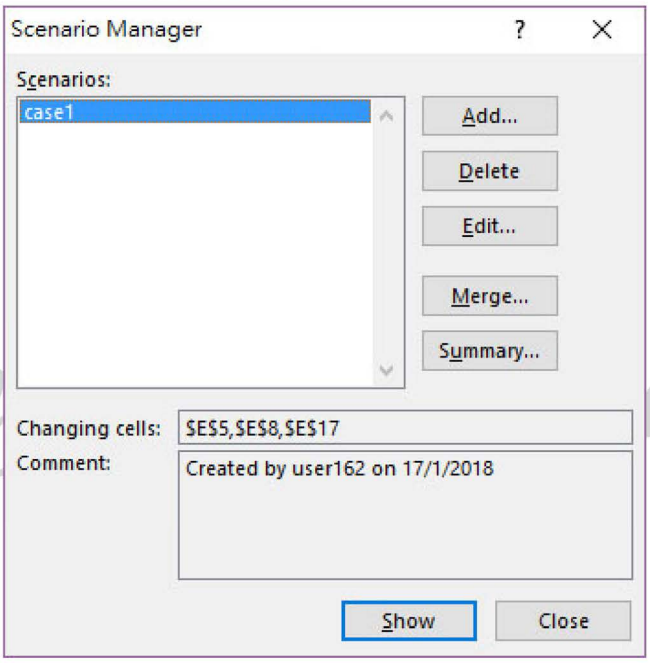
- **Giving the Scenario value of the different scenario**

- **Click Ok when done**



Show the scenario result

- **Select the scenario name and click Show button**



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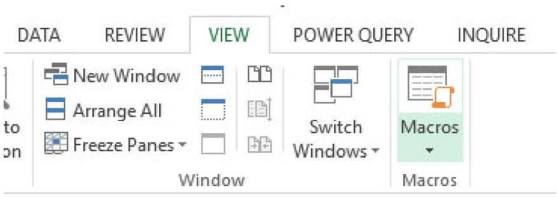
back to p.23

Creating and using Macros

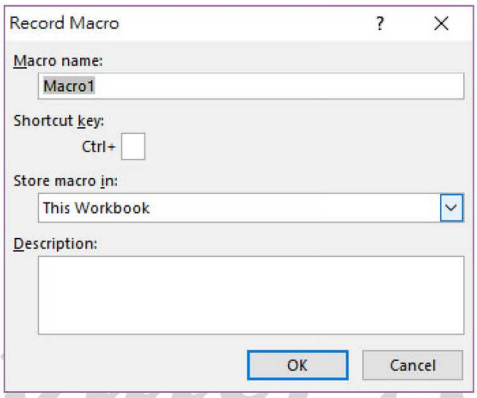
You can record your steps and save to Macros

Recording a macro

- **Go to VIEW tab and choose Macros**



- **select Use Relative References**
- **selec Record Macro....**



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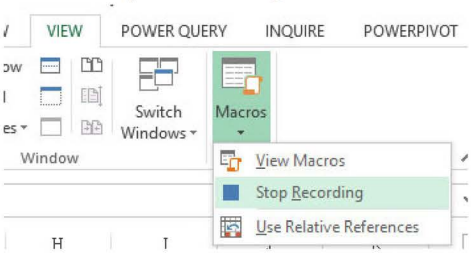
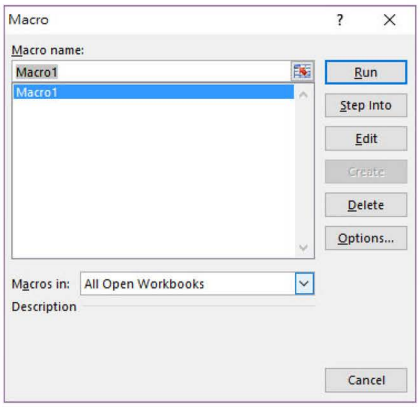
Excel will record the steps of yours now.....

- **select Stop Recording when finished**



Running a macro

- **Select View Macros**
- **Click Run to run it**



Save

Save as with macro enable

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Advanced Excel

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