

Excel Data

logic and errors

Logical Operators

NOT() returns the opposite of a logical value

example: NOT(**FALSE**) is TRUE

AND() evaluates all inputs and returns FALSE when *any* of them are FALSE

example: AND(**6 > 5**, **5 > 4**, **4 > 3**, **3 < 2**) is FALSE

OR() evaluates all inputs and returns TRUE when *any* of them are TRUE

example: OR(**6 + 3 > 2**, **8 / 4 > 2**, **2 > 2**)

The IF() function takes a logical condition as its first input, what to return if the condition is TRUE as its second input, and what to return if the condition is FALSE as its third input.

IF(<logical test>, <return if true>, <return if false>)

Here are the first few rows of the Starwars data:

	A	B	C	D	E	F	G	H	I	J
1	name	height	mass	hair_color	skin_color	eye_color	age	gender	homeworld	species
2										
3	Luke Skywalker	172	77	blond	fair	blue	19	male	Tatooine	Human
4	C-3PO	167	75	NA	gold	yellow	112	NA	Tatooine	Droid
5	R2-D2	96	32	NA	white, blue	red	33	NA	Naboo	Droid
6	Darth Vader	202	136	none	white	yellow	41.9	male	Tatooine	Human
7	Leia Organa	150	49	brown	light	brown	19	female	Alderaan	Human
8	Owen Lars	178	120	brown, grey	light	blue	52	male	Tatooine	Human
9	Beru Whitesun lars	165	75	brown	light	blue	47	female	Tatooine	Human
10	R5-D4	97	32	NA	white, red	red	NA	NA	Tatooine	Droid
11	Biggs Darklighter	183	84	black	light	brown	24	male	Tatooine	Human
12	Obi-Wan Kenobi	182	77	auburn, white	fair	blue-gray	57	male	Stewjon	Human
13	Anakin Skywalker	188	84	blond	fair	blue	41.9	male	Tatooine	Human
14	Wilhuff Tarkin	180	NA	auburn, grey	fair	blue	64	male	Eriadu	Human
15	Chewbacca	228	112	brown	unknown	blue	200	male	Kashyyyk	Wookiee

What will the following functions return?

1. =IF(B3 > 150, "tall", "short")
2. =IF(C4 = "NA", IF(C4 = "brown", "brunette", "not brunette"), "unknown")

The columns **Other Activities** and **Other Interactions** columns in the Central Park squirrel data look interesting...but there are also a lot of missing values.

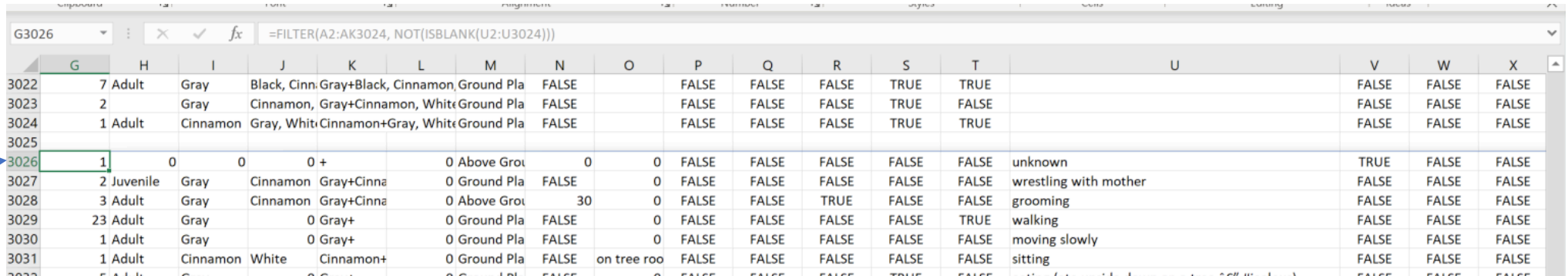
R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	
Climbing	Eating	Foraging	Other Activities	Kuks	Quaas	Moans	Tail flags	Tail twitches	Approaches	Indifferent	Runs from	Other Interactions	Lat/Long	Zip
FALSE	FALSE	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		POINT (-73.951	
FALSE	FALSE	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	me	POINT (-73.951	
TRUE	FALSE	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE		POINT (-73.971	
TRUE	FALSE	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE		POINT (-73.971	
FALSE	FALSE	FALSE	unknown	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		POINT (-73.951	
FALSE	FALSE	FALSE	wrestling with mother	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		POINT (-73.951	
FALSE	FALSE	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE		POINT (-73.971	
FALSE	FALSE	TRUE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE		POINT (-73.961	
FALSE	FALSE	TRUE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE		POINT (-73.971	
FALSE	TRUE	TRUE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE		POINT (-73.951	
FALSE	FALSE	TRUE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		POINT (-73.971	
FALSE	FALSE	TRUE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE		POINT (-73.961	
FALSE	FALSE	TRUE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		POINT (-73.951	
FALSE	FALSE	TRUE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE		POINT (-73.951	
FALSE	FALSE	FALSE		FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE		POINT (-73.961	
TRUE	FALSE	FALSE	grooming	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE		POINT (-73.971	
FALSE	FALSE	TRUE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE		POINT (-73.961	

Here's how we can filter down to the rows that aren't blank:

1. Use the ISBLANK() function to evaluate whether data is in the cell for each row in the **Other Activities** column (column U).
2. Because you want the rows that return FALSE for ISBLANK(), you next need to wrap the ISBLANK() with NOT().
3. Now you have created the condition for your FILTER(). The first argument is a range to include the entire spreadsheet.

FILTER(A2:AK3024, NOT(ISBLANK(U2:U3024)))

Put this
formula
below your
data.



	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
3022	7	Adult	Gray	Black, Cinn	Gray+Black, Cinnamon	Ground Pla		FALSE		FALSE	FALSE	FALSE	TRUE	TRUE		FALSE	FALSE	FALSE
3023	2		Gray	Cinnamon	Gray+Cinnamon	White Ground Pla		FALSE		FALSE	FALSE	FALSE	TRUE	FALSE		FALSE	FALSE	FALSE
3024	1	Adult	Cinnamon	Gray, White	Cinnamon+Gray, White	Ground Pla		FALSE		FALSE	FALSE	FALSE	TRUE	TRUE		FALSE	FALSE	FALSE
3025																		
3026	1	0	0	0	+	0	Above Groi	0	0	FALSE	FALSE	FALSE	FALSE	FALSE	unknown	TRUE	FALSE	FALSE
3027	2	Juvenile	Gray	Cinnamon	Gray+Cinna	0	Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	FALSE	wrestling with mother	FALSE	FALSE	FALSE
3028	3	Adult	Gray	Cinnamon	Gray+Cinna	0	Above Groi	30	0	FALSE	FALSE	TRUE	FALSE	FALSE	grooming	FALSE	FALSE	FALSE
3029	23	Adult	Gray		0	Gray+	0	Ground Pla	FALSE	0	FALSE	FALSE	FALSE	TRUE	walking	FALSE	FALSE	FALSE
3030	1	Adult	Gray		0	Gray+	0	Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	moving slowly	FALSE	FALSE	FALSE
3031	1	Adult	Cinnamon	White	Cinnamon+	0	Ground Pla	FALSE	on tree roo	FALSE	FALSE	FALSE	FALSE	FALSE	sitting	FALSE	FALSE	FALSE

This returns the 437 rows where the **Other Activities** column is not blank:

3023	2	Gray	Cinnamon, Gray+Cinnamon, White	Ground Pla	FALSE		FALSE	FALSE	FALSE	TRUE	FALSE		FALSE	
3024	1 Adult	Cinnamon	Gray, White	Cinnamon+Gray, White	Ground Pla	FALSE		FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	
3025														
3026	1	0	0	0 +	0 Above Gro	0	0	FALSE	FALSE	FALSE	FALSE	FALSE	unknown	TRUE
3027	2 Juvenile	Gray	Cinnamon	Gray+Cinna	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	FALSE	wrestling with mother	FALSE
3028	3 Adult	Gray	Cinnamon	Gray+Cinna	0 Above Gro	30	0	FALSE	FALSE	TRUE	FALSE	FALSE	grooming	FALSE
3029	23 Adult	Gray		0 Gray+	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	TRUE	walking	FALSE
3030	1 Adult	Gray		0 Gray+	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	FALSE	moving slowly	FALSE
3031	1 Adult	Cinnamon	White	Cinnamon+	0 Ground Pla	FALSE	on tree roo	FALSE	FALSE	FALSE	FALSE	FALSE	sitting	FALSE
3032	5 Adult	Gray		0 Gray+	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	TRUE	FALSE	eating (ate upside down on a tree â€™ #jealous)	FALSE
3033	1 Adult	Gray	White	Gray+White	0 Ground Pla	FALSE	0	TRUE	FALSE	FALSE	FALSE	FALSE	running (with nut)	FALSE
3034	6 Adult	Gray	Cinnamon	Gray+Cinna	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	FALSE	playing with #5	FALSE
3035	3 Adult	Gray	Cinnamon	Gray+Cinna	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	FALSE	hiding nut	FALSE
3036	10 Adult	Gray	White	Gray+White	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	TRUE	drank from a pond of rain water	FALSE
3037	1 Adult	Gray		0 Gray+	0 Above Gro	50	0	FALSE	FALSE	TRUE	FALSE	FALSE	sitting	FALSE
3038	3 Adult	Gray		0 Gray+	0 Above Gro	8	0	FALSE	TRUE	FALSE	FALSE	FALSE	chasing (#4 across trees)	FALSE
3039	1 Adult	Gray	Cinnamon	Gray+Cinna	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	FALSE	gathering acorns	FALSE
3040	6 Adult	Cinnamon		0 Cinnamon+	0 Ground Pla	FALSE	0	TRUE	FALSE	FALSE	TRUE	TRUE	eating (a mushroom),circles around us,really fat,scratcl	FALSE
3041	1 Adult	Gray	Black	Gray+Black	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	TRUE	digging	FALSE
3042	2 Adult	Gray		0 Gray+	0 Ground Pla	FALSE	0	TRUE	FALSE	FALSE	FALSE	TRUE	walking	FALSE
3043	4 Adult	Gray		0 Gray+	0 Above Gro	12	on tree kn	FALSE	FALSE	FALSE	FALSE	FALSE	sitting	FALSE
3044	4 Juvenile	Gray		0 Gray+	0 Above Gro	10	tree near la	FALSE	FALSE	FALSE	FALSE	FALSE	walking on branch	FALSE
3045	5 Juvenile	Gray	Cinnamon	Gray+Cinna	0 Ground Pla	FALSE	0	FALSE	FALSE	FALSE	FALSE	TRUE	being chased,was pushed by other squirrel	TRUE
3046	1 Adult	Gray	White	Gray+White	0 Above Gro	25	Climbing tr	FALSE	FALSE	TRUE	FALSE	FALSE	climbing (tree)	FALSE
3047	7	0 Gray		0 Gray+	0 Ground Pla	FALSE	"FIELD"	FALSE	TRUE	FALSE	FALSE	FALSE	chasing #8	FALSE
3048	3 Adult	Gray		0 Gray+	0 Above Gro	2	bottom of t	FALSE	FALSE	FALSE	TRUE	FALSE	still	FALSE
3049	3 Adult	Gray	Cinnamon	Gray+Cinna	0 Ground Pla	FALSE	0	TRUE	FALSE	FALSE	FALSE	FALSE	stop to look at meâ€™then ran	FALSE

Exercises

1. There is particular interest in squirrel with ID **6D-PM-1020-01**. This squirrel repeatedly runs onto the baseball field and seems fearless of the players on the field. This squirrel was observed in Hectare 06D. Insert a column to the right of the Hectare column. Call it **Near BB Squirrel**. Use a formula to identify squirrels who were observed in adjacent hectares (05D, 07D, 06C, and 06E). Use a filter to isolate just the 31 adjacent squirrels.
2. Find the squirrels that seemed *threatened*. Communicating threats may take the form of **Quaas**, **Moans**, **Tail Flags**, or **Run(ning) From** according to the documentation.