



Microsoft Excel

*basic and some
advance functions*

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Microsoft Excel:

Basic and some Advance Functions

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Excel

Introduction



Spreadsheet is an electronic document in which data is arranged in the rows and columns of a grid and can be manipulated and used in calculations.



Excel



Microsoft

Microsoft Excel is a spreadsheet developed by Microsoft for Windows, macOS, Android and iOS. It organizes numeric or text data in spreadsheets or workbooks.



Excel

Introduction

Advantages of Worksheet





The elements in Microsoft Excel

Microsoft Excel consists of several elements as shown in the following table.

Element	Description
Cell	Box collision between space and line.
Row	Horizontal box marked with the numbers 1, 2, 3 etc.
Column	Vertical box marked with the letters A, B, C, etc.
Title Bar	There on the screen that broadcasts the title / name of the worksheet
Tab	Menu that have toolbar
Name box	Broadcast position the mouse pointer on a cell
Toolbar	Contains icon serves as a "shortcut" for commonly used commands such as Save, Print, Paste etc..
Formula Bar	Publish the contents of the cell (as you type)
Navigation Tab	Publish the next sheet, previous, first and last
Tab Sheet	Publish worksheets are being used - we might have more than one worksheet

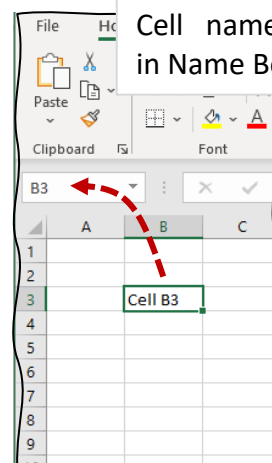
Each cell is given the name according to the position of the letters column and line number.

Example:

B3

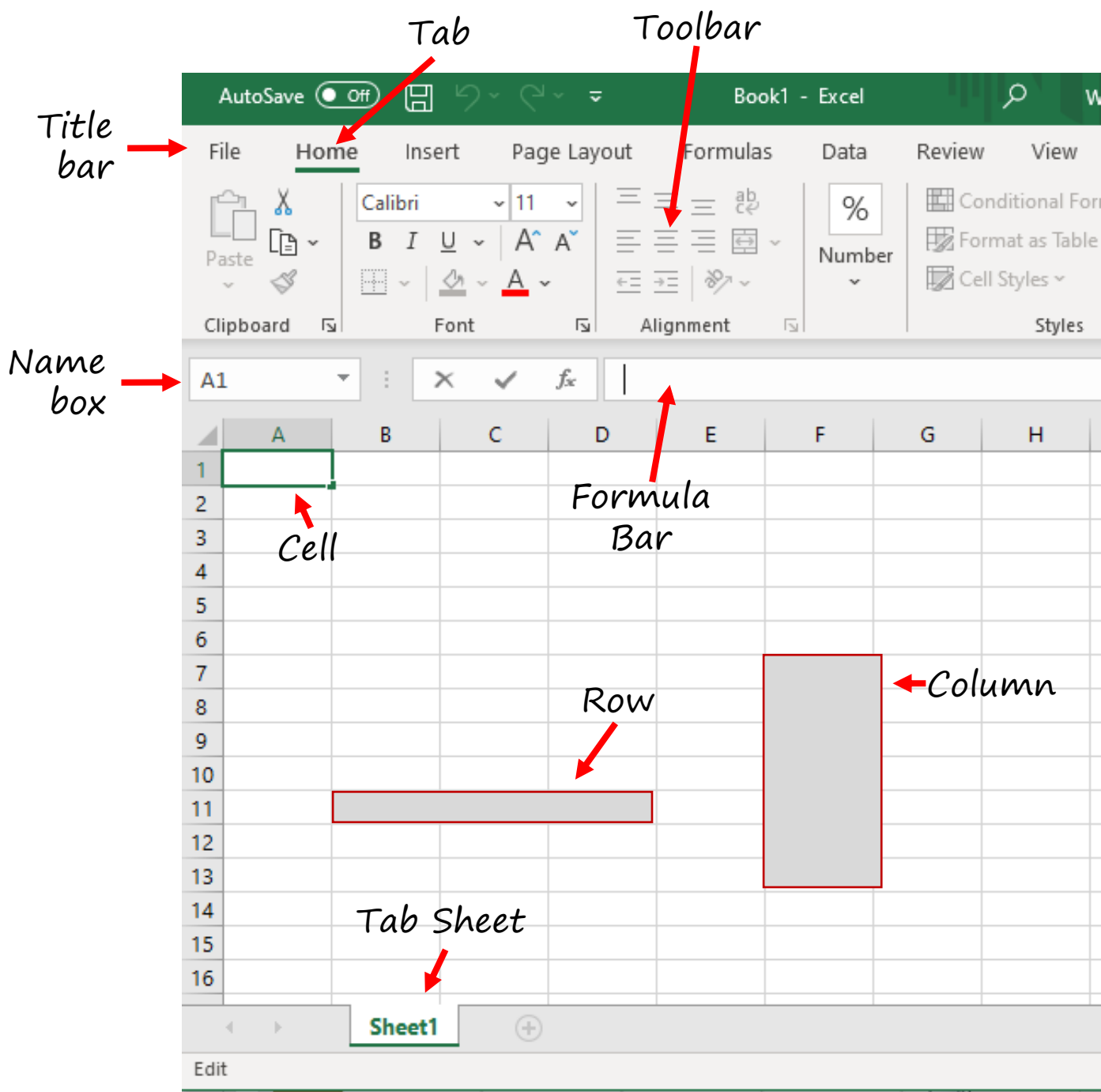
(Column B, Line 3)

Cell name shown in Name Box.





The elements in Microsoft Excel



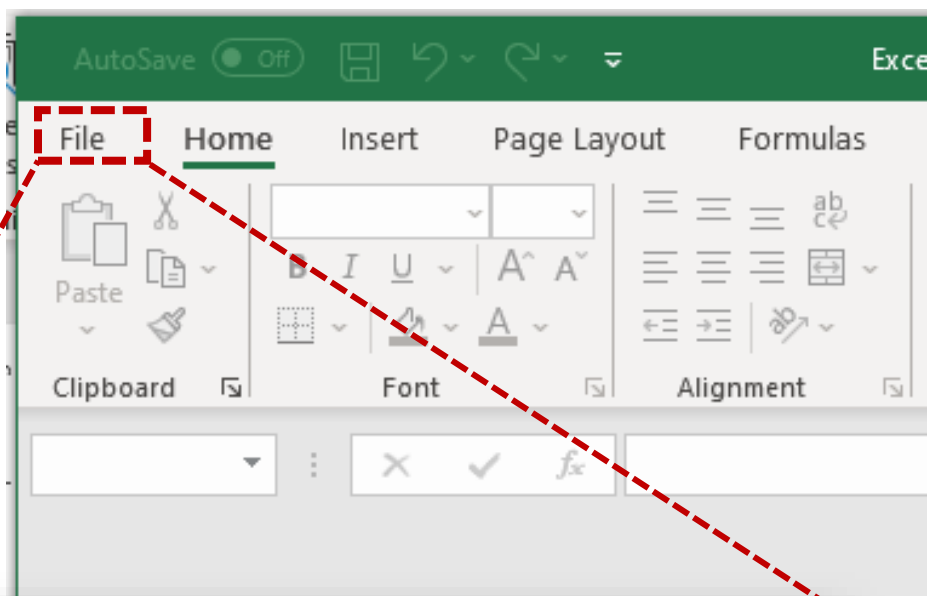


Excel

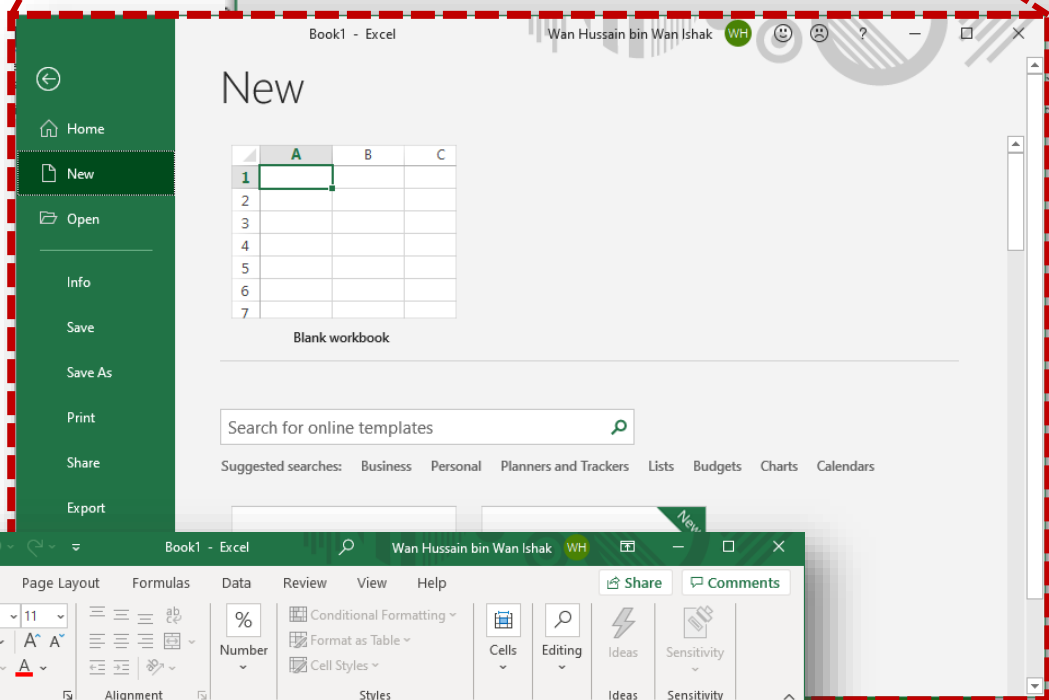
Create Worksheets

The steps:

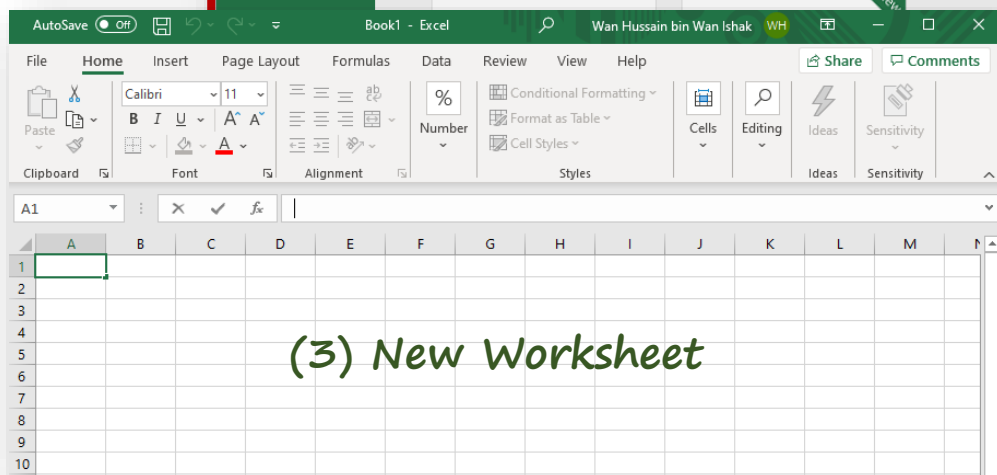
(1) Click [File]



(2) Click [New]



(3) New Worksheet

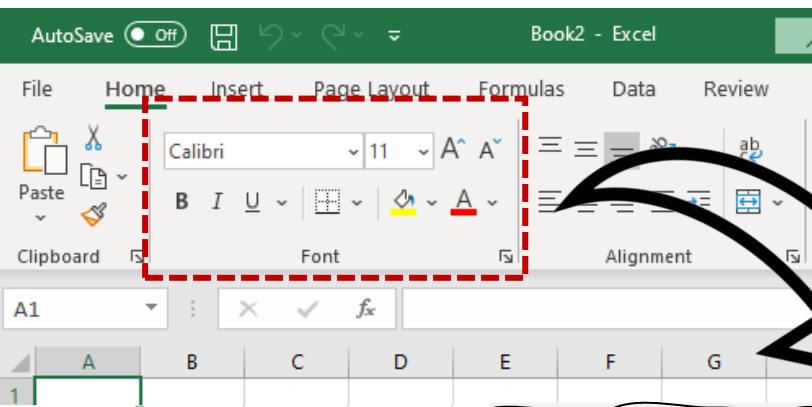




Excel

Basic Formatting

Font Setting



Increase Font Size

Font Size

Decrease Font Size

Font Type

Bold

Italic

Underline

Cell Borders

Fill Color

Font Color

Example

Record No.	Date	Persons	Accommodation (RM)
1	21-Jan	2	200.00
2	24-Jan	5	150.00
3	25-Jan	1	150.00
4	27-Jan	3	200.00
5	30-Jan	8	250.00
Total		19	950.00



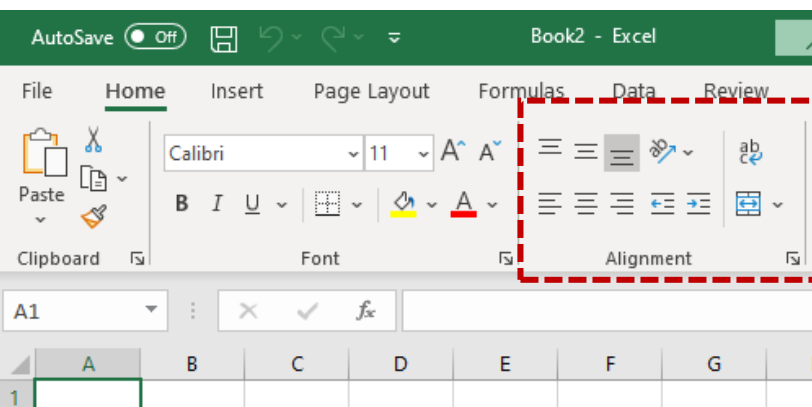
Record No.	Date	Persons	Accommodation (RM)
1	21-Jan	2	200.00
2	24-Jan	5	150.00
3	25-Jan	1	150.00
4	27-Jan	3	200.00
5	30-Jan	8	250.00
Total		19	950.00



Excel

Basic Formatting

Alignment

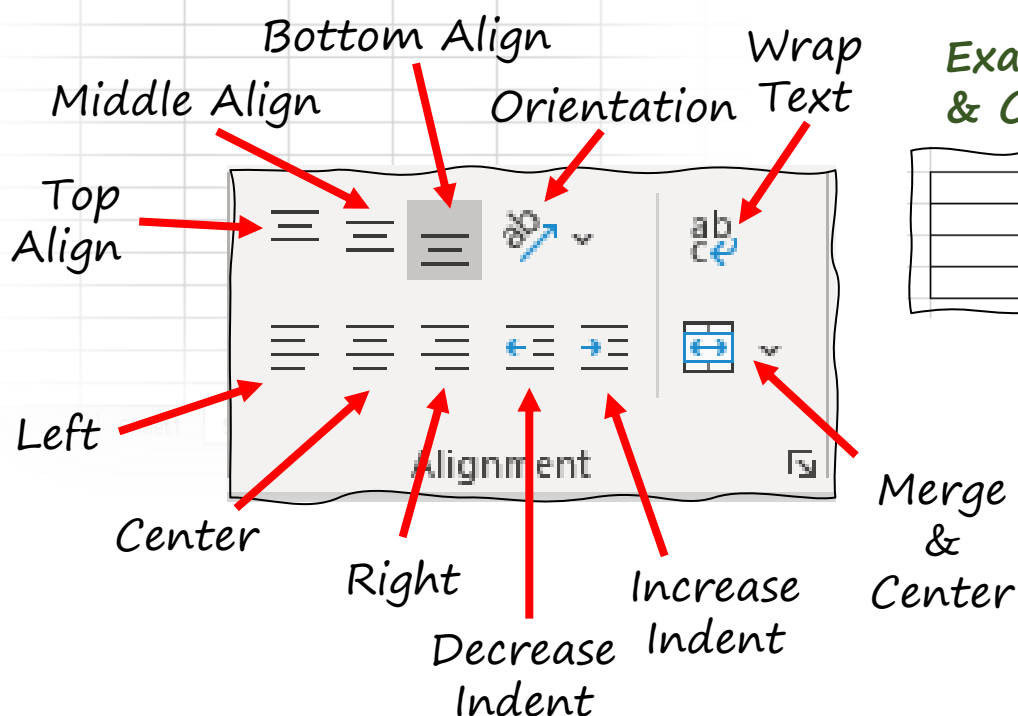


Example: Text Alignment

Top	Middle	Bottom
Left	Center	Right

Example: Wrap Text

Microsoft Excel	
	Microsoft Excel



Example: Merge & Center

	Microsoft Excel	



Data types:

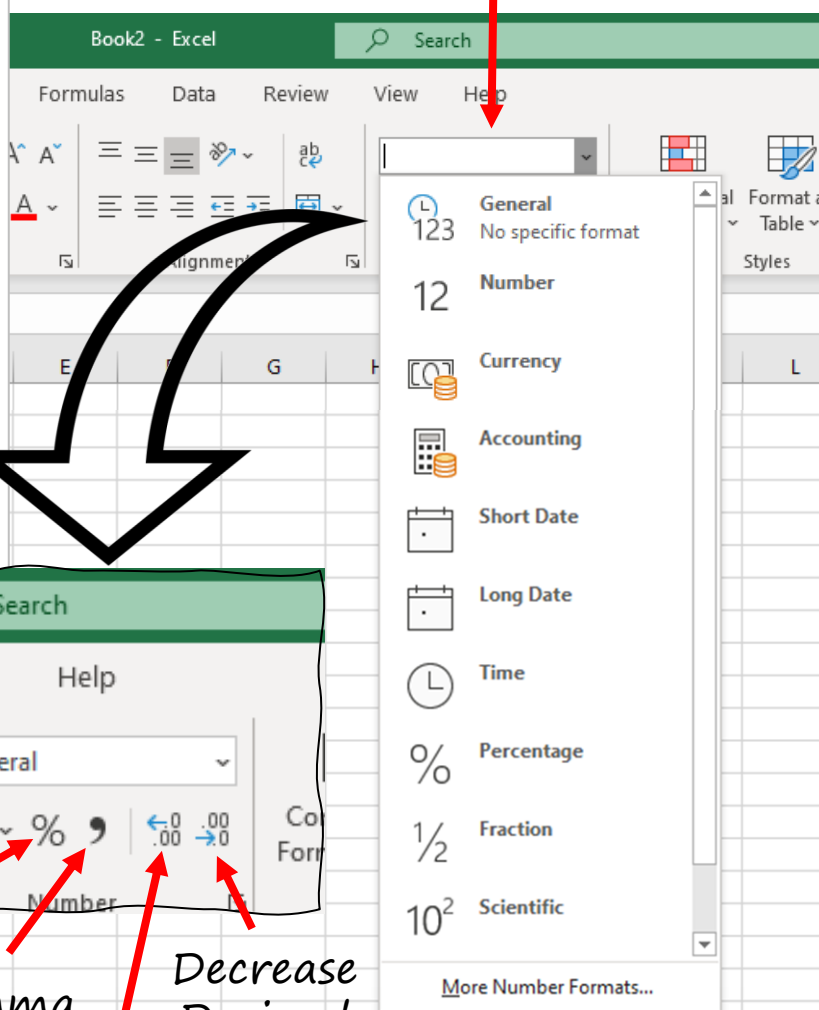
Each column has an associated data type that specifies the type of data the column can hold

Data type also determines what kinds of operations you can do on the column.

Common data types are:

- ✓ Text
- ✓ Number
- ✓ Date
- ✓ Time

Number
Format



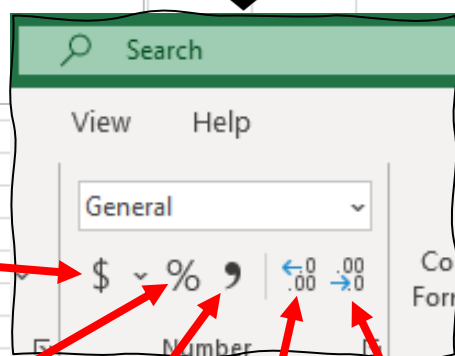
Accounting
Number
Format

Percent
Style

Comma
Style

Decrease
Decimal

Increase
Decimal





Example:

AutoSave Off Book1

File Home Insert Page Layout Formulas Data

Paste Clipboard Font Alignment

Calibri 11 A^ A^

B I U

H9

	A	B	C	D	E	F
1						
2		Accomodation Cost				
3						
4		Record No	Date	Persons	Accomodation (RM)	
5		1	21-Jan	2	MYR	200.00
6		2	24-Jan	5	MYR	150.00
7		3	25-Jan	1	MYR	350.00
8		4	27-Jan	3	MYR	200.00
9		5	30-Jan	8	MYR	250.00
10		Total		19	MYR	1,150.00
11						
12						
13						
14						
15						
16						
17						

Text →

Number →

Date format

Accounting Number Format with 2 decimal

Comma Style



Formula & Function

A **formula** is an expression (mathematical operation) which calculates the value of a cell.

Functions are predefined formulas and are already available in Excel to perform a series of mathematical operations.

Begin with '=' symbol.

Two ways to write a formula & function, (1) in the cell or (2) in the Formula Bar.

The formula icon	Operation	Formula
^	Power	=A1^3
+	Add	=A1+A2
-	Minus	=A1-A2
*	Multiply	=A1*3
/	Divide	=A1/50
	Mix	=(A1+A2+A3)/3

Priority Ordering

- 1) Power or equivalent in brackets: ^ and ()
- 2) Multiply and divide : * and /
- 3) Add and minus : + and -

Function Name	Description
AVERAGE =AVERAGE(A1:A5)	Calculate the average number of group
MAX MAX(A1:A5)	Provide maximum value in the interval sought Cells
MIN MIN(A1:A5)	Return the minimum value in the interval given cell
SUM SUM(A1:A5)	Calculate the total value of the given cell interval



Using Formula

Calculate the total cost for the accommodation.

$$=E5+E6+E7+E8+E9$$

=E5+E6+E7+E8+E9

Typing formula in cell

- 1) Click on cell E10
- 2) Press “=”
- 3) Select cell E5 followed by symbol “+”
- 4) Continue with cell E6, E7, E8 and E9.
- 5) Press ENTER.



Using Function

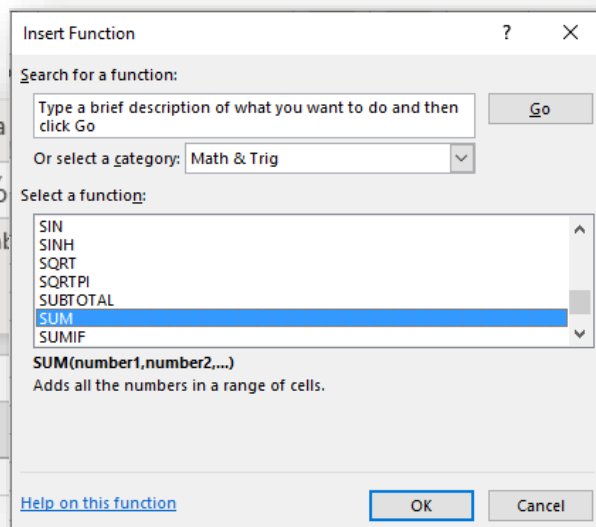
Example

Calculate the total cost for the accommodation.

Function:

=SUM(E5:E9)

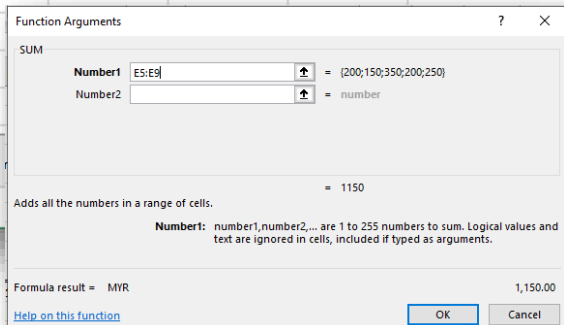
Dialog Box A



Steps:

- 1) Click on cell E10
- 2) Click *fx* on the formula bar
- 3) A dialog box (A) appear. Select category "Math & Trig".
- 4) Find SUM, then click [OK].
- 5) Dialog box (B) appear.
- 6) Select E5 until E9.
- 7) Press [OK]

Dialog Box B





2 types of cell referencing

absolute

- ✓ Remain **constant** no matter where they are copied.
- ✓ Designated in a formula by a **dollar sign (\$)**.
- ✓ Can precede the column reference, the row reference, or both.

relative

- ✓ **Default** setting in excel
- ✓ **Change** when a formula is copied to another cell.
- ✓ To **repeat** the same calculation across multiple rows or columns.

Shortcut:

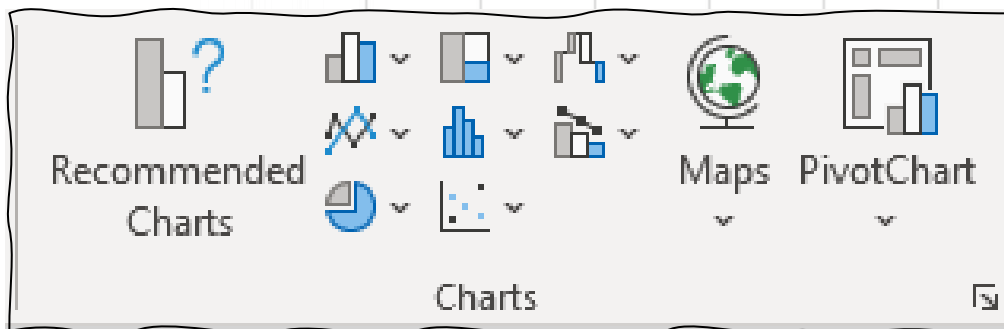
Press the F4 key on your keyboard to switch between relative and absolute cell references

Variations	Description
A\$1	The row does not change
\$A1	The column does not change
\$A\$1	The column and row do not change



Charts is also called graph.

Allows user to visualized numerical data into visual representation.



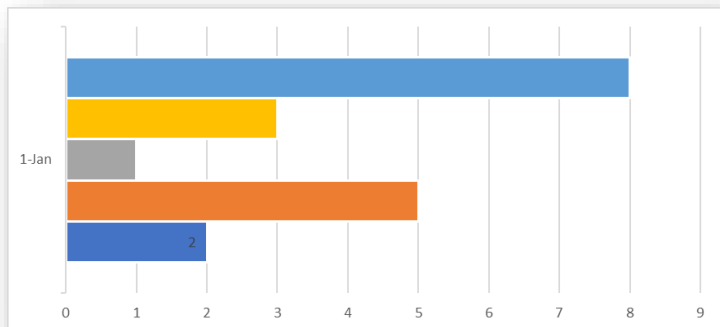
Under Menu Bar [Insert]



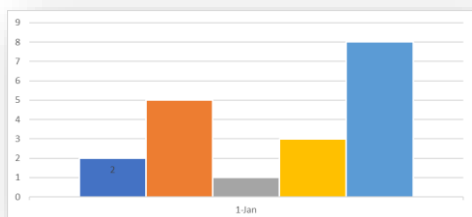
Types

Common types of charts are:

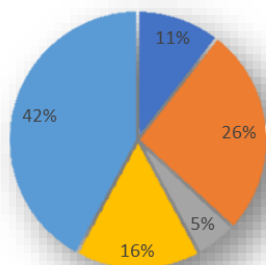
- ✓ Bar chart
- ✓ Column chart
- ✓ Pie chart
- ✓ Line chart



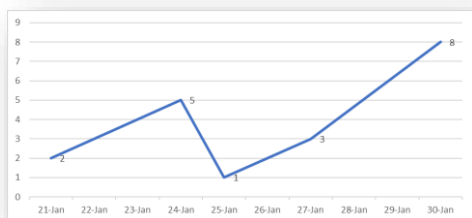
Bar chart



Column chart



Pie chart



Line chart

Other types of charts supported by Microsoft Office and Excel:

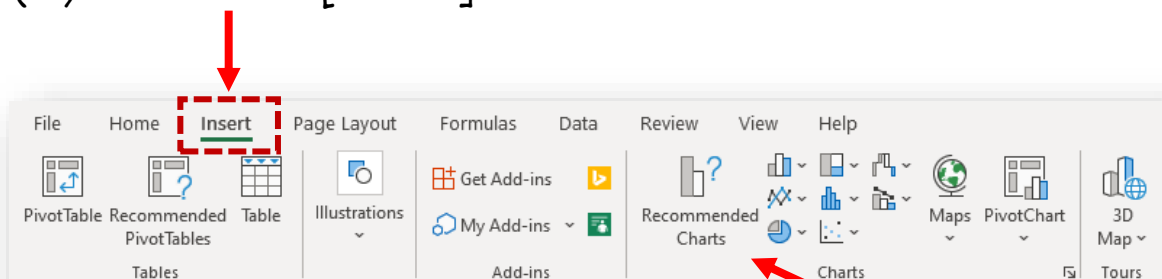
- ✓ Doughnut charts
- ✓ Area chart
- ✓ XY (scatter)
- ✓ Bubble chart
- ✓ Stock chart
- ✓ Surface chart
- ✓ Radar charts
- ✓ Treemap chart (version 2016 and above)
- ✓ Sunburst chart (version 2016 and above)
- ✓ Histogram charts (version 2016 and above)
- ✓ Box and Whisker charts (version 2016 and above)
- ✓ Waterfall charts (version 2016 and above)
- ✓ Funnel charts (version 2016 and above)
- ✓ Combo charts (version 2013 and above)
- ✓ Map chart (Excel only)



Inserting Charts

The following are the steps to insert chart into a worksheet.

(1) Switch to [Insert] Menubar



(2) Select the data

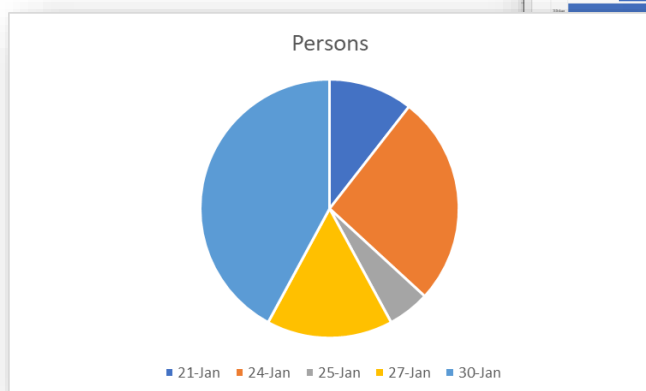
(3) Click [Recommended Charts] or click desired chart type

(4) Choose chart
Example: Pie chart

(5) Click [OK]

Record No	Date	Persons	Accommodation (RM)
1	21-Jan	2	MYR 200.00
2	24-Jan	5	MYR 150.00
3	25-Jan	1	MYR 350.00
4	27-Jan	3	MYR 200.00
5	30-Jan	8	MYR 250.00
Total		19	MYR 1,150.00

A pie chart is used to show proportions of a whole. Use it to show numbers that relate to a larger sum and always equal 100%. Do not use this chart if it contains many slices as angles are hard to estimate.

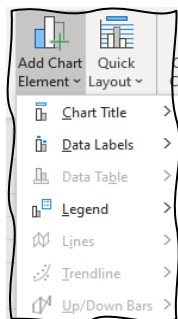


(6) Chart created



Editing Charts

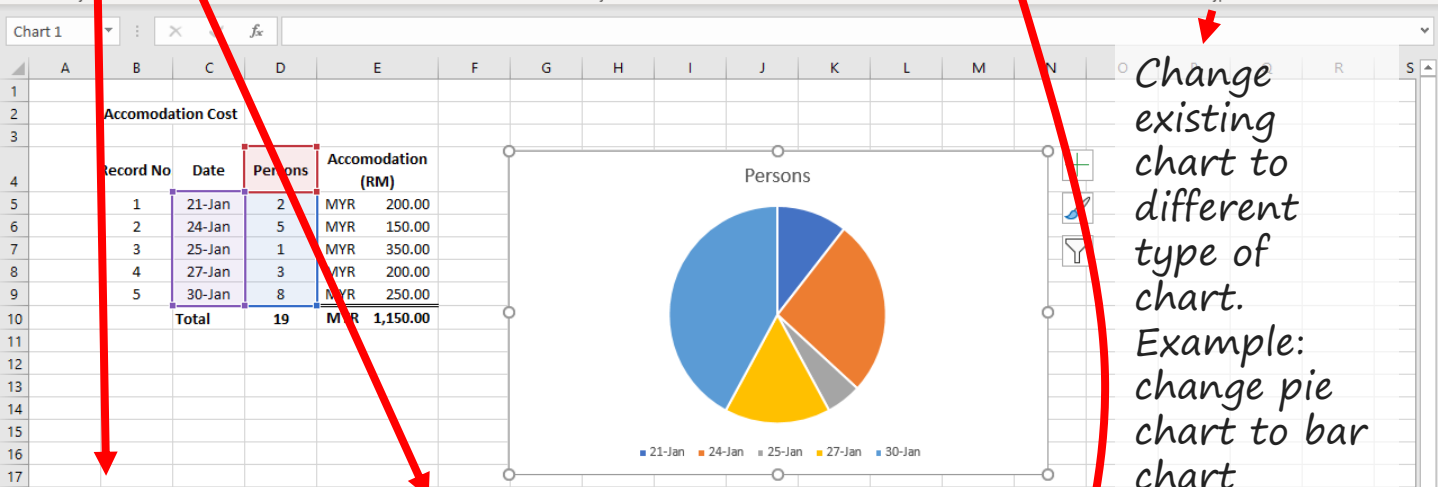
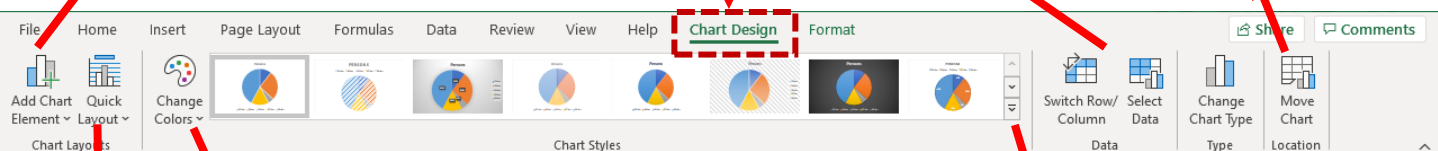
To edit a chart. Select the chart, then a new Menubar [Chart Design] will appear.



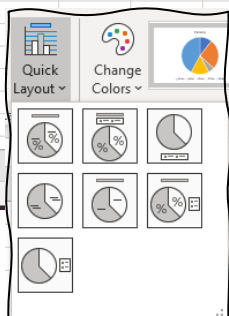
Add and edit the chart elements such as title, labels and legend

Swap the data over the axis and update the data selection

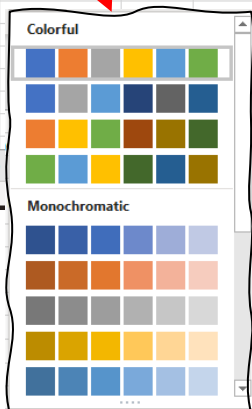
Move chart to other location. Example: from to other worksheet or new sheet



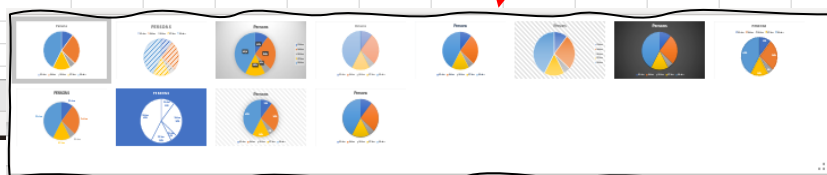
Change existing chart to different type of chart. Example: change pie chart to bar chart



Change the chart layout



Change the chart's color combination



Change the chart's style



Perform Sorting

To perform sorting, select the data then click on [Sort & Filter] under menu bar [Home]. Three options available:

- 1) Ascending – Smallest to Largest
- 2) Descending – Largest to Smallest
- 3) Custom Sort

(1) Select ALL data

The screenshot shows the Excel Home tab with the 'Sort & Filter' dropdown menu open. The 'Sort Smallest to Largest' option is selected. A red arrow points from the 'Home' tab to the 'Sort & Filter' dropdown. Another red arrow points from the 'Sort & Filter' dropdown to the 'Sort' dialog box. The 'Sort' dialog box is open, showing the 'Column' list with 'Matric' selected. The 'Sort On' dropdown is set to 'Cell Values' and the 'Order' dropdown is set to 'A to Z'. The 'My data has headers' checkbox is checked. A red arrow points from the 'OK' button in the dialog box to the text '(d) Click [OK]'. The 'Sort' dialog box is also shown with the 'Column' list open, showing 'Num', 'Matric', 'Name', 'Gender', 'INASIS', and 'CGPA'. A red arrow points from the 'Matric' header to the text '(b) Select the header name to sort by'. A red arrow points from the 'Order' dropdown to the text '(c) Choose order ...'. A red arrow points from the 'My data has headers' checkbox to the text '(a) Check the box My data has headers'.

(2) Click on [Sort & Filter] and choose one of the options

(3) Dialog box, If custom sort is selected

(a) Check the box My data has headers

(b) Select the header name to sort by

(c) Choose order ...

(d) Click [OK]



Perform Filtering

To perform filtering, select the data then click on [Sort & Filter] under menu bar [Home].

(1) Select ALL data

(2) Click on [Sort & Filter] and choose [Filter]

this icon will appear next to the header of each column

Num	Matric	Name	Gender	INASIS	CGPA
1	12345	Fatimah Zainal	Female	TNB	3.15
2	23456	Karim Alias	Male	Petronas	3.50
3	34567	Sandy Kaharudin	Male	Tradewinds	2.99
4	45678	Mohamd Jasni Nayan	Male	Proton	3.70
5	56789	Ali Taib	Male	TNB	3.00
6	13579	Jonathan Liew Ong	Male	Petronas	3.25
7	24680	Muthu A/L Munusamy	Male	BSN	2.85
8	12467	Marina Kasim	Female	BSN	3.75
9	24689	Andrika Jati Ahmed	Male	TNB	3.10
10	25467	Chandrika A/P Ravi	Female	Proton	2.95

Example:
Filtered gender. Female only

Num	Matric	Name	Gender	INASIS	CGPA
1	12345	Fatimah Zainal	Female	TNB	3.15
8	12467	Marina Kasim	Female	BSN	3.75
10	25467	Chandrika A/P Ravi	Female	Proton	2.95

Num	Matric	Name	Gender	INASIS	CGPA
1	12345	Fatimah Zainal	Female	TNB	3.15
2	23456	Karim Alias	Male	Petronas	3.50
3	34567	Sandy Kaharudin	Male	Tradewinds	2.99
4	45678	Mohamd Jasni Nayan	Male	Proton	3.70

(3) Click on the icon to open a dialog box.

Example:
Gender

(4) Select data to filter.
Example: Female

(5) Click [OK]



Highlighting Information

Conditional formatting

Conditional formatting can be used to visualize and analyze data, detect critical issues, and identify patterns and trends.

(2) Click
[Conditional Formatting]

The screenshot shows the Excel interface with the 'Home' tab selected. The 'Conditional Formatting' button is highlighted in the ribbon. The dropdown menu is open, showing options like 'Highlight Cells Rules', 'Top/Bottom Rules', 'Data Bars', 'Color Scales', 'Icon Sets', 'New Rule...', 'Clear Rules', and 'Manage Rules...'. The spreadsheet data is as follows:

	A	B	C	D	E	F	G	H
1								
2		Num	Matric	Name	Gender	INASIS	CGPA	
3		1	12345	Fatimah Zainal	Female	TNB	3.15	
4		2	23456	Karim Alias	Male	Petronas	3.50	
5		3	34567	Sandy Kaharudin	Male	Tradewinds	2.99	
6		4	45678	Mohamd Jasni Nayan	Male	Proton	3.70	
7		5	56789	Ali Taib	Male	TNB	3.00	
8		6	13579	Jonathan Liew Ong	Male	Petronas	3.25	
9		7	24680	Muthu A/L Munusamy	Male	BSN	2.85	
10		8	12467	Marina Kasim	Female	BSN	3.75	
11		9	24689	Andrika Jati Ahmed	Male	TNB	3.10	
12		10	25467	Chandrika A/P Ravi	Female	Proton	2.95	

At the bottom, the status bar shows: Average: 3.22 Count: 10 Sum: 31.5

(1) Select data

(3) Click on the
option



Highlighting Information

Using conditional formatting

Example

Highlight cell where CGPA is less than 3.00

(1) Select data

(2) Choose [Less Than...]

(3) A dialog appear. Enter 3, then press [OK]

Num	Matric	Name	Gender	INASIS	CGPA
1	12345	Fatimah Zainal	Female	TNB	3.15
2	23456	Karim Alias	Male	Petronas	3.50
3	34567	Sandy Kaharudin	Male	Tradewinds	2.99
4	45678	Mohamd Jasni Nayan	Male	Proton	3.70
5	56789	Ali Taib	Male	TNB	3.00
6	13579	Jonathan Liew Ong	Male	Petronas	3.25
7	24680	Muthu A/L Munusamy	Male	BSN	2.85
8	12467	Marina Kasim	Female	BSN	3.75
9	24689	Andrika Jati Ahcmed	Male	TNB	3.10
10	25467	Chandrika A/P Ravi	Female	Proton	2.95

Less Than

Format cells that are LESS THAN:

3 with Light Red Fill with Dark Red Text

OK Cancel

Num	Matric	Name	Gender	INASIS	CGPA
1	12345	Fatimah Zainal	Female	TNB	3.15
2	23456	Karim Alias	Male	Petronas	3.50
3	34567	Sandy Kaharudin	Male	Tradewinds	2.99
4	45678	Mohamd Jasni Nayan	Male	Proton	3.70
5	56789	Ali Taib	Male	TNB	3.00
6	13579	Jonathan Liew Ong	Male	Petronas	3.25
7	24680	Muthu A/L Munusamy	Male	BSN	2.85
8	12467	Marina Kasim	Female	BSN	3.75
9	24689	Andrika Jati Ahcmed	Male	TNB	3.10
10	25467	Chandrika A/P Ravi	Female	Proton	2.95

Results:
Cell with values less than 3 will be highlighted



Flash Fill

Flash fill analyzes the information entered and automatically fills data when it senses a pattern.

It can be used to:

- 1) separate data (from a single column)
- 2) combine data (from two different columns)

Example 2:

Combine name (first name and father's name) into one column.

First	Father's Name	Name
Fatimah	Zainal	Fatimah Zainal
Karim	Alias	Karim Alias
Sandy	Kaharudin	Sandy Kaharudin
Mohamd	Nayan	Mohamd Nayan
Ali	Taib	Ali Taib
Jonathan	Ong	Jonathan Ong
Muthu	Munusamy	Muthu A/L Munusamy
Marina	Kasim	Marina Kasim
Andrika	Ahmed	Andrika Jati Ahmed
Chandrika	Ravi	Chandrika A/P Ravi

Enter the first two data.
When suggestion appear,
press [ENTER].



Continue
with the
second
data

Name	First	Father's Name
Fatimah Zainal	Fatimah	Zainal
Karim Alias	Karim	Alias
Sandy Kaharudin	Sandy	Kaharudin
Mohamd Jasni Nayan	Mohamd	Nayan
Ali Taib	Ali	Taib
Jonathan Liew Ong	Jonathan	Ong
Muthu A/L Munusamy	Muthu	Munusamy
Marina Kasim	Marina	Kasim
Andrika Jati Ahmed	Andrika	Ahmed
Chandrika A/P Ravi	Chandrika	Ravi

Enter the
father's
name

Example 1:

Separate name into two parts first name and father's name.

Name	First	Father's Name
Fatimah Zainal	Fatimah	
Karim Alias	Karim	
Sandy Kaharudin	Sandy	
Mohamd Jasni Nayan	Mohamd	
Ali Taib	Ali	
Jonathan Liew Ong	Jonathan	
Muthu A/L Munusamy	Muthu	
Marina Kasim	Marina	
Andrika Jati Ahmed	Andrika	
Chandrika A/P Ravi	Chandrika	

Enter the
first
name



Turn on Flash Fill

If Flash Fill does not work automatically:

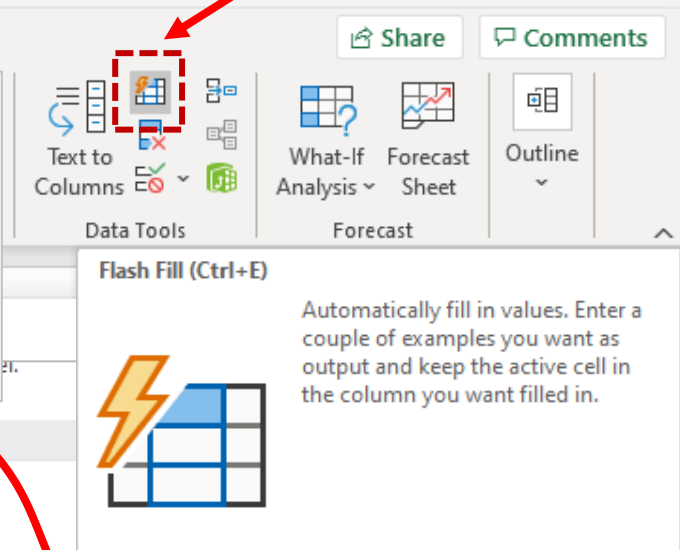
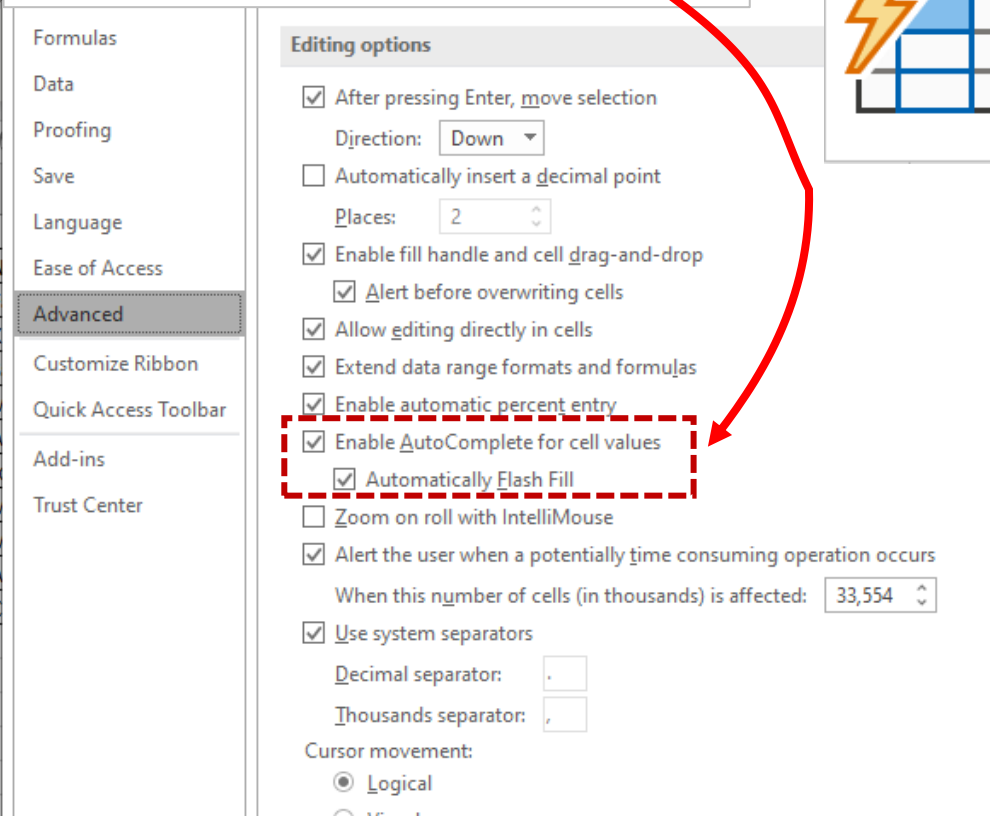
- 1) Check the setting in Excel
- 2) Run it manually

Run Flash Fill manually

Go to **Data > Flash Fill**, or press Ctrl+E.

Check the setting

To turn Flash Fill on, go to **Tools > Options > Advanced > Editing Options** > check the **Automatically Flash Fill** box.

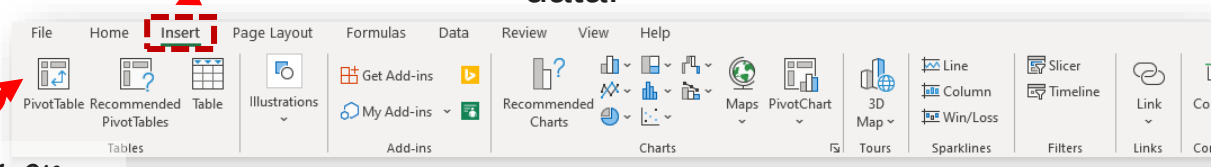




Pivot Table

Pivot Table can be found under menu bar [Insert].

A pivot table is a table of statistics that summarizes the data.

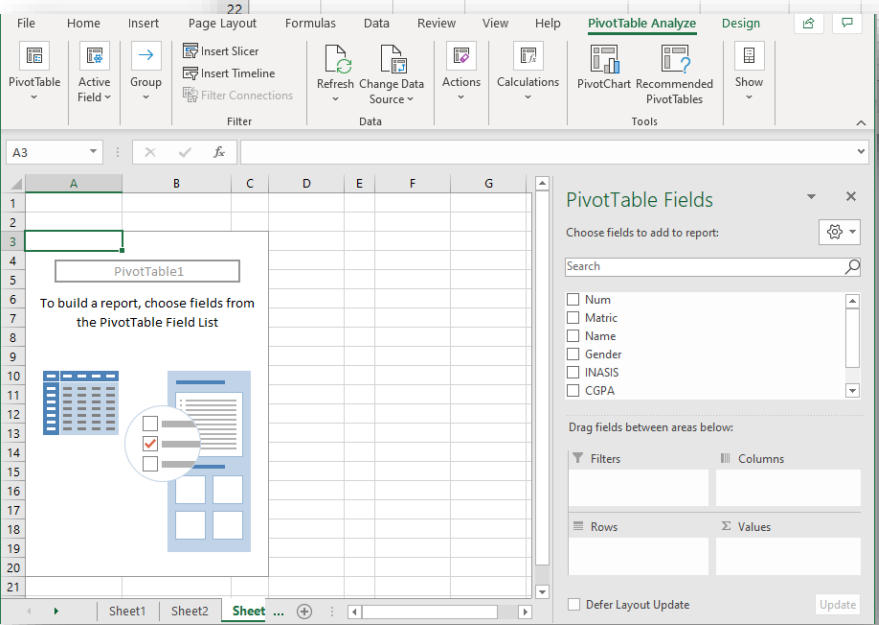
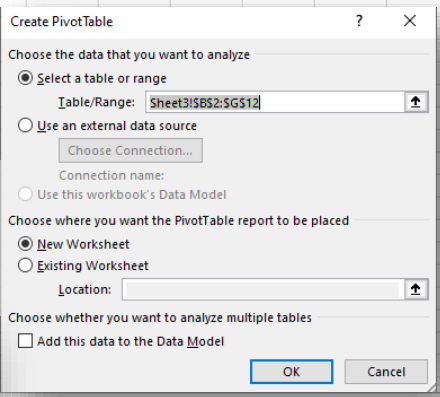


(2) Click on [Pivot Table]

Num	Matric	Name	Gender	INASIS	CGPA
1	12345	Fatimah Zainal	Female	TNB	3.15
2	23456	Karim Alias	Male	Petronas	3.50
3	34567	Sandy Kaharudin	Male	Tradewinds	2.99
4	45678	Mohamd Jasni Nayan	Male	Proton	3.70
5	56789	Ali Taib	Male	TNB	3.00
6	13579	Jonathan Liew Ong	Male	Petronas	3.25
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9	24689	Andrika Jati Ahmed	Male	TNB	3.10
10	25467	Chandrika A/P Ravi	Female	Proton	2.95

(1) Select the data

(3) A dialog box will appear. Click [OK]



New sheet will appear



Customizing Pivot Table Report

The content of the report generated by the Pivot Table can be customized as following example.

Example:

Create a report of the number of students that stay at INASIS based on their gender.

(1) Click on INASIS and drag to the Rows section.

(2) Click on Gender and drag to the Column section.

(3) Click on Gender and drag to the Values section.

Report preview

Row Labels	Female	Male	Grand Total
BSN	1	1	2
Petronas		2	2
Proton	1	1	2
TNB	1	2	3
Tradewinds		1	1
Grand Total	3	7	10



Waterfall Chart

A waterfall chart is a form of data visualization that helps in understanding the cumulative effect of sequentially introduced positive or negative values.

Example:

Create a Waterfall chart to show how net income is affected by a series of positive and negative values such as:

Revenue	25,250.00
Purchases	(7,500.00)
Gross margin	17,750.00
Administration	(2,500.00)
Net income	15,250.00

(2) Click the [Recommended Charts]

(3) Click [All Charts]

(4) Click [Waterfall]

(5) Click [OK]

(1) Select the data

Chart Preview

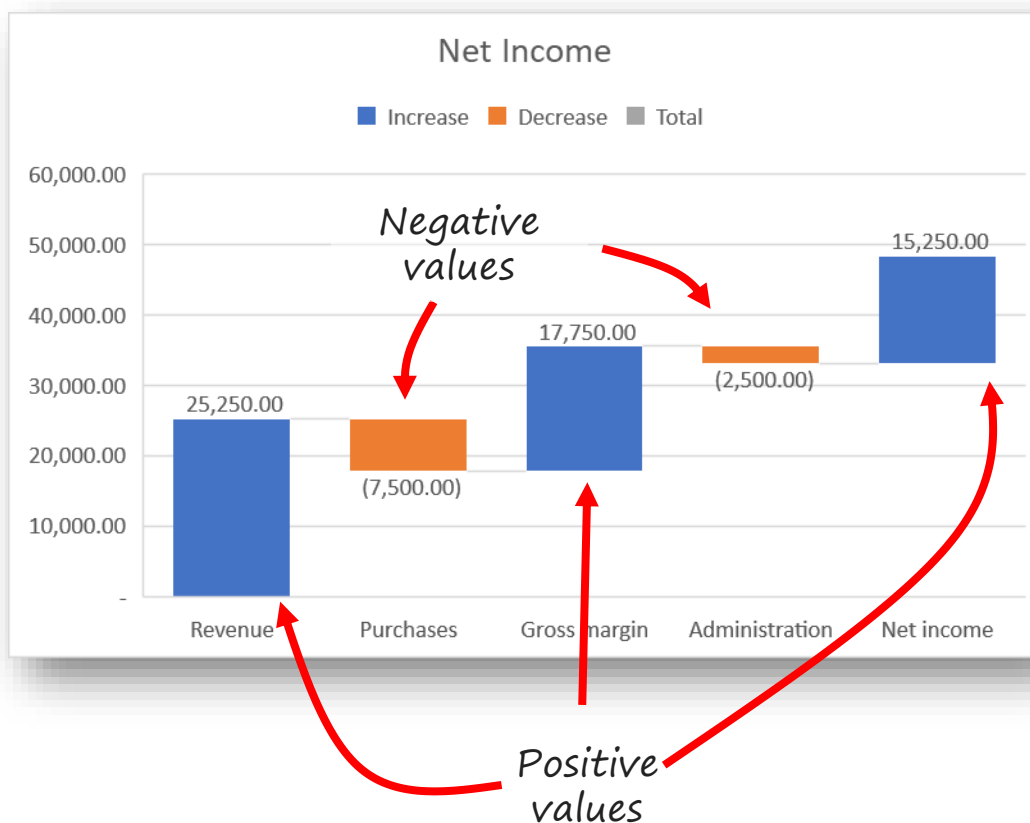


Waterfall Chart - Example

The columns are color coded so you can quickly tell positive from negative numbers.

The chart shows how the initial value **Revenue** change over a sequence of events and how the final value **Net income** is affected.

Waterfall charts are also called bridge charts.





HLOOKUP

Looks for a value in the **top row** of a table and returns the value in the same column.

For example, the function below looks up the value 45678 (cell G3) in the range D3:M7.

Value to find Row index num

↓ ↓

=HLOOKUP(D10,D3:M7,5)

 ↑

 Range

D11														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2			Num	1	2	3	4	5	6	7	8	9	10	
3			Matric	12345	23456	34567	45678	56789	13579	24680	12467	24689	25467	
4			Name	Fatimah Z	Karim Alia	Sandy Ka	Mohamd	Ali Taib	Jonathan	Muthu A/I	Marina Ka	Andrika Ja	Chandrika A/P	Ravi
5			Gender	Female	Male	Male	Male	Male	Male	Male	Female	Male	Female	
6			INASIS	TNB	Petronas	Tradewin	Proton	TNB	Petronas	BSN	BSN	TNB	Proton	
7			CGPA	3.15	3.50	2.99	3.70	3.00	3.25	2.85	3.75	3.10	2.95	
8														
9														
10			Find	45678										
11			CGPA	3.70										
12														

Returned value.

CGPA 3.70
row 5

Function Arguments

HLOOKUP

Lookup_value D10 = 45678

Table_array D3:M7 = {12345,23456,34567,45678,56789,13...}

Row_index_num 5 = 5

Range_lookup = logical

= 3.7

Looks for a value in the top row of a table or array of values and returns the value in the same column from a row you specify.

Lookup_value is the value to be found in the first row of the table and can be a value, a reference, or a text string.

Formula result = 3.70

[Help on this function](#)

OK Cancel



VLOOKUP

Looks for a value in the leftmost column of a table, and then returns a value in the same row.

Example: Lookup by specific value

For example, the function below looks up the value 45678 (cell J3) in the range C3:G12.

Value to find Column index
 num

$\searrow$ $\searrow$

$\text{=VLOOKUP}(\text{J3}, \text{C3:G12}, 5)$

$\nwarrow$
 Range

Function Arguments

VLOOKUP

Lookup_value: J3 = 45678

Table_array: C3:G12 = (12345, "Fatimah Zainal", "Female", "T...)

Col_index_num: 5 = 5

Range_lookup: = logical

Formula result = 3.70

[Help on this function](#)

OK Cancel

	A	B	C	D	E	F	G	H	I	J	K
1											
2		Num	Matric	Name	Gender	INASIS	CGPA				
3		1	12345	Fatimah Zainal	Female	TNB	3.15		Matric	45678	
4		2	23456	Karim Alias	Male	Petronas	3.50		CGPA	3.70	
5		3	34567	Sandy Kaharudin	Male	Tradewinds	2.99				
6		4	45678	Mohamd Jasni Nayan	Male	Proton	3.70				
7		5	56789	Ali Taib	Male	TNB	3.00				
8		6	13579	Jonathan Liew Ong	Male	Petronas	3.25				
9		7	24680	Muthu A/L Munusamy	Male	BSN	2.85				
10		8	12467	Marina Kasim	Female	BSN	3.75				
11		9	24689	Andrika Jati Ahcmed	Male	TNB	3.10				
12		10	25467	Chandrika A/P Ravi	Female	Proton	2.95				
13											

Returned
value.

$\nearrow$

CGPA 3.70
column 5



VLOOKUP

Example: Lookup by value in range

Looks up the group for given ID number.

ID number and range are as followings:

0 – 5	G1
6 – 10	G2
11 – 15	G3
16 – 20	G4
> 20	G5

Value to find Column index
 num

=VLOOKUP(H3,D3:E7,2)

Range

By default, the table must be sorted in an ascending order.

Function Arguments

VLOOKUP

Lookup_value	H3	= 10.1
Table_array	D3:E7	= {0,"G1";5,"G2";10,"G3";15,"G4";20,"G5"}
Col_index_num	2	= 2
Range_lookup		= logical

Formula result = G3

Help on this function

OK Cancel

Returned
value.
G2



Index and Match

Match

The MATCH function returns the **position** of a value in a given range. For example, the function below looks up the value 45678 (cell J3) in the range C3:C12 (column C).

Value to look up

Range

=MATCH(J3,C3:C12)

	Num	Matric	Name	
1	1	12345	Fatimah Zainal	Female
2	2	23456	Karim Alias	Male
3	3	34567	Sandy Kharudin	Male
4	4	45678	Mohamd Jasni Nayan	Male
5	5	56789	Ali Taib	Male
6	6	13579	Jonathan Niew Ong	Male
7	7	24680	Muthu A/L Munusamy	Male
8	8	12467	Marina Kasim	Female
9	9	24689	Andrika Jati Ahcmed	Male
10	10	25467	Chandrika A/P Ravi	Female

Returned value.

The position of matric 45678 in the list that is 4th position.

Function Arguments

MATCH

Lookup_value: J3 = 45678

Lookup_array: C3:C12 = {12345;23456;34567;45678;56789;13...}

Match_type: = number

= 4

Returns the relative position of an item in an array that matches a specified value in a specified order.

Lookup_array is a contiguous range of cells containing possible lookup values, an array of values, or a reference to an array.

Formula result = 4

[Help on this function](#)

OK Cancel



Index and Match

Index

The INDEX function returns a **specific value** based on the reference given. For example, what is the CGPA value at the 4th position?

=INDEX(G3:G12,4)

← Position

Range

	A	B	C	D	E	F	G	H	I	J
1										
2		Num	Matric	Name	Gender	INASIS	CGPA			
3		1	12345	Fatimah Zainal	Female	TNB	3.15		Matric	
4		2	23456	Karim Alias	Male	Petronas	3.50		CGPA	3.70
5		3	34567	Sandy Kaharudin	Male	Tradewinds	2.99			
6		4	45678	Mohamd Jasni Nayan	Male	Proton	3.70			
7		5	56789	Ali Taib	Male	TNB	3.00			
8		6	13579	Jonathan Liew Ong	Male	Petronas	3.25			
9		7	24680	Muthu A/L Munusamy	Male	BSN	2.85			
10		8	12467	Marina Kasim	Female	BSN	3.75			
11		9	24689	Andrika Jati Ahcmed	Male	TNB	3.10			
12		10	25467	Chandrika A/P Ravi	Female	Proton	2.95			

Returned value.
CGPA 3.70 at position 4

Function Arguments

INDEX

ArrayG3:G12= {3.15;3.5;2.99;3.7;3.3;3.25;2.85;3.75;3.1;2.95}

Row_num4= 4

Column_num= number

= 3.7

Returns a value or reference of the cell at the intersection of a particular row and column, in a given range.

Row_num selects the row in Array or Reference from which to return a value. If omitted, Column_num is required.

Formula result = 3.7

[Help on this function](#)

OKCancel



Combining (Index and Match)

INDEX and MATCH is a powerful combination. **MATCH** find the position and **INDEX** use the position to lookup the value.

For example, what is the CGPA for a student with martric num 45678? Index will find its position in column Matric and use the position number to lookup the CGPA from the CGPA column.

=INDEX(G3:G12,MATCH(J3,C3:C12))

J4										
	A	B	C	D	E	F	G	H	I	J
1										
2		Num	Matric	Name	Gender	INASIS	CGPA			
3		1	12345	Fatimah Zainal	Female	TNB	3.15		Matric	45678
4		2	23456	Karim Alias	Male	Petronas	3.50		CGPA	3.70
5		3	34567	Sandy Kaharudin	Male	Tradewinds	2.99			
6		4	45678	Mohamd Jasni Nayan	Male	Proton	3.70			
7		5	56789	Ali Taib	Male	TNB	3.00			
8		6	13579	Jonathan Liew Ong	Male	Petronas	3.25			
9		7	24680	Muthu A/L Munusamy	Male	BSN	2.85			
10		8	12467	Marina Kasim	Female	BSN	3.75			
11		9	24689	Andrika Jati Ahcmed	Male	TNB	3.10			
12		10	25467	Chandrika A/P Ravi	Female	Proton	2.95			
13										
14										

Returned value.

The position of matric 45678 in the list that is 4th position and the CGPA is 3.70.

Function Arguments

INDEX

Array: G3:G12 = {3.15;3.5;2.99;3.7;3;3.25;2.85;3.75;3.1;2}

Row_num: MATCH(J3,C3:C12) = 4

Column_num: = number

= 3.7

Returns a value or reference of the cell at the intersection of a particular row and column, in a given range.

Row_num selects the row in Array or Reference from which to return a value. If omitted, Column_num is required.

Formula result = 3.70

[Help on this function](#)

OK Cancel



Forecast Tool

Forecast tool can be used to predict a future value like future sales, revenue, number of customers and etc.

The forecasting is based on the historical timeline and historical values.

Example:

Forecast the number of customer for **Jan 2020** based on 2019 data.



	A	B
1	DATE	NUMBER OF CUSTOMER
2	Jan-19	9
3	Feb-19	10
4	Mar-19	13
5	Apr-19	14
6	May-19	15
7	Jun-19	16
8	Jul-19	15
9	Aug-19	14
10	Sep-19	16
11	Oct-19	18
12	Nov-19	18
13	Dec-19	20

DATE	NUMBER OF CUSTOMER
Jan-19	9
Feb-19	10
Mar-19	13
Apr-19	14
May-19	15
Jun-19	16
Jul-19	15
Aug-19	14
Sep-19	16
Oct-19	18
Nov-19	18
Dec-19	20

Timeline

Values

The timeline requires consistent intervals between its data points. For example, monthly intervals (1st of every month), yearly intervals, or numerical intervals.



Forecast Tool– Simple Forecasting

Example:

Solution. Use function FORECAST.ETS.

Target date/
Current date
=FORECAST.ETS(D5,B2:B13,A2:A13,1,1)
Values Timeline

Excel spreadsheet showing the FORECAST.ETS function being used to forecast the number of customers for January 2020.

DATE	NUMBER OF CUSTOMER
Jan-19	9
Feb-19	10
Mar-19	13
Apr-19	14
May-19	15
Jun-19	16
Jul-19	15
Aug-19	14
Sep-19	16
Oct-19	18
Nov-19	18
Dec-19	20

Forecasting table:

Date	Forecast
Jan-20	20.29553765

Function Arguments dialog box for FORECAST.ETS:

- Target_date: D5 = 43831
- Values: B2:B13 = {9;10;13;14;15;16;15;14;16;18;18;20}
- Timeline: A2:A13 = {43466;43497;43525;43556;43586;43617;43647;43678;43708;43739;43770;43800}
- Seasonality: 1 = 1
- Data_completion: 1 = 1

Formula result = 20.29553765

Help on this function

OK Cancel



Forecast Tool – Using Forecast Sheet Tool

Example:

Forecast the number of customer for **Jan-Jun 2020** based on 2019 data.

(1) Click [Data]

(2) Select the data

(3) Click [Forecast Sheet]

(4) Set end date

(5) To show click on [Options]

(6) Click [Create]

Forecast Sheet

Create a new worksheet to predict data trends.

Preview different forecast options before generating your visual forecast worksheet.

Tell me more

Create Forecast Worksheet

Use historical data to create a visual forecast worksheet

30
25
20
15
10
5
0

Jan-19 Feb-19 Mar-19 Apr-19 May-19 Jun-19 Jul-19 Aug-19 Sep-19 Oct-19 Nov-19 Dec-19 Jan-20 Feb-20 Mar-20

NUMBER OF CUSTOMER Forecast(NUMBER OF CUSTOMER)
Lower Confidence Bound(NUMBER OF CUSTOMER) Upper Confidence Bound(NUMBER OF CUSTOMER)

Forecast End 3/1/2020

Options

Forecast Start 12/1/2019

☒ Confidence Interval 95%

Seasonality

☒ Detect Automatically

☐ Set Manually 0

☐ Include forecast statistics

Timeline Range Sheet16!\$A\$1:\$A\$13

Values Range Sheet16!\$B\$1:\$B\$13

Fill Missing Points Using Interpolation

Aggregate Duplicates Using Average

Create Cancel

DATE	NUMBER OF CUSTOMER
Jan-19	9
Feb-19	10
Mar-19	13
Apr-19	14
May-19	15
Jun-19	16
Jul-19	15
Aug-19	14
Sep-19	16
Oct-19	18
Nov-19	18
Dec-19	20



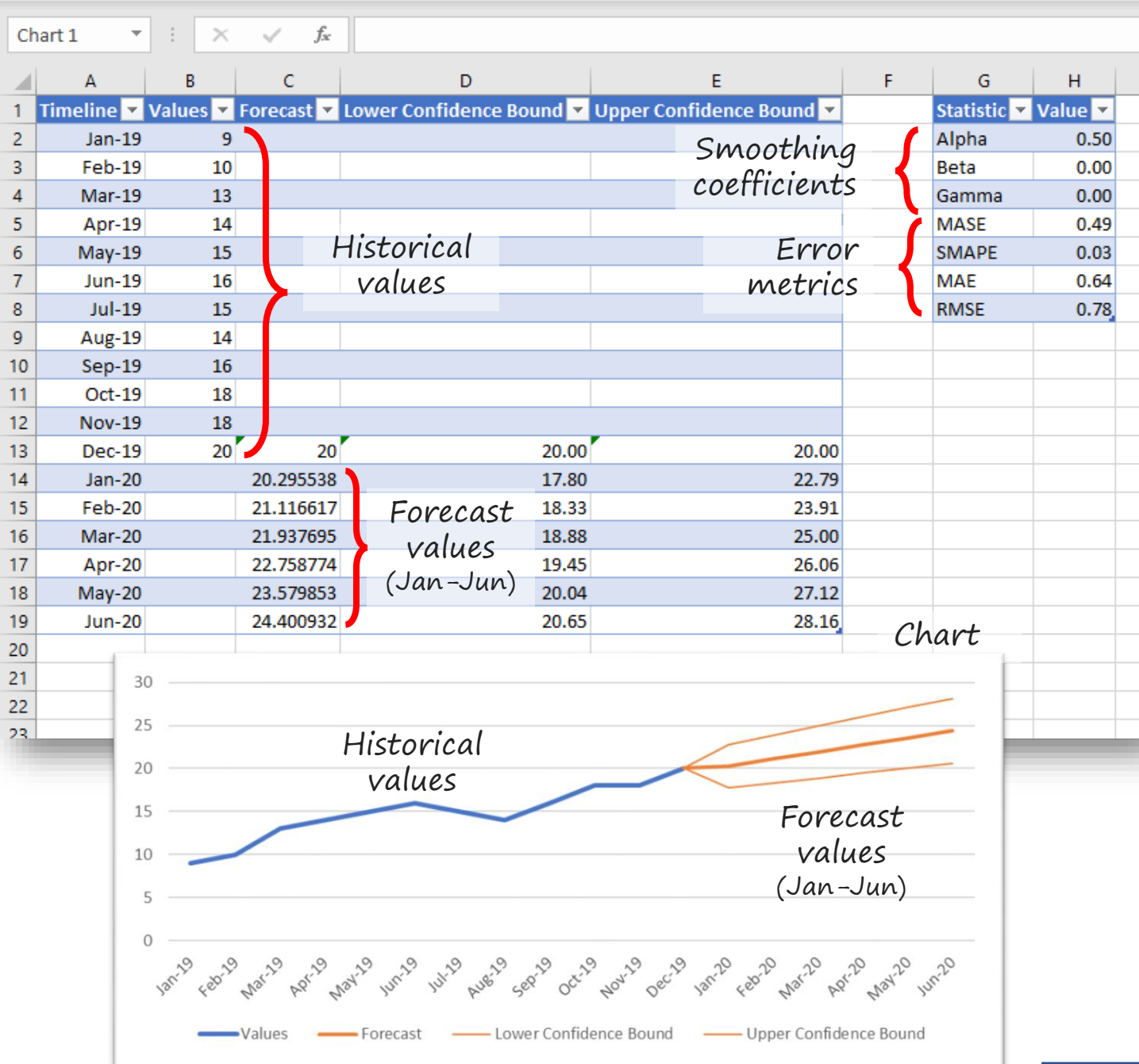
Forecast Tool – Options Description

Forecast Options	Description
Forecast Start	Pick the date for the forecast to begin.
Confidence Interval	Check or uncheck Confidence Interval to show or hide it. The confidence interval is the range surrounding each predicted value.
Seasonality	Seasonality is a number for the length (number of points) of the seasonal pattern and is automatically detected.
Timeline Range	The range used for timeline. This range needs to match the Values Range.
Values Range	The range used for value series. This range needs to be identical to the Timeline Range.
Fill Missing Points Using	To handle missing points,
Aggregate Duplicates Using	If data contains multiple values with the same timestamp, Excel will average the values.
Include Forecast Statistics	Additional statistical information on the forecast included in a new worksheet such as the smoothing coefficients (Alpha, Beta, Gamma), and error metrics (MASE, SMAPE, MAE, RMSE).



Forecast Tool – Using Forecast Sheet Tool

Result:





What-if-Analysis

What-If Analysis is the process of changing the values in cells to see how those changes will affect the outcome of formulas on the worksheet.

Three types:

1. Scenarios,
2. Goal Seek,
3. Data Tables.

What-if-Analysis Icon

What-if-Analysis can be found under [Data] Menu bar

Three types

What-If Analysis
Try out various values for the formulas in your sheet using Scenario Manager, Goal Seek and Data Tables.

- What-If Analysis ▾
- Forecast Sheet
- Outline ▾

Scenario Manager...
Goal Seek...
Data Table...

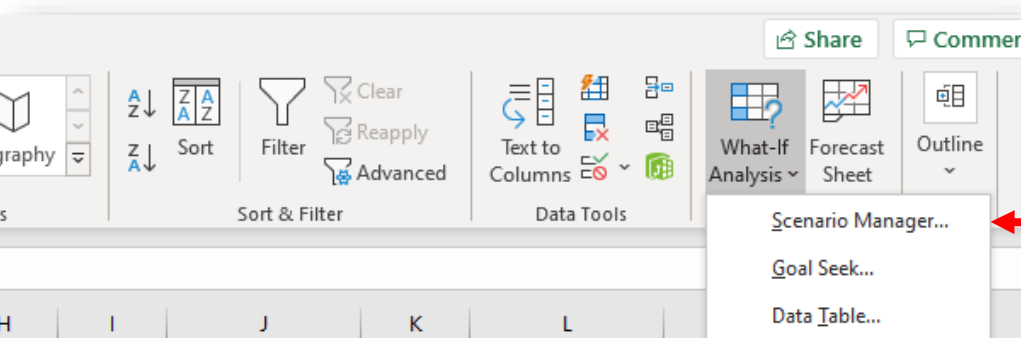


What-if-Analysis (Scenario Manager)

Works on different scenarios provided to it, it uses a group of ranges which impact on a certain output and can be used for making different scenarios.

Example:

Looking at the combination of revenues (product A, B and C) that affect on the total revenue and total contribution.



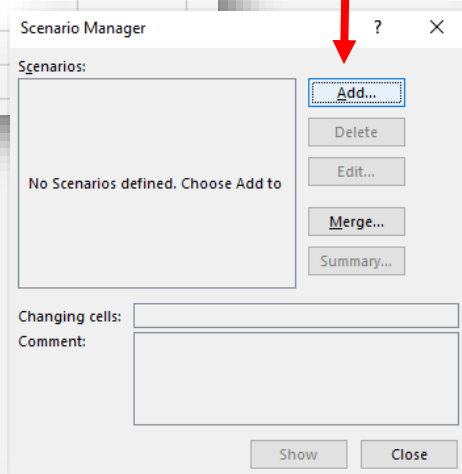
(1) Click [Scenario Manager]

	Revenue	% Contrib	Contribution
Product A	MYR 150,000.00	20%	MYR 30,000.00
Product B	MYR 240,000.00	25%	MYR 60,000.00
Product C	MYR 400,000.00	15%	MYR 60,000.00
TOTAL	MYR 790,000.00		MYR 150,000.00

(2) Select the input cell

(3) Scenario Manager dialog appear. Click [Add]

Note: These values affect the total revenue and the total contribution.





What-if-Analysis (Scenario Manager)

(3) Prepare original values

The 'Add Scenario' dialog box is shown. It has fields for 'Scenario name' (containing 'Original'), 'Changing cells' (containing '\$J\$3:\$J\$5'), and 'Comment' (containing 'Original Value'). There are 'OK' and 'Cancel' buttons at the bottom.

(4) Enter name

(5) Maintain

(6) Enter comment (if any)

(7) Click [OK]

The 'Scenario Values' dialog box is shown. It has a table with columns for 'Enter values for each of the changing cells.' and 'Values'. The table contains three rows of data: 1: \$J\$3 150000, 2: \$J\$4 240000, and 3: \$J\$5 400000. There are 'Add', 'OK', and 'Cancel' buttons at the bottom.

(8) Do not change the values. Then click [OK]

The 'Scenario Manager' dialog box is shown. It has a list of scenarios with 'Original' selected. There are buttons for 'Add...', 'Delete', 'Edit...', 'Merge...', and 'Summary...'. Below the list, there are fields for 'Changing cells' (containing '\$J\$3:\$J\$5') and 'Comment' (containing 'Original Value'). There are 'Show' and 'Close' buttons at the bottom.

(9) Once return to the scenario manager dialog, click [Add] to add more scenarios



What-if-Analysis (Scenario Manager)

(10) Repeat the process. Enter the first scenario.

The 'Add Scenario' dialog box is shown with the following fields and options:

- Scenario name: Scenario 1
- Changing cells: J3:J5
- Comment: Scenario 1
- Protection: ☒ Prevent changes, ☐ Hide
- Buttons: OK, Cancel

(14) Click [OK]

(11) Enter name. Exp: Scenario 1

(12) Maintain

(13) Enter comment (if any)

The 'Scenario Values' dialog box is shown with the following values:

	Cell Reference	Value
1:	\$J\$3	160000
2:	\$J\$4	250000
3:	\$J\$5	450000

Buttons: Add, OK, Cancel

(15) Enter desired values.
Then click [OK]

(16) Repeat the process. Enter the second scenario.

The 'Add Scenario' dialog box is shown with the following fields and options:

- Scenario name: Scenario 2
- Changing cells: J3:J5
- Comment: Scenario 2
- Protection: ☒ Prevent changes, ☐ Hide
- Buttons: OK, Cancel

(20) Click [OK]

(17) Enter name. Exp: Scenario 2

(18) Maintain

(19) Enter comment (if any)

The 'Scenario Values' dialog box is shown with the following values:

	Cell Reference	Value
1:	\$J\$3	200000
2:	\$J\$4	300000
3:	\$J\$5	500000

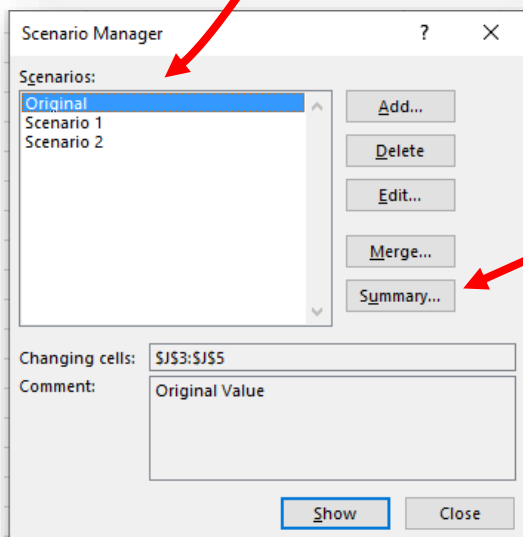
Buttons: Add, OK, Cancel

(21) Enter desired values.
Then click [OK]



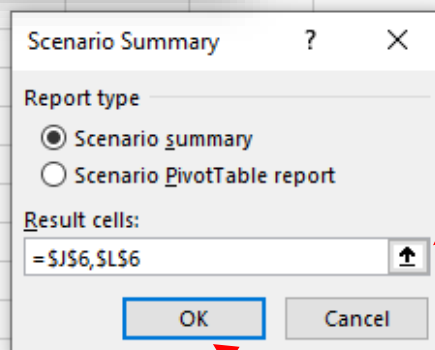
What-if-Analysis (Scenario Manager)

(22) List of scenarios



(23) Click [Summary]

	Revenue	% Contrib	Contribution
Product A	MYR 150,000.00	20%	MYR 30,000.00
Product B	MYR 240,000.00	25%	MYR 60,000.00
Product C	MYR 400,000.00	15%	MYR 60,000.00
TOTAL	MYR 790,000.00		MYR 150,000.00



(24) Select result cells.
Click the first cell, follow by ctrl key, then click the second cell.

The results

(25) Click [OK]

Scenario Summary									
		Current Values:		Original		Scenario 1		Scenario 2	
Changing Cells:									
	\$J\$3	MYR	150,000.00	MYR	150,000.00	MYR	160,000.00	MYR	200,000.00
	\$J\$4	MYR	240,000.00	MYR	240,000.00	MYR	250,000.00	MYR	300,000.00
	\$J\$5	MYR	400,000.00	MYR	400,000.00	MYR	450,000.00	MYR	500,000.00
Result Cells:									
	\$J\$6	MYR	790,000.00	MYR	790,000.00	MYR	860,000.00	MYR	1,000,000.00
	\$L\$6	MYR	150,000.00	MYR	150,000.00	MYR	162,000.00	MYR	190,000.00

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.



What-if-Analysis (Goal Seek)

Goal Seek allows you to see how one data item in a formula impacts another. “cause and effect” scenarios.

Example:

To achieve MYR 150,000 net income, what is the expected revenue for Product C?

The screenshot shows an Excel spreadsheet with the following data:

	Revenue	% Contribution	Contribution
Product A	MYR 150,000.00	20%	MYR 30,000.00
Product B	MYR 240,000.00	25%	MYR 60,000.00
Product C		15%	MYR -
TOTAL	MYR 390,000.00		MYR 90,000.00
		TARGET	MYR 150,000.00

The 'What-If Analysis' menu is open, showing 'Goal Seek...'. The 'Goal Seek' dialog box is also open, with the following settings:

- Set cell: K7
- To value: 150000
- By changing cell: \$I\$6

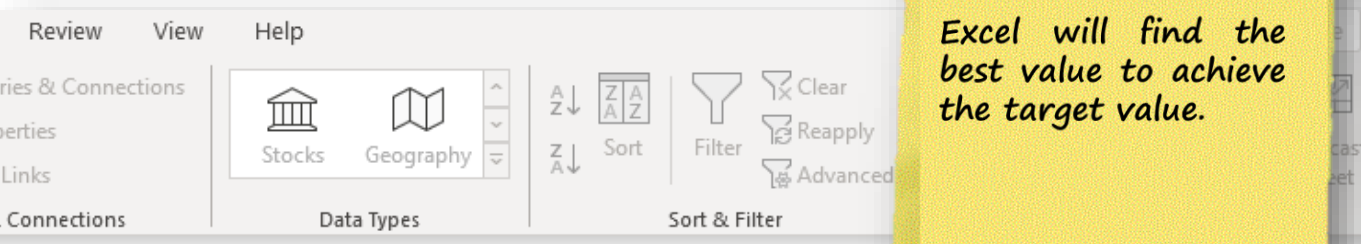
Annotations and arrows indicate the steps:

- (1) Click [Goal Seek] →
- (2) Select the cell to hold expected value/target (K7)
- (3) Set the target value RM 150,000
- (4) The changing cell (I6)
- (5) Press [OK]



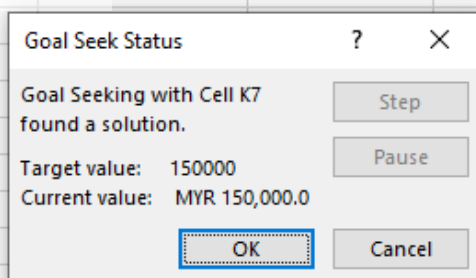
What-if-Analysis (Goal Seek)

Excel will find the best value to achieve the target value.



F	G	H	I	J	K	L	M	N	O
			Revenue	% Contribution	Contribution				
		Product A	MYR 150,000.00	20%	MYR 30,000.00				
		Product B	MYR 240,000.00	25%	MYR 60,000.00				
		Product C	MYR 400,000.00	15%	MYR 60,000.00				
		TOTAL	MYR 790,000.00		MYR 150,000.00				
				TARGET	MYR 150,000.00				

The best value determine by Excel



(6) Press [OK]



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