University of Basra
College Computer Science and Information Technology
Computer Information Systems Dep.

Computer Applications in Business

Chapter 2

Computer Information System Dep.

Lecture

Assist Prof. Dr. Aliea Salman Sabir

Last update : 2/3/2019

✓ Function Categories

We will list and briefly describe Excel's function categories in the following sections.

Function Categories	Short Description
Financial functions	The financial functions enable you to perform common business calculations that deal with money.
Date and time functions	The functions in this category enable you to analyze and work with date and time values in formulas.
Math and trig functions	This category contains a wide variety of functions that perform mathematical and trigonometric calculations.
Statistical functions	The functions in this category perform statistical analysis on ranges of data.
Lookup and reference functions	Functions in this category are used to find (look up) values in lists or tables.
Database functions	Functions in this category are useful when you need to summarize data in a list (also known as a worksheet database) that meets specific criteria.
Text functions	The text functions enable you to manipulate text strings in formulas.
Logical functions	This category consists of only seven functions that enable you to test a condition (for logical TRUE or FALSE).
Information functions	The functions in this category help you determine the type of data stored within a cell
User-defined functions	Functions that appear in this category are custom worksheet functions created by using VBA.
Engineering functions	The functions in this category can prove useful for engineering applications..
Cube functions	The functions in this category allow you to manipulate data that is part of an OLAP data cube.

☒ logical functions

Logical functions use to compare between values and give logical result only **(True, False)**,the following table describe these Category functions, which list ***all*** **t**hese function:

Function	Description
AND	**Returns TRUE if all its arguments are TRUE; returns FALSE if one or more argument is FALSE.** **Syntax :** **AND(logical1 ; logical2 ; ...)** **Logical1, logical2, ...** **are 1 to 255 conditions** you want to test that can be either TRUE or FALSE. **Remarks** • The arguments must evaluate to logical values such as TRUE or FALSE, or the arguments references that contain logical values. • If the specified range contains no logical values, AND returns the **#VALUE**! error value.

Example-1: Use the AND function to compare two columns

Two columns in a worksheet have to be evaluated. If the value in column A is greater than 20 and the value in column B is greater than 25, both values are valid

To compare two columns:

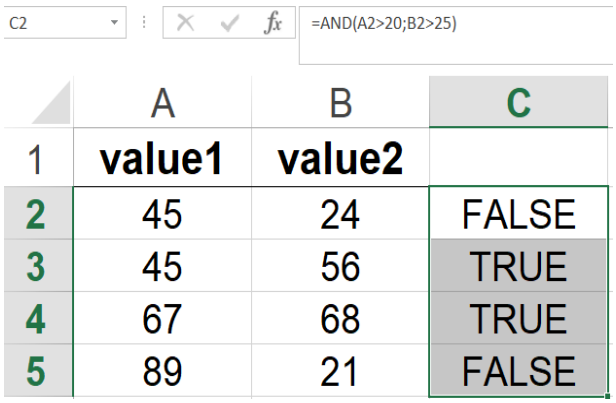
1. In cells A2:A10, enter values from 1 to 100.

2. In cells B2:B10, enter values from 1 to 100.

3. Select cells C2:C10 and type the following formula:

=AND(A2>20 ; B2>25).

4. Press **<Ctrl+Enter>**.



	A	B	C
1	value1	value2	
2	45	24	FALSE
3	45	56	TRUE
4	67	68	TRUE
5	89	21	FALSE

Note: If both criteria are valid, Excel shows the value as TRUE; otherwise it is FALSE.

Example-2: Use the AND function to show sales for a specific period of time

This example checks all rows for a specific time period using the AND function. The function returns TRUE if the arguments are TRUE and FALSE if one or more arguments are FALSE.

Note: Up to 30 conditions can be used in one formula.

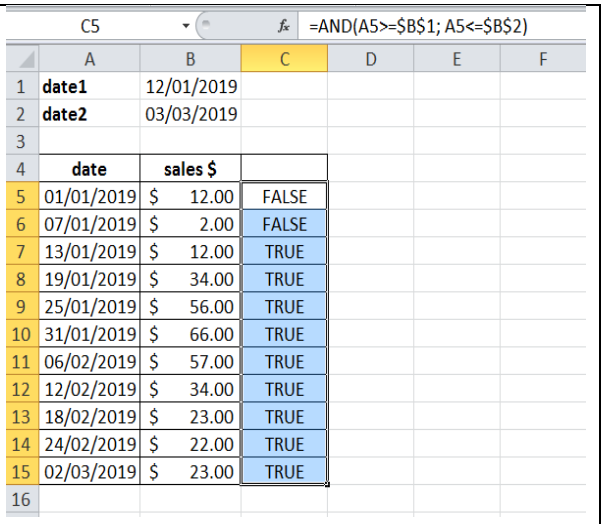
To show sales in a period of time:

-

1. Select cell B1 and enter the start date.
2. Select cell B2 and enter the end date.
3. The range A5:A15 contains dates from 1/1/2019 until 3/3/2019

4. The range B5:B15 contains sales amounts.
5. Select cells C5:C15 and type the following **=AND(A5>=$B$1 ; A5<=$B$2)**.

6. Press **<Ctrl+Enter>**.



	A	B	C
1	date1	12/01/2019	
2	date2	03/03/2019	
3			
4	date	sales $	
5	01/01/2019	$ 12.00	FALSE
6	07/01/2019	$ 2.00	FALSE
7	13/01/2019	$ 12.00	TRUE
8	19/01/2019	$ 34.00	TRUE
9	25/01/2019	$ 56.00	TRUE
10	31/01/2019	$ 66.00	TRUE
11	06/02/2019	$ 57.00	TRUE
12	12/02/2019	$ 34.00	TRUE
13	18/02/2019	$ 23.00	TRUE
14	24/02/2019	$ 22.00	TRUE
15	02/03/2019	$ 23.00	TRUE
16			

Function	Description
OR	Returns TRUE if any argument is TRUE; returns FALSE if all arguments are FALSE. **Syntax : OR(logical1 ; logical2 ; ...)** **Logical1, logical2,...** are 1 to 255 conditions you want to test that can be either TRUE or FALSE. Have the same remarks like And function

Example-3: Use the OR function to check cells for text

A worksheet contains several words in column A. Each row has to be checked for the words "new" or "actual" in column A. The OR function is used for this task. The function returns TRUE if either argument is true and FALSE if the arguments are not true.

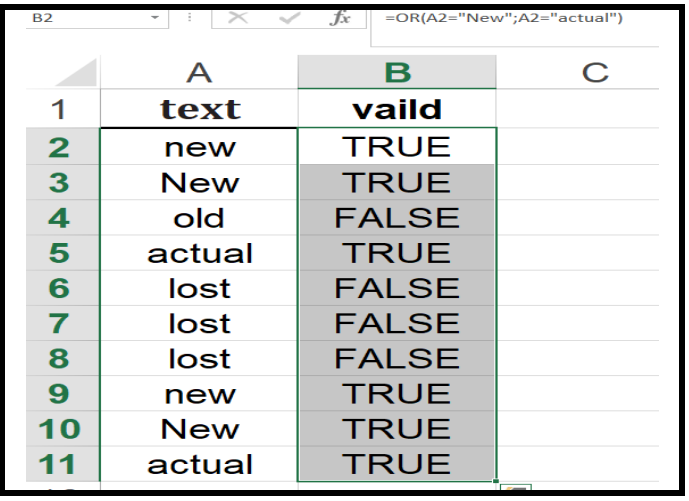
To use the OR function to check for two or more criteria:

1. Enter in range A2:A11 words like "new," "actual," and "old."

2. Select cells B2:B11 and type the following formula:

=OR(A2="New" ; A2="actual").

3. Press **<Ctrl+Enter>**.



	A	B	C
1	text	vaild	
2	new	TRUE	
3	New	TRUE	
4	old	FALSE	
5	actual	TRUE	
6	lost	FALSE	
7	lost	FALSE	
8	lost	FALSE	
9	new	TRUE	
10	New	TRUE	
11	actual	TRUE	

Example-4: Use the OR function to check cells for numbers

A worksheet contains several values in column A. Each row has to be evaluated based on certain criteria in column A. The OR function is used for this task. The function returns TRUE if any argument is TRUE and FALSE if all arguments are FALSE.

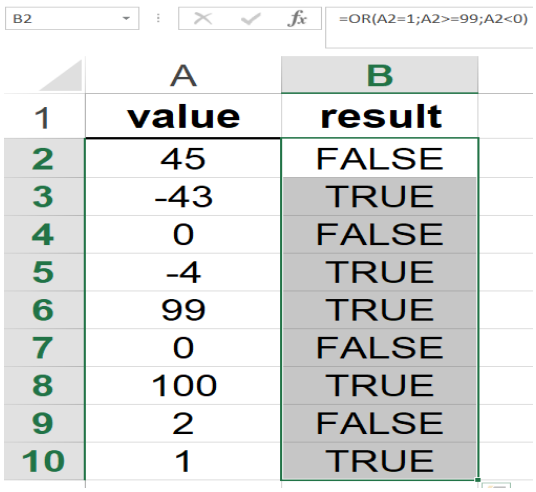
To check for two or more criteria:

1. Enter in range A2:A10 values from –43 to 100.

2. Select cells B2:B10 and type the following formula:

   =OR(A2=1 ; A2>=99,A2<0).

3. Press **<Ctrl + Enter>**.



Function	Description
IF	**Returns one value if a condition you specify evaluates to TRUE and another value if it evaluates to FALSE. Use IF to conduct conditional tests on values and formulas.** **Syntax : IF(logical_test ; value_if_true ; value_if_false)** **Logical_test** : is any value or expression that can be evaluated to TRUE or FALSE **Value_if_true** : is the value that is returned if logical_test is TRUE. **Value_if_false:** is the value that is returned if logical_test is FALSE **Remarks** • ***Up to 64 IF functions*** can be nested as value_if_true and value_if_false arguments to construct more elaborate tests. • When the value_if_true and value_if_false arguments are evaluated, IF returns the value returned by those statements. • Microsoft Excel provides additional functions that can be used to analyze your data based on a condition. For example,COUNTIF , COUNTIFS , SUMIF and SUMIFS functions.
NOT	**Reverses the value of its argument. Use NOT when you want to make sure a value is not equal to one particular value**. **Syntax : NOT(logical)** **Logical** is a value or expression that can be evaluated to TRUE or FALSE.

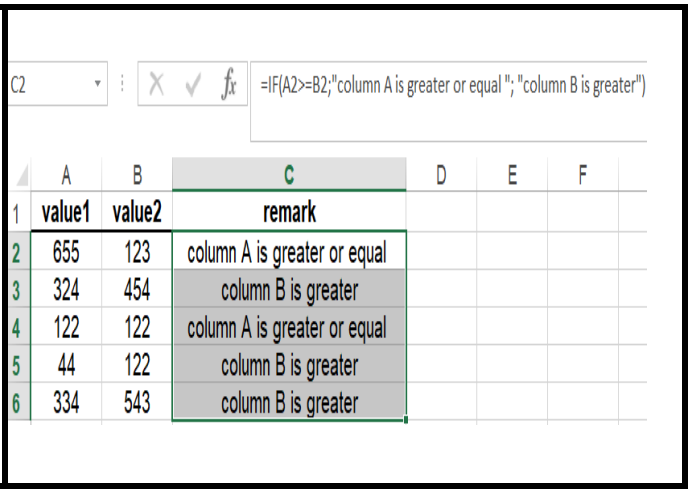
Example-5: Use the IF function to compare columns and return a specific result

As shown in earlier examples, Excel returns the value TRUE or FALSE when using the OR and AND functions. The IF function can also be used to conduct conditional tests on values and formulas. This example compares two columns and shows the result in column C. This example compares two columns and shows the result in column C.

To return specific text after comparing values:

1. Enter in range A2:A16 values from 1 to 1000.
2. Enter in range B2:B16 values from 1 to 1000.
3. Select cells C2:C6 and type the following formula:
=IF(A2>=B2 ; "Column A is greater or equal"; "Column B is greater")

4. Press **<Ctrl+Enter>**.



	A	B	C	D	E	F
1	value1	value2	remark			
2	655	123	column A is greater or equal			
3	324	454	column B is greater			
4	122	122	column A is greater or equal			
5	44	122	column B is greater			
6	334	543	column B is greater			

Example-6: Use the IF function to check for larger, equivalent, or smaller values

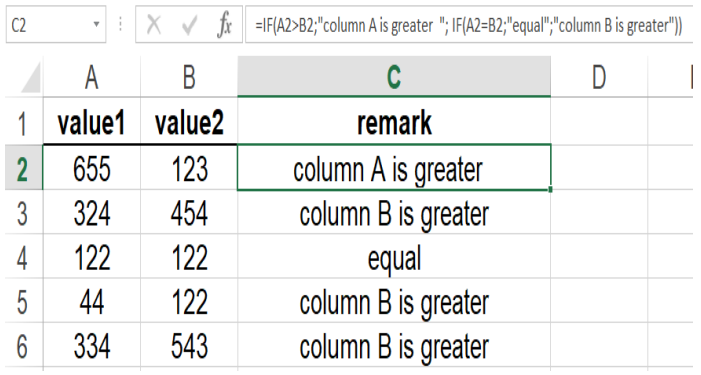
In the previous example, two different messages were used as the result for comparing values. To check for three conditions in column A and present the result as "Column A is larger," "equal," or "Column A is smaller," perform the following steps.

To compare columns and show the result:

1. enter the your data .
2. Select cells C2:C6 and type the following formula:
=IF(A2>B2; "Column A is larger "; IF(A2=B2; "equal" ; "Column A is smaller")).

3. Press **<Ctrl + Enter>**.

Note: ***Up to seven IF functions can be combined in one cell.***



	A	B	C	D
1	value1	value2	remark	
2	655	123	column A is greater	
3	324	454	column B is greater	
4	122	122	equal	
5	44	122	column B is greater	
6	334	543	column B is greater	

Example-7: Use the IF function to determine the quarter of a year

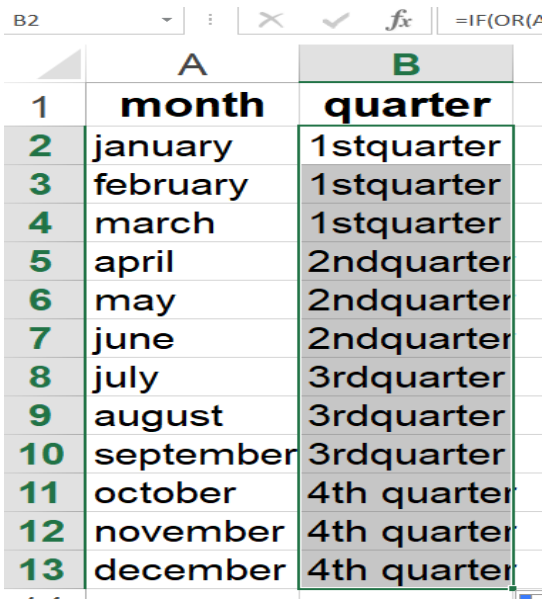
After entering an initial value, Excel can automatically fill worksheet cells with the names of weekdays or months

To determine the quarter of a year in which a particular

1. Select cells B2:B13 and type the following formula:

=IF(OR(A2="January";A2="February";A2="March");"1stquarter";IF(OR(A2="April";A2="May";A2="June");"2ndquarter";IF(OR(A2="July";A2="August";A2="September");"3rdquarter"; "4th quarter")))

2. Press **<Ctrl+Enter>**.



	A	B
1	month	quarter
2	january	1stquarter
3	february	1stquarter
4	march	1stquarter
5	april	2ndquarter
6	may	2ndquarter
7	june	2ndquarter
8	july	3rdquarter
9	august	3rdquarter
10	september	3rdquarter
11	october	4th quarter
12	november	4th quarter
13	december	4th quarter

Example-: 8 Use the IF function to calculate the commissions for individual sales

A company has a policy for individual commissions depending on sales, as shown below:

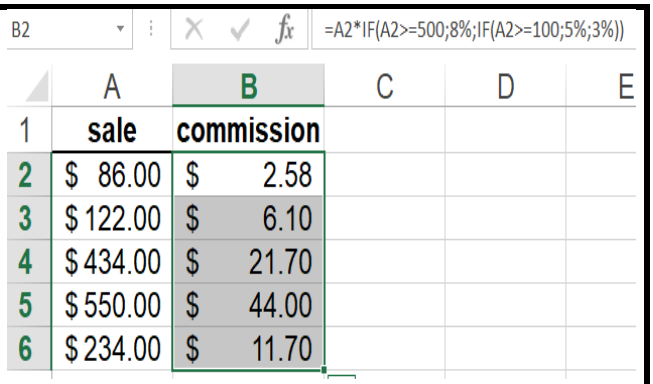
Sale < $100 3%
Sale => $100 and < $500 5%
Sale >= $500 8%

To calculate the commissions:

1. Enter different possible sales amounts in column A.

2. Select cells B2:B6 and type the following formula:
=A2*IF(A2>=500;8%;IF(A2>=100;5%;3%))

3. Press **<Ctrl + Enter>**.



	A	B	C	D	E
1	sale	commission			
2	$ 86.00	$ 2.58			
3	$ 122.00	$ 6.10			
4	$ 434.00	$ 21.70			
5	$ 550.00	$ 44.00			
6	$ 234.00	$ 11.70			

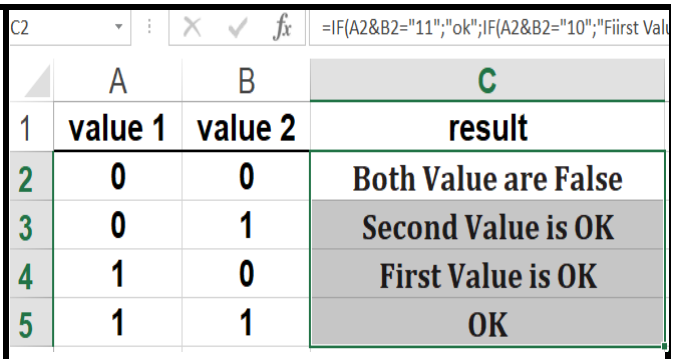
Example-9 Use the IF function to compare two cells

The following tip is a solution for comparing two cells line by line. Prepare a new worksheet, filling the first two columns with the values 0 and 1 as shown in the next Figure

1- Select cell C2:C5 and type the following formula:

=IF(A2&B2="11";"OK",IF(A2&B2="10";"First Value is OK"; IF(A2&B2="01";"Second Value is OK"; "Both Values are FALSE")))

2 . Press **<Ctrl+ Enter>**.



☒Statistical functions

The functions in this category perform statistical analysis on ranges of data. the following table describe these Category functions, which list ***some*** **of** these function:

MAX	***Returns the largest value in a set of values.*** ***Syntax*** **: MAX(number1 ; number2,...)** **Remarks** • Arguments can either be numbers or names, arrays, or references that contain numbers. • Logical values and text representations of numbers that you type directly into the list of arguments are counted. • If the arguments contain no numbers, MAX returns 0 (zero). • Arguments that are error values or text that cannot be translated into numbers cause errors.
MIN	***Returns the smallest number in a set of values.*** ***Syntax : MIN(number1; number2,...)*** **Remarks** ***: The same remarks of max function***
LARGE	***Returns the k-th largest value in a data set. You can use this function to select a value based on its relative standing. For example, you can use LARGE to return the highest, runner-up, or third-place score.*** ***Syntax :*** **LARGE(range ; k) , where** **Range :** range of data for which you want to determine the k-th largest value.

	K is the position (from the largest) in the a cell range of data to return. **Remarks** • If the range is empty, LARGE returns the #NUM! error value. • If k ≤ 0 or if k is greater than the number of data points, LARGE returns the #NUM! error value. **Note : If n is the number of data points in a range, then LARGE(range,1) returns the largest value, and LARGE(range,n) returns the smallest value.**
SMALL	***Returns the k-th smallest value in a data set. Use this function to return values with a particular relative standing in a data set.*** ***Syntax* : SMALL(range ; k)** **Range :** range of data for which you want to determine the k-th largest value. **K** is the position (from the largest) in the cell range of data to return. **Remarks** : **the same remarks in large function** **Note :If n is the number of data points in array, SMALL(range,1) equals the smallest value, and SMALL(range,n) equals the largest value**.

Example-1: Use the max , min large and small function

To determine the lowest monthly sales:

1. In a worksheet, enter the date in range A1:E6

2. To find the minimum value in all monthSelect cells B8:E8 the type the following formula: **=MIN(B2:B6)** then Press **<Ctrl+ Enter>**.

3- To find the maximum value for each person in all month , select the range f2:f6 , then write the formula **=max(b2:e2)** , then Press **<Ctrl+ Enter>**.

4- to find the first large value , select cell B9 then write **=large(B2:E6;1)** , **press enter**

5- to find the second large value , select cell B10 then write **=large(B2:E6;2)** , **press enter**

6- to find the first large value , select cell E9 then write =**small(B2:E6;1)** , **press enter**

7- to find the second large value , select cell E10 then write **=small(B2:E6;2)** , **press enter**

B8 =AVERAGEA(B2:B6)

	A	B	C	D	E	F
1	name	january	february	march	april	max
2	ali	$ 34.00	$ 23.00	$ 231.00	$ 334.00	$ 334.00
3	laith	$ 56.00	$ 543.00	$ 345.00	$ 653.00	$ 653.00
4	zain	$ 78.00	$ 444.00	$ 231.00	$ 323.00	$ 444.00
5	shead	$ 98.00	$ 333.00	$ 231.00	$ 345.00	$ 345.00
6	ahmead	$ 343.00	$ 123.00	$ 132.00	$ 154.00	$ 343.00
7						
8	min=	$ 121.80	$ 293.20	$ 234.00	$ 361.80	
9	first large value =	$ 653.00		first small value =	$ 23.00	
10	second large value =	$ 543.00		second small value =	$ 34.00	

Example-2 : Use the SMALL and large function to find the smallest and largest values in a list

To determine the three smallest values of a range:

1. In cells A1:A10 enter any values .
2. In cell b1 to b4 enter the value (1,2,3)
3. Select range C2:C4 and type the following formula **=SMALL($A$2:$A$6;B1)** to get the first three smallest value , then press **ctrl +enter** .
4. Select range C2:C4 and type the following formula **=Large($A$2:$A$6;B1)** to get the first three smallest value , then press **ctrl +enter** .

C2 =SMALL($A$2:$A$6;B2)

	A	B	C	D
1	value	order	first three miniumn value	first three maxiumn value
2	100	1	12	235
3	235	2	67	100
4	67	3	99	99
5	99			
6	12			

Function	Description
AVERAGE	***Returns the average (arithmetic mean) of the arguments.*** Syntax : **AVERAGE**(**number1**,number2,...) **Number1, number2, ...** are 1 to 255 numeric arguments for which you want the average. **Remarks** • Arguments can either be numbers or names, arrays, or references that contain numbers. • Logical values and text representations of numbers that you type directly into the list of arguments are not counted. • Arguments that are error values or text that cannot be translated into numbers cause errors. • If you want to include logical values and text representations of numbers in a reference as part of the calculation, use **the AVERAGEA** function.

Example - 3 : Use the AVERAGE function to calculate the average output

To calculate the average of the three highest capacities of each production line:

1. In cells B2:D10 type the output of each machine.
2. Select cells B13:D13 and type the following formula:

=AVERAGE(LARGE(B$2:B$10 ;1);LARGE(B$2:B$10 ;2);LARGE(B$2:B$10;3)).

3. Press **<Ctrl+ Enter>**.

B8 =AVERAGEA(LARGE(B$2:B$6;1);LARGE(B$2:B$6;2);LARGE(B$2:B$6;3))

	A	B	C	D	E	F	G
1	**date**	**A**	**B**	**C**			
2	01/01/2019	67	78	56			
3	03/02/2019	55	66	34			
4	20/02/2019	9	78	67			
5	23/02/2019	12	76	56			
6	01/03/2109	32	89	67			
7							
8	**top 3 average**	51.33333	81.66667	63.33333			
9							

Function	Description
AVERAGEIF	***Returns the average (arithmetic mean) of all the cells in a range that meet a given criteria.*** **Syntax** : **AVERAGEIF(range, criteria, [average_range])** **Range** is one or more cells to average, including numbers or names, arrays, or references that contain numbers. **Criteria** is the criteria in the form of a number, expression, cell reference, or text that defines which cells are averaged. For example, criteria can be expressed as 32, "32", ">32", "apples", or B4. **Average_range** is the actual set of cells to average. If omitted, range is used. **Remarks** • Cells in range that contain **TRUE** or **FALSE** are ignored. • If a cell in average_range is an empty cell, **AVERAGEIF** ignores it. • If range is a blank or text value, **AVERAGEIF** returns the #DIV0! error value. • If a cell in criteria is empty, **AVERAGEIF** treats it as a 0 value. • If no cells in the range meet the criteria, **AVERAGEIF** returns the #DIV/0! error value.

	• **Average_range** does not have to be the same size and shape as range. The actual cells that are averaged are determined by using the top, left cell in average_range as the beginning cell, and then including cells that correspond in size and shape to range. For example
AVERAGEIFS	**Returns the average (arithmetic mean) of all cells that meet multiple criteria.** ***Syntax*** **AVERAGEIFS(average_range, criteria_range1, criteria1, [criteria_range2, criteria2], ...)** **Note : Have the same Averageif remarks**

Example-4 use average , averageif , averageifs function

1- Enter the data in range A1:E^
2- Select cell **E8** then write the formula **=AVERAGE(E2:E6)** then press **Enter**
3- Select cell **E9** then write the formula **=AVERAGEIF(B2:B6;"dip";E2:E6)** then press **Enter**
4- Select cell **E10** then write the formula **=AVERAGEIF(D2:D6;"bas";E2:E6)** then press **Enter**
5- Select cell **E11** then write the formula **=AVERAGEIF(C2:C6;"<=20";E2:E6)**then press **Enter**
6- Select cell **E12** then write the formula **=AVERAGEIFS(E2:E6;B2:B6;"dip";D2:D6;"bag")** then press **Enter**
7- Select cell **E13** then write the formula **=AVERAGEIF(D2:D6;"bas";C2:C6)+ AVERAGEIF(D2:D6;"mes";C2:C6)**then press **Enter**

E8 =AVERAGE(E2:E6)

	A	B	C	D	E
1	**name**	**study**	**tax**	**city**	**salary**
2	ali	dip	45	bas	$ 700.00
3	zaki	grad	23	bas	$1,000.00
4	laith	dip	56	bag	$1,200.00
5	zain	grad	10	bag	$ 800.00
6	shaed	dip	23	mes	$ 23.00
7					
8	**average of salary =**				$ 744.60
9	**average of salary for dip study =**				$ 641.00
10	**average of salary for bas city=**				$ 850.00
11	**average of salary if tax <= 20**				$ 800.00
12	**average if salary for dip study and bag city=**				$1,200.00
13	**average of tax for bas and mes city=**				$ 57.00
14					