Spreadsheets 2
Functions and Charts
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CS111

IF function

Inserts a value in a cell based on the outcome of a logical test (i.e. true/false)

Syntax

=IF(logical_test, value_if_true, value_if_false)

Boolean functions

AND(a, b)
both a and b must be true
e.g. =AND(3 = 4, 2 = 2) is false

OR(a, b)
either a or b can be true
e.g. =OR(3 = 4, 2 = 2) is true

NOT(a)
inverts the outcome of a
e.g. =NOT(2 = 3) is true

Comparison operators

<  
eq  
> or <  
> or <=

IF function

Use an IF function in cell D5 to check whether each child is under the maximum height and weight. If they are, write “Yes!”, otherwise write “No”. Ensure that your formula can be filled down.

<table>
<thead>
<tr>
<th>Name</th>
<th>Height</th>
<th>Weight</th>
<th>Allowed in playground?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>1.45</td>
<td>56</td>
<td>No</td>
</tr>
<tr>
<td>Charlie</td>
<td>1.10</td>
<td>44</td>
<td>No</td>
</tr>
<tr>
<td>Ben</td>
<td>1.19</td>
<td>35</td>
<td>Yes!</td>
</tr>
</tbody>
</table>
IF function

Syntax
=IF(logical_test, value_if_true, value_if_false)

=IF(AND(B5<$B$1, C5<$B$2), value_if_true, value_if_false)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Max height:</td>
<td>1.2    metres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Max weight:</td>
<td>40      kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Name</td>
<td>Height</td>
<td>Weight</td>
<td>Allowed in playground?</td>
</tr>
<tr>
<td>4</td>
<td>Tom</td>
<td>1.45</td>
<td>56</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Charlie</td>
<td>1.10</td>
<td>44</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>Ben</td>
<td>1.19</td>
<td>35</td>
<td>Yes!</td>
</tr>
</tbody>
</table>

Check whether the child is under the maximum height and weight. If they are, write "Yes!"; otherwise write "No". Ensure that your formula can be filled down.

Q: What is wrong with this answer?

Syntax
=IF(logical_test, value_if_true, value_if_false)

=IF(AND(B5<B$1, C5<B$2), "Yes!", "No")

<table>
<thead>
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<td></td>
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<td>Height</td>
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</tr>
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<td>6</td>
<td>Ben</td>
<td>1.19</td>
<td>35</td>
<td>Yes!</td>
</tr>
</tbody>
</table>

Check whether the child is under the maximum height and weight. If they are, write "Yes!", otherwise write "No". Ensure that your formula can be filled down.

Answer.

Syntax
=IF(logical_test, value_if_true, value_if_false)

=IF(AND(B5<$B$1, C5<$B$2), "Yes!", "No")

or =IF(AND(B5<B$1, C5<B$2), "Yes!", "No")

<table>
<thead>
<tr>
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Check whether the child is under the maximum height and weight. If they are, write "Yes!", otherwise write "No". Ensure that your formula can be filled down.

Lookup functions
Lookup functions

- Sometimes we will need to look up values in a table in our spreadsheet
  - For example, matching a student’s ID number with their name

- Two kinds of lookup functions
  - VLOOKUP: used with vertical tables
  - HLOOKUP: used with horizontal tables

VLOOKUP

Syntax: VLOOKUP(value, table, column, range)

- Value: the cell that you are looking up
- Table: a range of cells containing the table, usually written as absolute references
- Column: the column of the table that contains the values we want to retrieve
- Range: this is a Boolean value...
  - TRUE if the lookup value is approximate,
  - FALSE if an exact match is required

Example

- Use VLOOKUP to insert the students’ surnames in the blank cells, given their ID number

```
=VLOOKUP(A3, $D$3:$F$10, 3, false)
```

VLOOKUP Example
HLOOKUP

- Same syntax as VLOOKUP, except it is used to look up values in horizontal tables
- Write a formula for C6 that finds the cost of tickets on a day in A6:A8 and multiplies the cost with the number of tickets

\[ \text{=HLOOKUP(A6,}$B$1:$H$2,2,\text{FALSE)} \times B6 \]

Using range=TRUE

Let’s imagine we want to write a formula in E3 that uses the table in cells A1 to B5 to find the person’s grade and place it in the cell. Your formula must be able to be filled to the right. Here we can put TRUE in the range argument.

This returns the next lowest match to your search term.

**EXERCISE:** Can you write the formula for E3 that you could fill to F3 and G3?

Write a formula in E3 that uses the table in cells A1 to B5 to find the person’s grade and place it in the cell. Your formula must be able to be filled to the right. Here we can put TRUE in the range argument.

This returns the next lowest match to your search term.
Sorting data

Excel can sort data using columns; Data → Sort

When we click 'OK' the data is sorted

Generating charts
Inserting a chart

Once you have sorted data, you can create a Chart to insert in your spreadsheet

- We’ll use the data from the previous slide

Decide on what is the best chart to use to present your data
We also need to decide on the dependent and independent variable

- Independent goes on the x-axis
- Dependent goes on the y-axis

Inserting a chart

Clicking on the 2D Column chart icon gives me a preview of my chart

- The chart that Excel generated had a few things missing
**Inserting a chart**

- Added axis title, adjusted scale, added trendline and equation

![Chart](image.png)

**Summary**

- Looked at three functions:
  - IF
  - VLOOKUP
  - HLOOKUP

- Discussed more Excel features:
  - Sorting data
  - Inserting and modifying charts

**Spreadsheets are super useful...**

Spreadsheets are incredibly useful. I use them every day, for all kinds of things.

- Managing finances
  - How much money do I have?
  - When can I expect to have saved enough to buy a car?
  - How much do I expect to spend each year (and how does that actually compare to how much I actually spend each year)?

- Scheduling a workshop
  
  https://docs.google.com/spreadsheets/d/1Jo9d-ee9HMaytvvDT3R-jP6XdWcpczrs93_o dy0/edit?#gid=0

- Tracking progress on my thesis wordcount (procrastination)

I personally enjoy using "Google Sheets." ([http://docs.google.com](http://docs.google.com)) Check it out, but remember that the exam questions will be based upon Microsoft Excel.