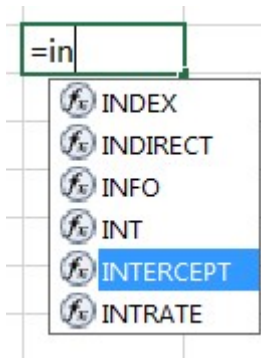# Week 3: Toolbox

Keyboard Shortcuts

Tab:

Accept a function that Excel has suggested at the prompt.

F4:

Immediately after typing a cell reference in the formula bar, use F4 to change the type of cell reference. Pressing F4 once will enforce an absolute reference. Pressing F4 repeatedly will let you cycle between absolute referencing, mixed referencing and relative referencing.

Windows Shortcuts: Microsoft Office Support pages **| Mac Shortcuts:** Microsoft Office Support pages

Excel Terminology

VLOOKUP

This is a function from the lookup family that is used for retrieving and categorising data. For example, it can automate the process of entering an individual's grade based on what mark he/she

got. The grades and the marks of all individuals would have to be placed in a lookup table. The V stands for vertical and can only be used when your data has been organised vertically.

Lookup Value:This is the value that you want to look up from the table. Excel will look for this value in the first column of the lookup table.

Lookup Table/Table Array: This refers to the table that contains the lookup value and the value you would like returned. This can be specified by a table name, named range or cell references.

Col_index: This is the column that contains the value you want Excel to return.

Range Lookup: This argument is in square brackets and can be omitted when using range **VLOOKUP**. This argument must be set to FALSE when using an exact match **VLOOKUP**.

Range VLOOKUP: This is a way of looking up a value from a table such that you don't necessarily want Excel to find an exact match for the lookup value. Excel will use the largest value that is less than or equal to the lookup value. For range lookup, make sure that the data is sorted alphabetically or numerically. This is the default **VLOOKUP** in Excel.

Exact Match VLOOKUP: This is a way of looking up a value with a unique identity, e.g. employee I.D. or account number of a particular employee. In this case, an exact match would be appropriate.

INDEX

This function returns a value, or the reference to a value, from within a table or range.

Array: This is the first argument of the Index function and it is usually a range of cells.

Row_num: This is the number of the row that contains the value you want to return. This option becomes optional if your array only contains one row.

Col_num: This is the number of the column that contains the value you want to return. This option becomes optional if your array only contains one column.

Area_num: This is to be specified when more than 1 disjoint (separated) set of cell references is specified so that it becomes important to communicate to Excel which disjoint set is of interest to you.

Note: To use the **INDEX** function to extract a row/column from a table specify the col_num/row_num as 0. Remember to highlight which cells you would like to place the array in and press Ctrl + Shift + Enter at the end of your formula.

CHOOSE

This is a function in the lookup family of functions. This function retrieves a value from a list based on a numeric value you specify. It is good for small lists that won't change often.

Index_num: This is a numeric value which communicates to Excel which position in the list to retrieve the value from.

Value 1, Value 2: This must be filled with the cell references of your list. Remember, use (say) **B4,B5,B6** and not **B4:B6**.

MATCH

This is a function in the family of lookup functions. This function works almost like **VLOOKUP**. It looks up a value in a row or column and returns a number for the position in which that value is contained. This function is usually used in combination with other lookup functions, e.g. **INDEX**.

Lookup_value: This is the value to be looked up in the lookup array.

Lookup_array: The range of cells being searched by Excel.

Match type: This can be omitted if you desire to have the default option, which is the less than match type.

0 is an exact match and it will return the position of the value that first matches the lookup value.

1 is the less than match type. For this type, the data in the array must be arranged in ascending order. The position of the largest value that is less than or equal to the lookup value is returned.

-1 is the greater than match type. For this type, the data in the array must be arranged in descending order. Excel will return the smallest value greater than or equal to the lookup value.

#NA

This error usually appears when the lookup function cannot find the lookup value in the lookup table.

Ninja Tips of the Week

Reminder: Relative and Absolute References

A relative cell reference consists of the column letter(s) and row number(s), e.g. **D4**. If you copy this cell reference one column to the right it will change to **E4**. The column letter will increase by 1. Similarly, if you copy it one row down it will change to **D5**. The row number will increase by 1. This is very useful as you can write one formula and copy it across or down and have the formula change as you copy it.

But what happens if you do not want the cell reference to change when you copy the formula? You can change the cell reference to an absolute cell reference by putting dollar signs ($) in front of the column letter and row number. So we could change **D4** to **$D$4**. Now when you copy the formula the cell reference will not change.

You can also have mixed cell references, where either the column or row is "locked". If you copy **$D4** one column to the right it will not change, but if you copy it one row down it will change to **$D5**. Similarly, **D$4** will not change when copied down rows but will change when copied across columns.

Range Lookup vs. Nested IFs

Range lookup can be used as an efficient alternative to nested IF functions. While nested IFs can be difficult to implement, check and edit, range lookups overcome these issues because they are much easier to use.

Consider the following example for categorising retail price by discount level:

	D	E	F	G	H
3	Retail Price	Category		Cost	DiscCategory
4	995.00			$0.00	A
5	1,695.00			$1,000.00	B
6	3,295.00			$10,000.00	C
7	4,945.00			$25,000.00	D
8	10,995.00				

Under the nested IFs approach, you would input the following in cell **E4**:

=IF(D4<$G$5,$H$4,IF(D4<$G$6,$H$5,IF(D4<$G$7,$H$6,$H$7)))

Under the range lookup approach, you would only have to input the following in cell **E4**:

=VLOOKUP(D4,$G$4:$H$7,2)

Under both approaches, you would be able to copy the formula down column E to categorise all the retail prices, but the range lookup approach would be much more efficient and less prone to error.