Microsoft Excel Functions

Excel Functions

- Text Functions
- Statistical Functions
- Mathematical Functions
- Logical Functions

Text Functions

- FIND
- LEFT, RIGHT, MID
- CONCATENATE
- REPLACE
- TRIM
- LEN
- UPPER, LOWER
- DOLLAR
- PROPER
- REPT
- SUBSTITUTE
- BAHTTEXT
- VALUE

TEXT

- The **Text** function returns a value converted to text with a specified format.
- Syntax: **=Text(value, format)**
  - **value** is the value to convert to text.
  - **format** is the format to display the results in.

FIND

- It searches for a text inside another text and returns the position of the text searched.
- Syntax: =FIND(find_text;within_text;start_num)
  - “find_text” refers to the text to be found
  - “within_text” refers to the string or cell reference to be searched
  - “start_numb” refers to the initial position of the search
- It performs the search reading the text from left to right, from the initial position indicated in “start_numb”.
- FIND does not distinguish between capital and small letters and admits joker characters (?, *)

LEFT, RIGHT, MID

- When data is imported or copied into an Excel spreadsheet unwanted characters or words can sometimes be included with the new data.
- Excel has several functions that can be used to remove such unwanted characters.
- Which function you use depends upon where the unwanted characters are located.

LEFT

- If the unwanted characters are on the right side of your good data, use the **LEFT** function to remove them.
- Syntax: **= LEFT (Number , Num_chars)**
  - **Number** - the piece of data (cell number) you want to change
  - **Num_chars** - specifies the number of characters to be retained from the **Number** specified above.

RIGHT

- If the unwanted characters are on the left side of your good data, use the **RIGHT** function to remove them.
- Syntax: **= RIGHT (Number , Num_chars)**
  - **Number** - the piece of data (cell number) you want to change
  - **Num_chars** - specifies the number of characters to be retained from the **Number** specified above.

MID

- If the unwanted characters on both sides of your good data, use the **MID** function to remove them.
- Syntax: **= MID (Number , Start_num , Num_chars)**
  - **Number** - the piece of data (cell reference) you want to change.
  - **Start_num** - specifies the starting character from the left of the data to be kept.
  - **Num_chars** - specifies the number of characters to the right of the Start_num to be retained.

CONCATENATE

- The CONCATENATE function is used to join two or more words or text strings together.

- The syntax for the CONCATENATE function is: **= CONCATENATE (text1, text2, ... textn)**
  - “**text1**”, “**text2**”,…“**textn**” may be the text to be concatenated or the cell number or a combination of both.

REPLACE

- The REPLACE function can be used to replace unwanted characters with good data or with nothing at all.
- Syntax: **=REPLACE(Old_text, Start_num, Num_chars, New_text)**
  - **Old_text** - the piece of data (cell reference) you want to change.
  - **Start_num** - specifies the start position (from the left) of the characters in old_text that you want to replace.
  - **Num_chars** - specifies the number of characters to be replaced from the Start_num specified above.
  - **New_text** - specifies the new data to be added. This argument can be left blank if you just want to remove unwanted characters.

TRIM

- When text data is imported or copied into an Excel spreadsheet extra spaces can sometimes be included along with the words.
- The TRIM function can be used to remove these unwanted spaces.
- Syntax: **= TRIM (Text)**
  - **Text** - the text you want to change. This can be a cell reference to where the text is stored.

LEN

- The LEN function returns the length or the number of characters that a text chain or a cell has.
- Syntax: **=LEN(text)**
  - **Text** may be the text to be counted (enclosed in double quotation marks) or a cell number.

UPPER, LOWER

- UPPER
  - Converts into capital letters a text chain or a cell.
  - Syntax: **=UPPER(text)**
    - **Text** may be the text to be converted or the cell number whose text must be converted.
- LOWER
  - Converts into small letters a text chain or a cell.
  - Syntax: **=LOWER(text)**
    - **Text** may be the text to be converted or the cell number whose text must be converted.

DOLLAR

- The DOLLAR dunction converts to text a number using currency format.

- Syntax: **=DOLLAR(number, decimals)**
  - **Number** – specifies the number that is to be converted
  - **Decimals** – specifies the number of decimal places to be used in the conversion.

PROPER

- The PROPER function converts the first letter of each word of a text into capital letters, the rest of the word into small letters.

- Syntax: **=PROPER(text)**
  - **Text** may be the text to be converted or the cell reference which contains the text to be converted.

REPT

- The REPT function repeats previous text a fixed number of times.

- Syntax: **=REPT(text, number_times)**
  - **Text** specifies the text chain to be repeated (in double quotation marks)
  - **Number_times** specifies the number of times the text is to be repeated

SUBSTITUTE

- The SUBSTITUTE function substitutes portions of text by new text.
- Syntax: **=SUBSTITUTE(text, old_text; new_text; instance_num)**
  - **Text** – specifies the text (or cell reference containing text) in which to substitute characters.
  - **Old_text** – specifies the portion of the **text** to be substituted. It is case sensitive.
  - **New_text** – specifies the text to substitute the **old_text.**
  - **Instance_num** – specifies which occurrence of old text to be substituted. If omitted, every

BAHTTEXT

- The BAHTTEXT function converts a number in Thai (Baht) text.
- The baht format can be changed into a different style used. Regional configuration or Regional options in the Windows Control panel .
- Syntax: **=BAHTTEXT(number)**
  - This only works for numbers.

VALUE

- The VALUE function converts a text string that represent a number to a number
- Syntax: **=VALUE(text)**
  - **Text** is the text enclosed in quotation marks or a cell reference containing the text to be converted.

LOGICAL FUNCTIONS

- Comparison Operators
- TRUE
- FALSE
- AND
- OR
- IF
- NOT

Comparison Operators

- Excel's logic functions always involve a comparison between two values. The logic test can only return a true or false answer, depending on the condition tested.
- The comparison operators that can be used in a logic test are:
  - Equals (**=**)
  - Less than (**<**)
  - Less than or equal to (**< =**)
  - Greater than (**>**)
  - Greater than or equal to (**> =**)
  - Not equal to (**< >**)

TRUE

- The TRUE function returns the logical value TRUE.
- Syntax: **=TRUE**( )
  - The function does not have arguments.
- You can also type the word TRUE directly onto the worksheet or into the formula, and Microsoft Excel interprets it as the logical value TRUE.

FALSE

- The FALSE function returns the logical value FALSE.
- Syntax: **=FALSE**( )
  - The function does not have arguments.
- You can also type the word FALSE directly onto the worksheet or into the formula, and Microsoft Excel interprets it as the logical value FALSE.

AND

- The AND function checks whether all arguments are TRUE.
- The function returns TRUE if all arguments in the function are TRUE, otherwise it returns FALSE
- Syntax: **= AND (logical-1 , logical-2 , ... logical-255)**
  - **logical** - refers to the cell reference that is being checked. Up to 255 logical values can be entered into the function.

OR

- The OR function checks whether any of the arguments are TRUE, and returns TRUE or FALSE.
- The function returns FALSE if all arguments are FALSE.
- Syntax: **=OR (logical-1 , logical-2 , ... logical-255)**
  - **logical** - refers to the cell reference that is being checked. Up to 255 logical values can be entered into the function.

IF

- The IF function is used to conduct conditional tests on values and formulas.
- It returns one value if a condition you specify evaluates to TRUE and another value if it evaluates to FALSE.
- 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 when the condition is TRUE. If it is not specified, the function returns TRUE.
  - **Value_if_false** is the value that is returned

NOT

- The NOT function 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.
- **Remark**
  - If logical is FALSE, NOT returns TRUE; if logical is TRUE, NOT returns FALSE.

Statistical Functions

- AVERAGE
- AVERAGE IF
- LARGE
- SMALL
- MIN
- MAX
- MODE
- MEDIAN
- RANK

AVERAGE

- The AVERAGE function is used to find the average or arithmetic mean of a given list of arguments.
- Syntax: **= AVERAGE (argument1, argument2, ... argument255)**
  - Argument1, argument 2, ... argument 255 can be numbers, named ranges, arrays, or cell references. Up to 255 arguments can be entered.

AVERAGE IF

- The AVERAGE IF function is used to find the average of values in cells in a selected range that meet certain criteria.
- Syntax: **=AVERAGEIF(Range, Criteria, Average_Range)**
  - Range - the group of cells the function is to search.
  - Criteria - determines whether the cell is to be counted or not.
  - Average_range - the data range that is averaged if the first range meets the specified criteria. If this range is omitted, the first range

LARGE

- The LARGE function can be used to find data based on relative size.
- Syntax: **= LARGE (Array , K)**
  - **Array** - the array or range of cells containing the data to be used in the function.
  - **K** - the K^{th} largest value, such as the third largest value, that is being sought.

SMALL

- The SMALL function can be used to find data based on relative size.
- Syntax: **= SMALL (Array , K)**
  - **Array** - the array or range of cells containing the data to be used in the function.
  - **K** - the K^{th} smallest value, such as the third smallest value, that is being sought.

MIN

- The MIN function is used to find the smallest or minimum value in a given list of numbers or arguments.
- Syntax: **=MIN (argument1, argument2, ... argument30)**
  - Argument1, argument2, ... argument30 can be numbers, named ranges, arrays, or cell references. Up to 30 arguments can be entered.

MAX

- The MAX function is used to find the largest or maximum number in a given list of values or arguments.
- Syntax: **=MAX(argument1, argument2, ... argument30)**
  - Argument1, argument2, ... argument30 can be numbers, named ranges, arrays, or cell references. Up to 30 arguments can be entered.

MODE

- The MODE function is used to find the most frequently occurring value in a list of numbers.
- Syntax: **= MODE (number1, number2, ... number255)**
  - **Number1,…,number255** is the list of values or cell references to be checked by the function.
    - **Note:** Up to 255 numbers can be entered into the function.

MEDIAN

- The MEDIAN function shows the middle value in a list of numbers.
- Middle, in this case, refers to arithmetic size rather than the location of the numbers in a list.
- If there is an even set of numbers, the median is the average of the middle two values.
- Syntax: **= MEDIAN (number1, number2, ... number255)**
  - **Number1,…,number255** is the list of values or cell references to be checked by the function.
    - **Note:** Up to 255 numbers can be entered into the function.

RANK

- The RANK function ranks the size of a number compared to other numbers in a list a data.
- Syntax: **= RANK (Number, Ref, Order)**
  - **Number** - the cell reference of the number to be ranked.
  - **Ref** - the range of cells to use in ranking the Number.
  - **Order** - determines whether the Number is ranked in ascending or descending order.
    - Type a “0" (zero) to rank in descending order (largest to smallest). Type a 1 to rank in ascending order (smallest to largest).

Information Functions

- CELL
- TYPE
- ISBLANK
- ISERROR
- ISNUMBER
- ISTEXT
- ERROR.TYPE
- N
- NA

CELL

- Excel’s CELL function is used to find out information about a specific cell, worksheet or workbook.
- The function's job is to give out information about a cell such as its formatting, the type of data it contains, and whether or not the cell is locked or protected.
- Syntax:**= CELL (info_type , reference)**
  - Info_type: Refers to the type of cell information being sought. Only specific key words can be used for this parameter.
  - Reference: Refers to the cell reference that is being checked.

CELL (cont.)

Info_type	Returns
address	Reference of the first cell in reference, as text.
col	Column number of the cell in reference.
color	1 if the cell is formatted in color for negative values; otherwise returns 0 (zero).
contents	Value of the upper-left cell in reference; not a formula.
filename	Filename (including full path) of the file that contains reference, as text. Returns empty text ("") if the worksheet that contains reference has not yet been saved.
format	Text value corresponding to the number format of the cell. The text values for the various formats are shown in the following table. Returns "-" at the end of the text value if the cell is formatted in color for negative values. Returns "()" at the end of the text value if the cell is formatted with
parentheses	1 if the cell is formatted with parentheses for positive or all values; otherwise returns 0.

CELL (cont.)

Info_type	Returns
prefix	Text value corresponding to the "label prefix" of the cell. Returns single quotation mark (') if the cell contains left-aligned text, double quotation mark (") if the cell contains right-aligned text, caret (^) if the cell contains centered text, backslash (\) if the cell contains fill-aligned text, and empty text ("") if the cell contains anything else.
protect	0 if the cell is not locked, and 1 if the cell is locked.
row	Row number of the cell in reference.
type	Text value corresponding to the type of data in the cell. Returns "b" for blank if the cell is empty, "l" for label if the cell contains a text constant, and "v" for value if the cell contains anything else.
width	Column width of the cell rounded off to an integer. Each unit of column width is equal to the width of one character in the default font size.

TYPE

- The TYPE function returns the type of value. Use TYPE when the behavior of another function depends on the type of value in a particular cell.
- Syntax: **=TYPE(value)**
  - **Value** can be any Microsoft Excel value, such as a number, text, logical value, and so on.

Value Type	Result
Number	1
Text	2
Logical Value	4
Error Value	16

TYPE (cont.)

- Remarks:
  - TYPE is most useful when you are using functions that can accept different types of data, such as ARGUMENT and INPUT. Use TYPE to find out what type of data is returned by a function or formula.
  - You cannot use TYPE to determine whether a cell contains a formula. TYPE only determines the type of the resulting, or displayed, value. If value is a cell reference to a cell that contains a formula, TYPE returns the type of the formula's resulting value.

ISBLANK

- The ISBLANK function's job is to check to see if a certain cell is empty or not. If the cell is empty, a value of TRUE is returned by the function.
- If data is later added to an empty cell the function will automatically update and return a FALSE value.
- Syntax: **= ISBLANK (Value)**
  - Value: Refers to the cell reference that is being checked.

ISERROR

- Returns TRUE if the value is any error value.
- When a formula refers to a cell in which you have another formula, always use the ISERROR function to avoid trashing the last formula with a "#DIV/0" or a "#VALUE" or a "#N/A".
- Syntax: **=ISERROR(Value)**
  - Value: Refers to the cell reference that is being checked.

ISNUMBER

- The ISNUMBER function's job is to determine if the data in a certain cell is a number or not. If the data is a number, a value of TRUE is returned by the function.
- If it is not a number, or the cell is empty, a FALSE value is returned. It should be noted that, for this function, dates and times are considered numbers.
- Syntax: **= ISNUMBER (Value)**
  - Value: Refers to the cell reference that is being checked.

ISTEXT

- The ISTEXT function's job is to determine if the data in a certain cell is text or not. If the data is text, a value of TRUE is returned by the function.
- If it is not a text, or the cell is empty, a FALSE value is returned.
- Syntax: **= ISTEXT (Value)**
  - Value: Refers to the cell reference that is being checked.

ERROR.TYPE

- The ERROR.TYPE function returns a number corresponding to one of the error values in Microsoft Excel or returns the #N/A error if no error exists.
- Use the ERROR.TYPE in an IF function to test for an error value and return a text string, such as a message, instead of the error value
- Syntax: **=ERROR.TYPE(error_val)**
  - **Error_val** is the error value whose identifying number you want to find. Although error_val can be the actual error value, it will usually be a reference to a cell containing a formula that you

ERROT.TYPE (cont.)

If Error_val is	ERROR.TYPE returns
#NULL!	1
#DIV/0!	2
#VALUE!	3
#REF!	4
#NAME?	5
#NUM!	6
#N/A	7
Anything else	#N/A

N

- The N function returns a value converted to a number.
- Syntax: **=N(value)**
  - **Value** is the value you want converted.

- It is not generally necessary to use the N function in a formula, because Excel automatically converts values as necessary.

NA

- The NA function returns the error value #N/A. #N/A is the error value that means “no value is available.”
- Use NA to mark empty cells. By entering #N/A in cells where you are missing information, you can avoid the problem of unintentionally including empty cells in your calculations. (When a formula refers to a cell containing #N/A, the formula returns the #N/A error value.)
- Syntax: **= NA**( )
  - You must include the empty parentheses with the function name. Otherwise, Microsoft Excel

Financial Functions

- PMT
- DB

PMT

- The PMT function can be used to calculate the payments for a loan or the future value of an investment.
- Syntax: **= PMT (rate , nper , pv , fv , type)**
  - rate - the annual interest rate for the loan.
  - nper - the total number of payments to be made on the investment.
  - pv - the present value of the investment. For future value this argument is omitted.
  - fv - future value - the value of the investment at the end of the investment period.
  - type - indicates when payments are made:
    - "0" (or omitted) - at the end of the period i.e.: end of the month.

DB

Lookup Function

- TRANSPOSE

TRANSPOSE

- The TRANSPOSE function is used to copy data located in a row into a column or copy data located in a column into a row.
- The syntax for the TRANSPOSE function is:

  { = TRANSPOSE (Array)}

  - Array - the range of cells to be copied from the horizontal to the vertical or vertical to the horizontal.
  - The curly braces " **{ }** " surrounding the function indicate that it is an array function.

Mathematical Functions

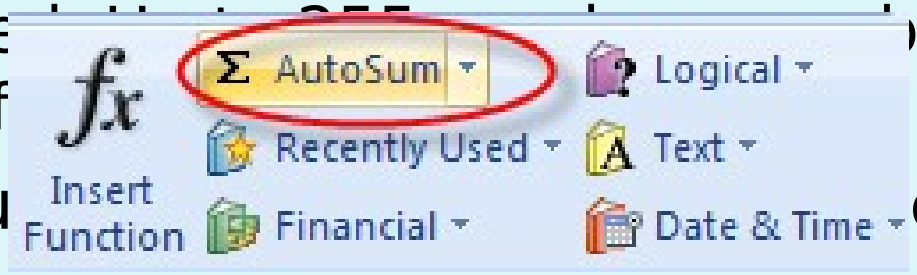
- SUM, AUTOSUM
- PRODUCT, QUOTIENT
- SUMPRODUCT
- ABS
- ROUND, ROUNDUP, ROUNDDOWN
- RAND
- TRUNC
- MOD
- SUMIF
- INT, ROMAN
- RADIANS
- COS, SIN, TAN, ACOS, ASIN, ATAN

SUM

- The SUM function provides a quick way to add numbers together in an Excel spreadsheet.
- Syntax: **=SUM(Number1, Number2, ... Number255)**
  - Number1, …, Number255 specifies the numbers or the range of cells with the numbers to be added. Up to 255 numbers can be entered into the function.

AUTOSUM

- The AutoSum feature is a shortcut to using Excel's SUM function. It provides a quick way to add up columns or rows of figures in a spreadsheet.
- Syntax: **=SUM(Number1, Number2, ... Number255)**
  - Number1, ..., Number255 specifies the numbers or the range of cells with the numbers to be adde[illegible]e entered into the f[illegible]
- The fu[illegible]e standard tool bar.



PRODUCT

- The PRODUCT function can be used when multiplying numbers or a range of values together.
- Syntax: **=PRODUCT(num1,…,num255)**
  - **Num1,…,num255** specifies the numbers that must be multiplied together or the cell references containing the numbers to be multiplied.

QUOTIENT

- The QUOTIENT function can be used to divide numbers in Excel.
- Unlike regular division, however, the QUOTIENT function only gives you the whole number as an answer - not the remainder.
- Syntax: **=QUOTIENT (numerator , denominator)**
  - Numerator refers to the number to be divided.
  - Denominator refers to the divisor.

SUMPRODUCT

- The SUMPRODUCT function returns the sum of the products of the corresponding ranges or arrays.
- Syntax: **=SUMPRODUCT(array1,…, array255)**
  - **Array1,…,array255** are 2 to 255 arrays that are to be multiplied and then add the components.
    - Note that all arrays must have the same dimensions.

ABS

- The ABS function returns the absolute value of a number.
  - The absolute value of a number is the number without its sign
- Syntax: **= ABS(number)**
  - **Number** is the real number or cell reference of which you want the absolute value

ROUND

- The ROUND function is used to reduce a given value to a specific number of decimal places.
- Syntax: **= ROUND (Number, Num_digits)**
  - Number - the value to be rounded.
  - Num_digits - the number of decimal places to reduce the above number to.

ROUNDUP

- The ROUNDUP function is used to round a number upwards towards the next highest number.
- ROUNDUP is similar to the ROUND function except that it always rounds a number upward while the ROUND function will round up or down depending on whether the last digit is greater than or less than 5.
- Syntax: **= ROUNDDOWN (Number, Num_digits)**
  - Number - the value to be rounded.
  - Num_digits - the number of decimal places to

ROUNDDOWN

- The ROUNDDOWN function is used to round a number downwards towards the next lowest number.
- ROUNDDOWN is similar to the ROUND function except that it always rounds a number downward while the ROUND function will round up or down depending on whether the last digit is greater than or less than 5.
- Syntax: **= ROUNDDOWN (Number, Num_digits)**
  - Number - the value to be rounded.
  - Num_digits - the number of decimal places to

RAND

- One way to generate random numbers in Excel is to use the RAND function. This function produces a random number between 0 and 1.
- Syntax: = **RAND ( )**
  - **Note:** This function takes no arguments.

TRUNC

- The TRUNC function truncates a number to an integer by removing the decimal or fraction part of the number.
- Syntax: **=TRUNC(Number, Num_digits)**
  - **Number** is the number or cell reference to be truncated.
  - **Num_digits** is a number specifying the precision of the truncation, 0 if omitted.

MOD

- The MOD function (modulo) returns the remainder after division.
- Syntax: **=MOD(Number, Divisor)**
  - **Number** is the number (or cell reference) for which you wan to find the remainder after the division is performed.
  - **Divisor** is the number (or cell reference) by which to divide the Number.

SUMIF

- The SUMIF function is used to add up the values in cells in a selected range that meet certain criteria.
- Syntax:**=SUMIF(Range, Criteria, Sum Range)**
  - Range - the group of cells the function is to search.
  - Criteria - determines whether the cell is to be counted or not.
  - Sum Range - the data range that is summed if the first range meets the specified criteria. If this range is omitted, the first range is summed

INT

- The INT function is used to round a number downwards towards the next lowest number.
- INT is similar to the ROUNDDOWN function except that it always rounds a number down to the nearest whole number - completely removing the decimal portion.
- Syntax: **= INT (Number)**
  - Number - the value to be rounded.

ROMAN

- The ROMN function returns the Roman equivalent of an Arabic number.
- Syntax: **=ROMAN(Number, Form)**
  - **Number** is the Arabic numeral to be converted.
  - **Form** is the number specifying the type or Roman numeral you want.

RADIANS

- The RADIANS function provides a way of converting angles measured in degrees to radians.
- Syntax: = **RADIANS (Angle)**
  - Angle - the angle in degrees to be converted to radians.
- Note: radians=angle*pi/180 where pi=22/7

COS, SIN, TAN

- The COS function gives the cosine of an angle measured in radians.
- The SIN function gives the sine of an angle whereas the TAN function gives the tangent of an angle measured in radians.
- Syntax: **= COS (Number)**; **=SIN(Number); =TAN(Number)**
  - Number - the angle in radians being calculated.

ACOS, ASIN, ATAN

- The ACOS function returns the arccosine of a number, in radians, in a range between 0 and pi.
  - The arccosine is the angle whose cosine is the number.
- The ASIN and ATAN return the arcsine and arctangent of a number respectively.
  - The range of the ASIN and ATAN radians is –pi/2 to pi/2
- Syntax: =ASIN(Number); =ACOS(number); =ATAN(Number)
  - The Number is the radian of the angle

Date Functions

- TODAY
- NOW
- NETWORKDAYS

TODAY

- The TODAY function is used to add the current date to a spreadsheet.
- Syntax: **=TODAY( )**
  - Note: The TODAY function takes no arguments.

NOW

- The NOW function is used to add the current time and date to a spreadsheet.
- Syntax: **= NOW ( )**
  - Note: The NOW function takes no arguments.

NETWORKDAYS

- The NETWORKDAYS function can be used to calculate the number of working days during a specific time period. The function automatically removes weekend days from the total. Specific holidays can be omitted as well.
- Syntax: **= NETWORKDAYS (Start_date , End_date , Holidays)**
  - Start_date - the start date of the chosen time period.
  - End_date - the end date of the chosen time period.
  - Holidays - can be used to exclude one or more

Nesting Functions

- Nested functions are just functions within functions. The result returned from one function is used as the argument to another function.
- You can nest up to seven functions within the same formula.
- When nesting functions you should try to use extra parentheses where necessary in order to make the formula as intuitive as possible.

Nested IF Function

- Probably the most common use of nested functions is to perform conditional tests.
- Nested IF functions are a common conditional test
  - Although being limited to seven nested functions can cause problems.

Nesting Other Functions

- You can nest any types of functions as long as the arguments are of the correct data type.

PivotTables and PivotCharts

- A PivotTable is a form of report that works by rearranging the fields and records in a database into a different format.
  - You can rotate (pivot) the columns in a PivotTable to display data summarized in different ways, easily sort the database in various ways, filter data, and collapse and expand the level of information displayed.
- A PivotChart is a powerful data analysis tool that enables one to visualize a pivot table.

PivotTables

- The PivotTable creates a PivotTable field from each field in the database (each column, in the default orientation). Each PivotTable field contains items that summarize the rows of information that contain a particular entry.
- Creating and manipulating the PivotTable doesn’t change the contents or layout of the database, so you can safely use a PivotTable to experiment with your data without worrying about corrupting the data or needing to restore the database’s layout afterwards.

Creating a PivotTable using a wizard

- Open the workbook that contains the database you want to manipulate.
- Display the worksheet that contains the database, and click a cell in the database. To use a specific range of the database instead of the whole database, select that range.
- Choose Data | PivotTable and PivotChart Report.
- Make sure the Microsoft Excel List or Database option button and the PivotTable option button are selected, and then click the Next button.

Creating a PivotTable using a wizard (cont.)

- Enter the database range in the Range text box:
  - If you selected a cell in the database in step 2, the wizard should have identified the range that contains the database.
  - If the wizard selected the wrong range, click the Collapse Dialog button to collapse the dialog box, select the range manually, and then click the Collapse Dialog button again to restore the dialog box.
- Click Next. The wizard displays its third screen
- Specify where to place the PivotTable by selecting the New Worksheet option button or the Existing Worksheet option button, as

Creating PivotTables using a wizard (cont.)

- At this point, you can also specify the layout of the PivotTable (by clicking the Layout button and working in the Layout dialog box) or options for the PivotTable (by clicking the Options button and working in the PivotTable Options dialog box)
- Click the Finish button. The wizard creates the new worksheet or selects the specified existing worksheet (depending on your choice), creates a blank PivotTable, and displays the PivotTable toolbar and the PivotTable Field List.

Creating a PivotTable on the Framework

- Create your PivotTable by dragging the appropriate field buttons from the PivotTable Field List window to the appropriate areas of the blank PivotTable.
- Which field buttons you drag depend on what results you're trying to produce.
- Check the steps on the examples presentation

Changing a PivotTable

- Once you've created the PivotTable on the framework, you can change, format, and configure it.
- You can also control how Excel displays the PivotTable
- You can change a PivotTable by dragging the fields you've already placed to different locations, removing one or more of those fields, or adding other fields.

Formatting a PivotTable

- The standard method of formatting a PivotTable is to apply an AutoFormat by clicking the Format Report button on the PivotTable toolbar, selecting the most suitable AutoFormat in the AutoFormat dialog box, and clicking the OK button.

- You can also apply formatting manually to the data area of the PivotTable, but be warned that visual elements will disappear when Excel reapplies the current AutoFormat to the PivotTable, unless you select the Preserve Formatting check box in the PivotTable Options

Changing A Field To A Different Function

- Select the Field button on the PivotTable.
- Click the Field Settings button on the PivotTable toolbar to display the PivotTable Field dialog box
- In the Summarize By list box, select the function you want.
- To apply number formatting, click the Number button and work on the Number tab of the Format Cells dialog box.
- To show the data in a different way than normal, click the Options button.
  - Excel displays a previously hidden section at the bottom of the PivotTable Field dialog box.

Changing A Field To A Different Function (cont.)

- Use the Show Data As drop-down list, the Base Field list, and the Base Item list to specify the format you want. For example, you might choose Difference From in the Show Data As drop-down list to show how the data differs from the specified base field
- Click the OK button to close the PivotTable Field dialog box and apply the function.

Configuring A PivotTable

- Choose PivotTable ->Table Options from the PivotTable toolbar to display the PivotTable Options dialog box
- Settings from the dialog box:
  - Grand Totals for Columns check box – Controls whether the PivotTable displays grand totals for its columns.
  - Grand Totals for Rows check b**ox** – Controls whether the PivotTable displays grand totals for its rows.
  - AutoFormat Table check box – Controls whether Excel automatically applies the default AutoFormat to the PivotTable.

Configuring A PivotTable (cont.)

- Merge Labels check box – Controls whether Excel merges the cells for the outer row labels and the column labels.
- Preserve Formatting check box – Controls whether Excel retains formatting that is applied to the PivotTable when you change the PivotTable's layout or refresh its data.
- Repeat Item Labels on Each Printed Page check box – Controls whether Excel repeats the outer row field item labels at the top of each page in a printout. Usually, repeating the labels like this makes a PivotTable easier to read.

Configuring A PivotTable (cont.)

- Mark Totals with * check box – Available only for PivotTables based on online analytical processing (OLAP) source data (as opposed to data from an Excel database, such as you've been using in this chapter).
  - When you're using OLAP source data, this check box controls whether Excel displays an asterisk after each grand total and subtotal to remind you that these totals include hidden items.
- Page Layout drop-down list – Lets you choose between Down, Then Over layout (the default) and Over, Then Down layout to suit your paper type and layout.
- Fields Per Column text box Lets you specify how

Configuring A PivotTable (cont.)

- For Error Values, Show check box and text box – Lets you force Excel to display a specific value (for example, an error message) in each cell that contains an error value.
- For Empty Cells, Show check box and text box Lets you force Excel to display a specific value in each empty cell.
- Set Print Titles check box Controls whether Excel prints the field and item labels as row and column titles. Before using this feature, turn off repeating rows and columns:
  - Choose File | Print Setup to display the Print Setup dialog box.
  - Click the Sheet tab to display its contents.

Configuring A PivotTable (cont.)

- Save Data with Table Layout check box – Controls whether Excel saves a copy of the PivotTable's data in the workbook.
  - Saving the copy enables you to reopen the workbook and work with the PivotTable without refreshing the data, but it makes the workbook file substantially larger than it would be otherwise.
  - If you need to keep the workbook file as small as possible, clear this check box and either select the Refresh on Open check box or refresh the data in the PivotTable manually when necessary.
- Enable Drill to Details check box Controls whether – Excel lets you double-click a cell in the PivotTable's data area to create and display a new worksheet showing the data behind that cell.
  - This option is on by default, and can help you

Configuring A PivotTable (cont.)

- Refresh on Open check box – Controls whether Excel refreshes the PivotTable data when you reopen the workbook.
  - This option is off by default; you'll need it only when using an external data source.
- Refresh Every NN Minutes check box and text box – Let you specify whether and, if so, at what interval Excel should refresh the data from an external source.
- Save Password check box – Controls whether Excel saves your password when accessing an external data source. Saving your password saves you the time and effort of reentering it

Configuring A PivotTable (cont.)

- Background Query check box – Controls whether Excel runs queries to an external database in the background or in the foreground.
  - When Excel runs the queries in the background, you can continue to work while a query is running, but the query may take longer than if it were running in the foreground and temporarily preventing you from working in the PivotTable.
- Optimize Memory check box – Controls whether Excel attempts to conserve memory when refreshing data from an external data source.
  - Unless you're working with a colossal PivotTable or your computer is terminally short on memory, you

The PivotTable Toolbar

- When you're working in a PivotTable, Excel displays the PivotTable toolbar by default.
- Here's what the controls on the PivotTable toolbar do:
  - PivotTable Menu – Contains commands for working with PivotTables.
  - Format Report – Displays the AutoFormat dialog box, from which you can quickly apply any of a wide selection of canned formats to the PivotTable.
  - Chart Wizard – Launches the Chart Wizard.
  - Hide Detail and Show Detail – Toggles the

The PivotTable Toolbar (cont.)

- Refresh External Data – Forces Excel to refresh the data contained in the PivotTable.
  - Click this button to update the PivotTable after changing data in the cells from which the PivotTable is drawn.
- Include Hidden Items in Totals – Controls whether Excel includes hidden items in the totals displayed in the PivotTable.
- Always Display Items – Controls whether Excel always displays the items in the table.
- Field Settings – Displays the PivotTable Field dialog box for configuring settings for the selected field.
- Show/Hide Field List – Toggles the display of the

Create PivotCharts from PivotTables

- A PivotChart is a chart derived from a PivotTable.
- The advantage of a PivotChart over a regular chart is that you can drag fields to different locations in the chart layout to display different levels of detail or different views of the data.
  - This flexibility makes PivotCharts great for analyzing data.
- The easiest way to create a PivotChart is to create a PivotTable as described so far in this chapter, select a cell in the PivotTable, and then click the Chart Wizard button on the PivotTable toolbar to create the framework of a PivotChart

Create PivotCharts from PivotTables (cont.)

- But you can also create a PivotChart by running the PivotTable and PivotChart Wizard and selecting the PivotChart Report (with PivotTable Report) option on the first screen of the wizard.
- This option creates the PivotTable for you (on your choice of a new worksheet or an existing worksheet, as before), creates a new chart page named Chart*n* (where *n* is the lowest unused number), and places the framework of a PivotChart on it.
- Check example for the steps.

What-If Analysis

- What-if analysis: A process of changing the values in cells to see how those changes affect the outcome of formulas on the worksheet.
- What-If Utilities
  - Goal Seek
  - Scenario Manager
  - Solver
  - VLOOKUP and HLOOKUP

Goal Seeking

- *Goal seeking* is the act of finding a specific value for a single worksheet cell by adjusting the value of one other worksheet cell.
- When you goal seek, Excel adjusts the value in a single worksheet cell that you specify until a formula that is dependent on that worksheet cell returns the result that you want.
- To goal seek in Excel, click Tools ➤ Goal Seek, complete the requested information in the Goal Seek dialog box, and then click OK.
  - The results will appear in the Goal Seek Status dialog box.

Scenario Manager

- A *scenario* is a set of values and formulas that Excel saves as a group. You can create and save different sets of values and formulas on a worksheet as different scenarios, and then switch to any of these scenarios to view their outcomes.
- You use scenarios to forecast the outcome of a particular set of worksheet cell values and formulas that refer to those cell values.
- Scenarios are particularly helpful for comparing sets of cell values to validate assumptions or analyze outcomes.

Solver

- Solver is a tool that obtains a certain value, a maximum value, or a minimum value of one worksheet cell by changing other related cells. Solver will change the worksheet cell value you specify to the specified value, highest value, or lowest value for a worksheet cell formula.
- You can also restrict the allowed values that Solver can use.

VLOOKUP and HLOOKUP

- VLOOKUP and HLOOKUP are functions in Excel that allow you to search a table of data and based on what the user has supplied and give appropriate information from that table.
- VLOOKUP allows you to search a table that is set up vertically. That is, all of the data is set up in columns and each column is responsible for one kind of data.
- HLOOKUP looks up data that has been formatted by rows instead of columns.

VLOOKUP

- Syntax: =VLOOKUP (lookup_value, table_array, col_index_num, range_lookup)
  - The **lookup_value** is the user input. This is the value that the function uses to search on.
  - The **table_array** is the area of cells in which the table is located. This includes not only the column being searched on, but the data columns for which you are going to get the values that you need.
  - The **col_index_num** is the column of data that contains the answer that you want.

VLOOKUP (cont.)

- **Range_lookup** is a TRUE or FALSE value.
  - When set to TRUE, the lookup function gives the closest match to the lookup_value without going over the lookup_value.
  - When set to FALSE, an exact match must be found to the lookup_value or the function will return #N/A.
- Note: This requires that the column containing the lookup_value be formatted in ascending order.

HLOOKUP

- Excel's HLOOKUP function, short for horizontal lookup, is used to find specific information that has been stored in a spreadsheet table.
- HLOOKUP works much the same the Excel VLOOKUP function, or Vertical Lookup.
- The only difference being that VLOOKUP searches for data in columns and HLOOKUP searches for data in rows.

HLOOKUP (cont.)

- Syntax: **=HLOOKUP (lookup_value, table_array, col_index_num, range_lookup)**
  - **lookup _value** is the value that is searched for in the first row of the table array. The lookup _value can be a text string, a logical value (TRUE or FALSE only), a number or a cell reference to a value.
  - **table_array** is the range of data that the function searches to find your information. The table_array must contain at least **two rows** of data. The first row contains the lookup_values.
    - This argument is either a named range or a reference to a range of cells

HLOOKUP (cont.)

- If you are using a reference to a range a cells, it is a good idea to use an absolute cell reference for the table_array.
- If you do not use an absolute reference and you copy the HLOOKUP function to other cells, there is a good chance you will get error messages in the cells the function is copied to.

- **row_index_num** for this argument, enter the row number of the table_array from which you want data returned from.

HLOOKUP (cont.)

- **range_lookup** is a logical value (TRUE or FALSE only) that indicates whether you want HLOOKUP to find an exact or an approximate match to the lookup_value.
  - If TRUE or if this argument is omitted, HLOOKUP will use an approximate match if it cannot find an exact match to the lookup_value. If an exact match is not found, HLOOKUP uses the next largest lookup_value.
- If FALSE, HLOOKUP will only use an exact match to the lookup_value.
  - If there are two or more values in the first column of table_array that match the lookup_value, the first value found is used. If an exact match is not found, an #N/A error is returned.