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IF Function, Nested IF, IF with AND, OR, NOT

Exp:2

Name:

Reg.No.

Aim:

The IF function in Excel is used for making decisions and performing calculations based on specific conditions. The purpose is to evaluate a condition and return one value if the condition is true, and another value if the condition is false.

The Nested IF condition in Excel helps us to evaluate multiple conditions in a single formula.

The nested IF functions let you test multiple conditions and specify different outcomes for each condition.

The AND, OR, NOT are the logical functions used to perform logical operations.

Functions:

Table 1

	Name	Sales
1	Abel	50000
2	Kocher	200000
3	Larry	100000
4	Steve	500000
5	Mark	20000
6	Smith	55000
7	Harisson	70000
8	Lucy	80000

Table 2.

Student	Score
Abel	73
Kocher	90
Smith	91
Joney	88
Lucy	45

We apply the below formulas and functions to the above tables.

1. Simple IF :

It is used for making decisions and performing calculations based on specific conditions. The purpose is to evaluate a condition and return one value if the condition is true, and another value if the condition is false.

Syntax:

=IF(logical_test, value_if_true, value_if_false)

Example:

Place the cursor in the cell where we want to display the result and type the below and drag the formula to all the cells.

=IF(C3>50000,C3*0.1,0)

If the sales is above 50000 then the bonus offered is 10 % . If the sales value is less than 50000, then there is no bonus and the value 0 is assigned as the result.

Output:

Name	Sales	10% Bonus
Abel	50000	0
Kocher	200000	20000
Larry	100000	10000
Steve	500000	50000
Mark	20000	0
Smith	55000	5500
Harisson	70000	7000
Lucy	80000	8000

2. Nested IF:

The Nested IF condition in Excel helps us to evaluate multiple conditions in a single formula. The nested IF functions let you test multiple conditions and specify different outcomes for each condition.

Syntax:

```
=IF(condition1, value_if_true1,  
    IF(condition2, value_if_true2,  
        IF(condition3, value_if_true3,  
            value_if_false)  
    )  
)
```

Example: We apply the below formula to the table2.

Place the cursor in the cell where we want to display the result and type the below and drag the formula to all the cells.

=IF(D4>89,"A",IF(D4>79,"B",IF(D4>69,"C",IF(D4>59,"D","F"))))

Output:

Student	Score	Grade
Abel	73	C
Kocher	90	A
Smith	91	A
Joney	88	B
Lucy	45	F

Logical Functions:

In Excel, AND, OR, and NOT are logical functions that help you evaluate conditions based on multiple criteria. They are particularly useful in conjunction with other functions like IF, COUNTIF, and SUMIF.

3. OR Function:

The OR function returns TRUE if at least one if the arguments evaluate to TRUE, and returns FALSE if all arguments are FALSE

Syntax:

OR(logical1, [logical2], ...)

Example:

Place the cursor in the cell where we want to display the result and type the formula:

Formula	Description
=OR(A2="Bananas", A2="Oranges")	Returns TRUE if A2 contains "Bananas" or "Oranges", FALSE otherwise.
=OR(B2>=40, C2>=20)	Returns TRUE if B2 is greater than or equal to 40 or C2 is greater than or equal to 20, FALSE otherwise.
=OR(B2=" ", C2="")	Returns TRUE if either B2 or C2 is blank or both, FALSE otherwise.

Output:

	A	B	C	D	E	F
1	Product	In Stock	Sold	Formula 1	Formula 2	Formula 3
2				=OR(A2="Bananas", A2="Oranges")	=OR(B2>=40, C2>=20)	=OR(B2="", C2="")
3	Bananas	30	10	TRUE	FALSE	FALSE
4	Oranges		20	TRUE	TRUE	TRUE
5	Cherries	20		FALSE	FALSE	TRUE
6	Oranges	30	10	TRUE	FALSE	FALSE
7	Cherries			FALSE	FALSE	TRUE

4. AND Function:

The AND function tests the conditions you specify and returns TRUE if all of the conditions evaluate to TRUE, FALSE otherwise.

Syntax:

=AND(logical1, [logical2], ...)

Example:

Formula	Description
=AND(A2="Bananas", B2>C2)	Returns TRUE if A2 contains "Bananas" and B2 is greater than C2, FALSE otherwise.
=AND(B2>20, B2=C2)	Returns TRUE if B2 is greater than 20 and B2 is equal to C2, FALSE otherwise.
=AND(A2="Bananas", B2>=30, B2>C2)	Returns TRUE if A2 contains "Bananas", B2 is greater than or equal to 30 and B2 is greater than C2, FALSE otherwise.

Output:

	A	B	C	D	E	F
1	Product	In Stock	Sold	Formula 1	Formula 2	Formula 3
2				=AND(A2="Bananas", B2>C1)	=AND(B2>20, B2=C2)	=AND(A2="Bananas", B2>=30, B2>C2)
3	Bananas	30	20	TRUE	FALSE	TRUE
4	Oranges	40	40	FALSE	TRUE	FALSE
5	Bananas	20	20	FALSE	FALSE	FALSE
6	Oranges	40	10	FALSE	FALSE	FALSE

5. IF with AND Function:

In combination with other Excel functions, AND can significantly extend the capabilities of your worksheets. AND function can be used along with the IF function to test several conditions instead of just one.

Example:

=IF(AND(A2="Bananas", B2>C2), "Good", "Bad")

Output:

D2		✕ ✓ <i>fx</i>		=IF(AND(A2="Bananas", B2>C2), "Good", "Bad")
	A	B	C	D
1	Product	In Stock	Sold	IF formula
2	Bananas	30	20	Good
3	Oranges	40	40	Bad
4	Bananas	20	20	Bad
5	Oranges	40	10	Bad

6. IF with OR Function :**Example:**

=IF(OR(C5>=18, C5=""), "Adult", "Child")

If the age of a person is greater than or equal to 18 or the cell value is empty then the output is Adult. If both the values are false then the output is false.

Output:

Name	Age	Category
Abel	15	Child
Kocher	56	Adult
Smith	45	Adult
Lucy	12	Child

7. XOR function:

An XOR formula contains just 2 logical statements and returns:

TRUE if either argument evaluates to TRUE.

FALSE if both arguments are TRUE or neither is TRUE.

Syntax:




=XOR(logical1, [logical2],...)

Formula	Result	Description
=XOR(1>0, 2<1)	TRUE	Returns TRUE because the 1st argument is TRUE and the 2 nd argument is FALSE.
=XOR(1<0, 2<1)	FALSE	Returns FALSE because both arguments are FALSE.
=XOR(1>0, 2>1)	FALSE	Returns FALSE because both arguments are TRUE.

Example:

=XOR(B2="Won", C2="Won")

Output:

D2	:	  	=XOR(B2="Won", C2="Won")	
	A	B	C	D
1	Contestant	Game 1	Game 2	Play Game 3?
2	Andrew	Won	Won	FALSE
3	Billy	Won	Lost	TRUE
4	Erik	Lost	Won	TRUE
5	Josh	Lost	Lost	FALSE

8. NOT Function:

We use the NOT function in Excel to reverse a value of its argument. In other words, if logical evaluates to FALSE, the NOT function returns TRUE and vice versa.

For example, both of the below formulas return FALSE:




=NOT(TRUE)

=NOT(2*2=4)

Example:

=NOT(C2="black")

OUTPUT:

E2	:	  	=NOT(C2="black")		
	A	B	C	D	E
1	Item	Description	Color	Price	Any color but black
2	113456	Coat	White	\$980	TRUE
3	113457	Coat	Black	\$1,090	FALSE
4	113458	Jacket	Brown	\$780	TRUE
5	113459	Fur coat	White	\$1,000	TRUE
6	113460	Fur coat	Ivory	\$1,035	TRUE
7	113461	Jacket	Black	\$760	FALSE
8	113462	Coat	White	\$800	TRUE

Results:

All the If conditions, nested If, If with AND, OR and NOT are applied to various data items and the results are verified.