

IF Statement

IF Statement | Reference

=IF(logical_test, value_if_true, value_if_false)

The IF function can be quite useful in a spreadsheet. It is used when you want to test for more than one value. For example, has a bill been paid or not? If it has, you can deduct the amount from the money you have left to spend; if it hasn't, keep it on your debt list. Later, you'll see how to use the IF Function to grade student exam scores. If the student has above 80, award an A grade; if the student has below 30, award a fail grade.

First, here's what an IF Function looks like:

=IF(logical_test, value_if_true, value_if_false)

The thing to note here is the three items between the round brackets of the word IF. These are the arguments that the IF function needs. Here's what they mean:

- **logical_test** - The first argument is what you want to test for. Is the number in the cell greater than 80, for example?
- **value_if_true** - This is what you want to do if the answer to the first argument is YES. (Award an A grade, for example)
- **value_if_false** - This is what you want to do if the answer to the first argument is NO. (Award a FAIL grade.)

If that's not terribly clear, an example may clear things up. Open a new spreadsheet, and do the following:

- Widen the B column a bit, as we'll be putting a message in cell B1
- Now click in cell A1 and type the number 6
- Type the following in the formula bar (The right angle bracket after A1 means "Greater Than".)

=IF(A1>5, "Greater than Five", "Less than Five")

- Hit the enter key on your keyboard and your spreadsheet should look like the one below:

Figure 1 | IF Statement Example

	A	B	C	D	E	F	G
1	6	Greater than Five					
2							

- Make sure you have all the commas and double quotes in the correct place, otherwise Excel will give you an error message. That right angle bracket (>) is known as a Conditional Operator. You'll meet some others shortly.

But what we're saying in the IF function is this:

- **logical_test**: Is the value in cell A1 greater than 5?
- **value_if_true**: If the answer is Yes, display the text "Greater than Five"
- **value_if_false**: If the answer is NO, display the text "Less than Five"

So your first tell Excel what you want to check the cell for, then what you want to do if the answer is YES, and finally what you want to do if the answer is NO. You separate each part with a comma.

Try this

- Click into cell A1
- Change the 6 into a 4
- Hit the enter key on your keyboard

What happens? Your spreadsheet should look like the one below:

Figure 2 | IF Statement Example

	A	B	C	D	E	F	G
1	4	Less than Five					
2							

Try this

- Click into cell A1
- Change the 4 into a 5
- Hit the enter key on your keyboard

What happens? Your spreadsheet should look like the one below:

Figure 3 | IF Statement Example

	A	B	C	D	E	F	G
1	5	Less than Five					
2							

For the last exercise above, Excel should tell you that 5 is "Less than 5"! It does this because the answer to your logical test was NO. We were testing if the number in cell A1 was greater than 5. Since 5 is not greater than 5, the answer to the question is NO. We've told Excel to display a message of "Less than 5", if the answer was NO. In other words, we didn't tell Excel what to do if the value in cell A1 was the same as 5.

The solution to this is to use a different Conditional Operator. We used the Greater Than (>) operator. Here's some more:

< Less Than

>= Greater than Or Equal To

<= Less than Or Equal To

<> Not Equal To

For the second and third operators above, you type an angle bracket followed by the equals sign. There are no spaces between the two. For the final one, it's a left angle bracket followed by a right angle bracket.

So for this exercise, the symbol we should have used was the one for Greater than Or Equal To. Change your IF function to this and try again:

=IF(A1>=5, "Greater than or Equal to Five", "Less than Five")

Figure 4 | IF Statement Example

	A	B	C	D	E	F	G
1	5	Greater than or Equal to Five					
2							

Try this

- Click into cell A1
- Change the 5 into a 3
- Hit the enter key on your keyboard

What happens? Your spreadsheet should look like the one below:

Figure 5 | IF Statement Example

B1		fx =IF(A1 >= 5, "Greater than or Equal to Five", "Less than Five")					
	A	B	C	D	E	F	G
1	3	Less than Five					
2							

In the example above, A1 is less than (<) 5 which causes IF Statement displays the false value (Less than 5) in cell B1.

Complex If Functions

The If Functions you've just met are consider fairly simple ones. They can get more complex as illustrated in the following Student Exam problem. The spreadsheet we created to track our student grades looks like this...

Figure 6 | Complex IF Statement Example

B11		fx =AVERAGE(B3:B10)				
	A	B	C	D	E	F
1		Students				Subject
2	Subjects	Nick	Carol	Suzanne	James	Averages
3	Mathematics	76	89	43	48	64.00
4	English	55	85	78	61	69.75
5	Science	65	82	39	58	61.00
6	History	45	91	56	72	66.00
7	Geography	51	84	54	64	63.25
8	Art	43	63	49	62	54.25
9	Computer Studies	63	95	45	59	65.50
10	French	35	91	65	26	54.25
11	Overall Average	54.13	85.00	53.63	56.25	

However, we want to display the following grades as well:

- A If the student scores 80 or above
- B If the student scores 60 to 79
- C If the student scores 45 to 59
- D If the student scores 30 to 44
- FAIL If the student scores below 30

With such a lot to check for, what will the IF Function look like? Here's one that works:

`=IF(B3>=80, "A", IF(B3>=60, "B", IF(B3>=45, "C", IF(B3 >=30, "D", "Fail"))))`

Quite long, isn't it? Look at it, and see if you can see how it works. What we're doing here is adding more IF Functions if the answer to the first question is NO. If it's YES, it will just display an "A".

But take a look at our Student Exam spreadsheet now:

Figure 7 | Complex IF Statement Example

B15		=IF(B3>=80, "A", IF(B3>=60, "B", IF(B3>=45, "C", IF(B3 >=30, "D", "Fail"))))								
	A	B	C	D	E	F	G	H	I	
1		Students				Subject				
2	Subjects	Nick	Carol	Suzanne	James	Averages				
3	Mathematics	76	89	43	48	64.00				
4	English	55	85	78	61	69.75				
5	Science	65	82	39	58	61.00				
6	History	45	91	56	72	66.00				
7	Geography	51	84	54	64	63.25				
8	Art	43	63	49	62	54.25				
9	Computer Studies	63	95	45	59	65.50				
10	French	35	91	65	26	54.25				
11	Overall Average	54.13	85.00	53.63	56.25					
12										
13		Students								
14	Subjects	Nick	Carol	Suzanne	James					
15	Mathematics	B	A	D	C					
16	English	C	A	B	B					
17	Science	B	A	D	C					
18	History	C	A	C	B					
19	Geography	C	A	C	B					
20	Art	D	B	C	B					
21	Computer Studies	B	A	C	C					
22	French	D	A	B	Fail					

After the correct answer is displayed in cell B15 on the spreadsheet above, we used AutoFill for the rest!