

COMP1022Q

Introduction to Computing with Excel VBA

# Using Logic in Cell Formulas

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# Outcomes

- After completing this presentation, you are expected to be able to:
  1. Understand how to use logic functions AND, OR, and NOT in cell formulas

# Using Logic

- We usually need to make a decision based on several *criteria* (sometimes called *conditions*)
- For example, you decide what you will eat for lunch based on the price *and* the quality of the food *and* how far away the restaurant is
- Several cell functions help us do decisions
- We will look at 3 of them in this presentation

# Using Logic

- Logic functions are used to help make decisions
- We will look at AND, OR and NOT
- Sometimes you combine them with IF, discussed in another presentation
- Although humans usually use ‘yes’ and ‘no’, computers use TRUE and FALSE

# Some Commonly Used Logic Functions

- These are the most commonly used logic functions
- All logic functions return either TRUE or FALSE:

AND	returns TRUE if all the input(s) are TRUE, otherwise it returns FALSE	}	Usually these have at least two inputs
OR	returns TRUE if at least one of the inputs is TRUE, otherwise it returns FALSE		
NOT	returns TRUE if the input is FALSE, otherwise it returns FALSE	}	This has just one input. The result is the opposite of the input.

# Summary of Logical Functions

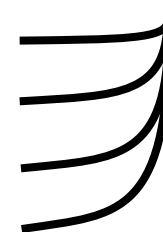
- Here is a summary of the input and output of the three logical functions:

<b>a</b>	<b>b</b>	<b>AND (a , b)</b>	<b>OR (a , b)</b>	<b>NOT (a)</b>
FALSE	FALSE	FALSE	FALSE	TRUE
FALSE	TRUE	FALSE	TRUE	TRUE
TRUE	FALSE	FALSE	TRUE	FALSE
TRUE	TRUE	TRUE	TRUE	FALSE

- All of the inputs must be TRUE for the result to be TRUE, otherwise the result is FALSE

## AND

- In this example cells B5, B6, B7 and B8 are the inputs to the AND



	A	B
1	<b>Logical AND</b>	
2	<i>This example shows an example of AND in a cell formula</i>	
3		
4	<b>Information About The Boy/Girl You Are Interested In</b>	
5	Age	21
6	Height (cm)	162
7	Weight (kg)	66
8	Savings	HKD 100,000
9		
10	Considering everything, suitable partner?	<b>=AND( age&gt;=18, age&lt;=23, height&gt;=165, height&lt;=180, weight&gt;=50, weight&lt;=70, savings&gt;=200000 )</b>

# Using Names for Cells

5	Age	21
6	Height (cm)	162
7	Weight (kg)	66
8	Savings	HKD 100,000

- For this example we first gave appropriate names for cells B5, B6, B7 and B8

- When we use the cell names the formula is nice:

```
=AND (age>=18, age<=23, height>=165, height<=180,  
      weight>=50, weight<=70, savings>=200000 )
```

- If the formula is like this it works fine, although it doesn't look as nice:

```
=AND ( $B$5>=18, $B$5<=23, $B$6>=165, $B$6<=180,  
      $B$7>=50, $B$7<=70, $B$8>=200000 )
```



# Some Results

4	Information About The Boy/Girl You Are Interested In	
5	Age	21
6	Height (cm)	162
7	Weight (kg)	66
8	Savings	HKD 100,000
9		
10	Considering everything, suitable partner?	<b>FALSE</b>

4	Information About The Boy/Girl You Are Interested In	
5	Age	20
6	Height (cm)	180
7	Weight (kg)	70
8	Savings	HKD 200,000
9		
10	Considering everything, suitable partner?	<b>TRUE</b>

4	Information About The Boy/Girl You Are Interested In	
5	Age	20
6	Height (cm)	185
7	Weight (kg)	66
8	Savings	HKD 320,000
9		
10	Considering everything, suitable partner?	<b>FALSE</b>

4	Information About The Boy/Girl You Are Interested In	
5	Age	22
6	Height (cm)	169
7	Weight (kg)	66
8	Savings	HKD 888,000
9		
10	Considering everything, suitable partner?	<b>TRUE</b>

- If one or more of the inputs is TRUE then the result will be TRUE, otherwise the result is FALSE

# OR

- For this example we first gave appropriate names for cells B5, B6, B7 and B8

	A	B
1	<b>Logical OR</b>	
2	<i>This example shows an example of OR in a cell formula.</i>	
3		
4	<b>Information About The Boy/Girl You Are Interested In</b>	
5	Cute	FALSE
6	Wealthy	TRUE
7	Has flat	FALSE
8	Has car	FALSE
9		
10	<b>Considering everything, suitable partner?</b> <b>=OR( cute, wealthy, flat, car )</b>	



We don't have to do that, but now the formula is nicer:

# Some Results

4	Information About The Boy/Girl You Are Interested In	
5	Cute	FALSE
6	Wealthy	TRUE
7	Has flat	FALSE
8	Has car	FALSE
9		
10	Considering everything, suitable partner?	<b>TRUE</b>

4	Information About The Boy/Girl You Are Interested In	
5	Cute	TRUE
6	Wealthy	TRUE
7	Has flat	FALSE
8	Has car	FALSE
9		
10	Considering everything, suitable partner?	<b>TRUE</b>

4	Information About The Boy/Girl You Are Interested In	
5	Cute	TRUE
6	Wealthy	TRUE
7	Has flat	TRUE
8	Has car	TRUE
9		
10	Considering everything, suitable partner?	<b>TRUE</b>

4	Information About The Boy/Girl You Are Interested In	
5	Cute	FALSE
6	Wealthy	FALSE
7	Has flat	FALSE
8	Has car	FALSE
9		
10	Considering everything, suitable partner?	<b>FALSE</b>

# NOT

- The result of NOT is the opposite of the input

	A	B
1	<b>Logical NOT</b>	
2	<i>This example shows an example of NOT in a cell formula</i>	
3		
4	Are you alive? Enter TRUE or FALSE	TRUE
5	Are you dead? The answer is:	<b>=NOT( B4 )</b>

- Examples showing the formula being used:

4	Are you alive? Enter TRUE or FALSE	TRUE
5	Are you dead? The answer is:	<b>FALSE</b>
4	Are you alive? Enter TRUE or FALSE	FALSE
5	Are you dead? The answer is:	<b>TRUE</b>