Using Functions to Create,Convert and Interpret Data

About nested functions(functions within functions)

In certain cases, you may need to use a function as one of the arguments
(argument: The values that a function uses to perform operations or calculations.
The type of argument a function uses is specific to the function. Common arguments
that are used within functions include numbers, text, cell references, and names.) of
another function. For example, the following formula uses a nested AVERAGE
function and compares the result with the value 50.

=IF(AVERAGE(F2:F5)>50,SUM(G2:G5),0)

Valid returns   When a nested function is used as an argument, it must return the
same type of value that the argument uses. For example, if the argument returns a
TRUE or FALSE value, then the nested function must return a TRUE or FALSE. If it
doesn't, Microsoft Excel displays a **#VALUE!** error value.

Nesting level limits   A formula can contain up to seven levels of nested
functions. When Function B is used as an argument in Function A, Function B is a
second-level function. For instance, the AVERAGE function and the SUM function
are both second-level functions because they are arguments of the IF function. A
function nested within the AVERAGE function would be a third-level function, and so
on.

VLOOKUP

Searches for a value in the leftmost column of a table, and then returns a value in
the same row from a column you specify in the table. Use VLOOKUP instead of
HLOOKUP when your comparison values are located in a column to the left of the
data you want to find.

The V in VLOOKUP stands for "Vertical."

Syntax

VLOOKUP(**lookup_value**,**table_array**,**col_index_num**,range_lookup)

Lookup_value   is the value to be found in the first column of the array.
Lookup_value can be a value, a reference, or a text string.

Table_array   is the table of information in which data is looked up. Use a reference
to a range or a range name, such as Database or List.

- If range_lookup is TRUE, the values in the first column of table_array must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE; otherwise VLOOKUP may not give the correct value. If range_lookup is FALSE, table_array does not need to be sorted.
- You can put the values in ascending order by choosing the **Sort** command from the **Data** menu and selecting **Ascending**.
- The values in the first column of table_array can be text, numbers, or logical values.
- Uppercase and lowercase text are equivalent.

Col_index_num   is the column number in table_array from which the matching value must be returned. A col_index_num of 1 returns the value in the first column in table_array; a col_index_num of 2 returns the value in the second column in table_array, and so on. If col_index_num is less than 1, VLOOKUP returns the #VALUE! error value; if col_index_num is greater than the number of columns in table_array, VLOOKUP returns the #REF! error value.

Range_lookup   is a logical value that specifies whether you want VLOOKUP to find an exact match or an approximate match. If TRUE or omitted, an approximate match is returned. In other words, if an exact match is not found, the next largest value that is less than lookup_value is returned. If FALSE, VLOOKUP will find an exact match. If one is not found, the error value #N/A is returned.

Remarks

- If VLOOKUP can't find lookup_value, and range_lookup is TRUE, it uses the largest value that is less than or equal to lookup_value.
- If lookup_value is smaller than the smallest value in the first column of table_array, VLOOKUP returns the #N/A error value.
- If VLOOKUP can't find lookup_value, and range_lookup is FALSE, VLOOKUP returns the #N/A value.

FREQUENCY

Calculates how often values occur within a range of values, and then returns a vertical array of numbers. For example, use FREQUENCY to count the number of test scores that fall within ranges of scores. Because FREQUENCY returns an array, it must be entered as an array formula.

Syntax

FREQUENCY(data_array,bins_array)

Data_array   is an array of or reference to a set of values for which you want to count frequencies. If data_array contains no values, FREQUENCY returns an array of zeros.

Bins_array   is an array of or reference to intervals into which you want to group the values in data_array. If bins_array contains no values, FREQUENCY returns the number of elements in data_array.

Remarks

- FREQUENCY is entered as an array formula after you select a range of adjacent cells into which you want the returned distribution to appear.
- The number of elements in the returned array is one more than the number of elements in bins_array. The extra element in the returned array returns the count of any values above the highest interval. For example, when counting three ranges of values (intervals) that are entered into three cells, be sure to enter FREQUENCY into four cells for the results. The extra cell returns the number of values in data_array that are greater than the third interval value.
- FREQUENCY ignores blank cells and text.
- Formulas that return arrays must be entered as array formulas.

Example

This example assumes all test scores are integers.

The example may be easier to understand if you copy it to a blank worksheet.

	A	B
	Scores	**Bins**
1		
2	79	70
3	85	79
4	78	89
5	85	
6	50	
7	81	
8	95	
9	88	
10	97	

Formula	Description (Result)
=FREQUENCY(A2:A10,B2:B5)	Number of scores less than or equal to 70 (1)
	Number of scores in the bin 71-79 (2)
	Number of scores in the bin 80-89 (4)
	Number of scores greater than or equal to 90 (2)

SUMIF

Adds the cells specified by a given criteria.

Syntax
SUMIF(**range**,**criteria**,sum_range)

Range   is the range of cells you want evaluated.

Criteria   is the criteria in the form of a number, expression, or text that defines which cells will be added. For example, criteria can be expressed as 32, "32", ">32", "apples".

Sum_range   are the actual cells to sum.

Remarks

- The cells in sum_range are summed only if their corresponding cells in range match the criteria.
- If sum_range is omitted, the cells in range are summed.
- Microsoft Excel provides additional functions that can be used to analyze your data based on a condition. For example, to count the number of occurrences of a string of text or a number within a range of cells, use the COUNTIF function. To have a formula return one of two values based on a condition, such as a sales bonus based on a specified sales amount, use the IF function.

Example

The example may be easier to understand if you copy it to a blank worksheet.

	A	B
1	Property Value	Commission
2	100	7
3	200	14
4	300	21
5	400	28

Formula	Description (Result)
=SUMIF(A2:A5,">160000",B2:B5)	Sum of the commissions for property values over 160000 (63,000)

COUNTIF

Counts the number of cells within a range that meet the given criteria.

Syntax

COUNTIF(**range**,**criteria**)

Range   is the range of cells from which you want to count cells.

Criteria   is the criteria in the form of a number, expression, or text that defines which cells will be counted. For example, criteria can be expressed as 32, "32", ">32", "apples".

Remark

Microsoft Excel provides additional functions that can be used to analyze your data based on a condition. For example, to calculate a sum based on a string of text or a number within a range, use the SUMIF worksheet function. To have a formula return one of two values based on a condition, such as a sales bonus based on a specified sales amount, use the IF worksheet function.

Example

The example may be easier to understand if you copy it to a blank worksheet.

	A	B
1	**Data**	**Data**
2	apples	32
3	oranges	54
4	peaches	75
5	apples	86

Formula	Description (Result)
=COUNTIF(A2:A5,"apples")	Number of cells with apples in the first column above (2)
=COUNTIF(B2:B5,">55")	Number of cells with a value greater than 55 in the second column above (2)