Python For Beginners

Lab Exercise 3

One key thing you should know about a conditional statement is that it has the ability to create something called a Truth Table.

A **Truth Table** is a table that has a certain number of inputs. Usually a Truth Table has a minimum of 2 or more inputs with one exception -- NOT -- that gives the expected output.

They run using binary, which is what is happening behind the scenes within Python. Your inputs are being converted to binary when you are doing a comparison.

There are six Truth Tables in total, however we will just be looking at just three: "And", "Or" and "Not".

1. Take the following tables and try to convert them into If Statements in order to receive the correct output. Each row shows a different set of inputs.

AND:

A	B	Q
1	1	1
0	0	0
1	0	0
0	1	0

(You will see that the only place where two 'True' Statements get passed is 1 and 1. Thus, that is the only output that is actually true, making the rest false.)

OR:

A	B	Q
1	1	1
0	0	0
1	0	1
0	1	1

2. As you can see with the OR Truth Table, any place with either 1 or more 1's is true, as you would probably expect. Try to represent this using If Statements as well.

Within the code I produce for this one, I utilized the AND Operator in Python to show you exactly what is happening behind the scenes for the OR Truth Table. Python also has this built-in. Thus, it uses the OR Operator so we can use that later-on to save from writing unnecessary code.

NOT:

A	Q
1	0
0	1

(As you can see, the NOT Truth Table is the expectation to the rule – it takes only one input. How does this work? Basically, it reverses the values.)

Now for the real challenge!

3. Try to represent the following Truth Table with the equation as follows:

4. Using the above tables. Try to create a program that will give you the correct outputs for this:

A	B	C	Q
1	1	1	
1	0	1	
1	1	0	
1	0	0	
0	1	0	
0	0	1	
0	0	0	
0	1	1	

Good luck.

Note: The creation of the main challenge (step #3) will involve more variables (than as shown above) to store the current details in.

A and not B or C = Q

The equation is read left to right, and if shown in mathematical terms would be seen as:

$$((A\&{\sim}B)|C) = Q$$