

Boolean logic

Boolean

- Every day we may cross a path of many situations like “Should I do this or not?”, “Should I do switch on laptop or not?”. These types of questions having answer either “Yes” or “No”. So, this kind of situation is binary decision.
- Now let's consider following examples:
- Sachin Tendulkar is the only player who scored 100 centuries in Cricket.
- $56 - 4 = 52$
- Ahmedabad is biggest district of Gujarat.
- What do you feel about lockdown extension?
- In these sentences 1, 2 are TRUE and sentence 3 is False, whereas sentence 4 cannot be answered in TRUE or FALSE. Hence sentences which can be answered in TRUE or FALSE are known as logical statements or truth functions.
- The result of truth functions is stored in TRUE or FALSE values are known as truth values. This can be written as 0 and 1 in logical constant where 1 means TRUE and 0 means FALSE. These values can be stored in variables are known as logical variables or binary valued variables.
- Boolean logic refers to Boolean Algebra which values of variables are the truth values true or false. These values have two states either on or off denoted by 0 or 1.
- Sentences which can be determined to be true or false are called logical statements or truth functions and the results TRUE or FALSE are called truth values.
- 1 means TRUE and 0 means FALSE
- Variable which stores these truth values are called logical variables or binary valued variables as these can store one of the two values TRUE or FALSE.

Truth Table

- A truth table represents a Boolean function or expression with all possible input and output results in tabular form.

Logical Operations

- Logical operations can be applied of truth functions. These operations carried out by logical operators with operands.

Logical Operators

- OR operator
 - Also called as logical addition
 - The Boolean operator “OR” is used to express that as long as one of two or more conditions are, met the value of a specified query is true.
 - For example, to build an audience which encompasses anyone who enjoys Mexican, Chinese, or French Cuisine, the following audience definition would apply:

Using the “OR” operator would ensure that anyone who has shown an affinity for at least one of these cuisines will be included in the audience created.

X	Y	X+Y(X OR Y)
0	0	0
0	1	1
1	0	1
1	1	1

0	+	0	=	0
0	+	1	=	1
1	+	0	=	1
1	+	1	=	1

- AND operator
 - Also called as logical multiplication
 - As a Boolean operator, “AND” serves to indicate that ALL specified conditions must be met in order for a query to return true.

- In the event that a client was building an audience and wanted to target only users who had shown an affinity for Sports Cars and Fishing and History, the following audience definition would apply:

Audience Definition

The screenshot shows an 'Audience Definition' interface. It contains three criteria boxes: 'Sports Cars', 'Fishing', and 'History'. Each box has a globe icon on the left and a pencil icon on the right. The criteria are connected by 'AND' operators, which are shown as dropdown menus with a downward arrow.

- The use of the “AND” operator means that a user must meet ALL of the specified criteria to be included in the audience; users who merely like Fishing or like only Fishing and History (etc.) will be excluded from this audience definition.

X	Y	X.Y(X AND Y)
0	0	0
0	1	0
1	0	0
1	1	1

0	.	0	=	0
0	.	1	=	0
1	.	0	=	0
1	.	1	=	1

○ NOT operator

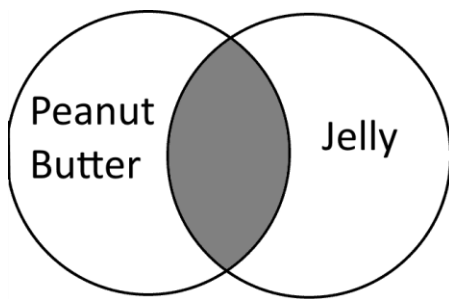
- Operates on single variable
- Also called as complementation
- The “NOT” Boolean operator is used to exclude nodes from an audience definition. As it applies to the creation of an audience definition, “NOT” will exclude all users falling under the node which has been prepended by “NOT.”
- For example, to create an audience of users over the age of 18 (NOT 13-17 years of age) with a demonstrated interest in movies, the following audience definition would be used:

Audience Definition

The screenshot shows an 'Audience Definition' interface. It contains two criteria boxes: 'NOT 13-17' and 'Movies'. Each box has a globe icon on the left and a pencil icon on the right. The criteria are connected by an 'AND' operator, which is shown as a dropdown menu with a downward arrow.

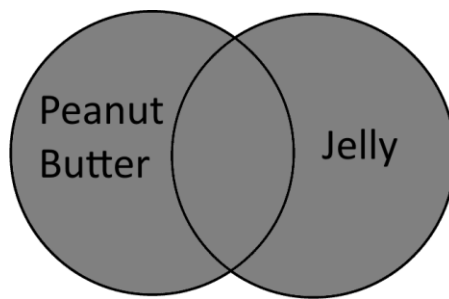
- In this instance, the “NOT” which prepends 13-17 means that no users within this age range will be included in this audience definition. It is also worth noting that the “AND” operator is used here as well. Translated into plain English, this definition would be read as “Users who are not between ages 13 and 17 who have an interest in movies.”

X	X(NOT X)
0	1
1	0



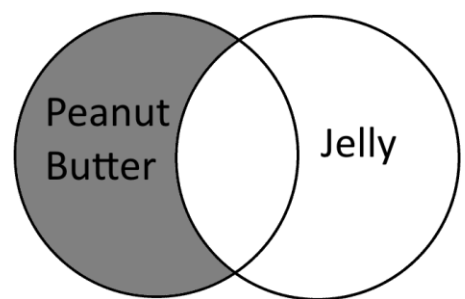
AND

Using AND, this search would only retrieve results with Peanut Butter and Jelly.



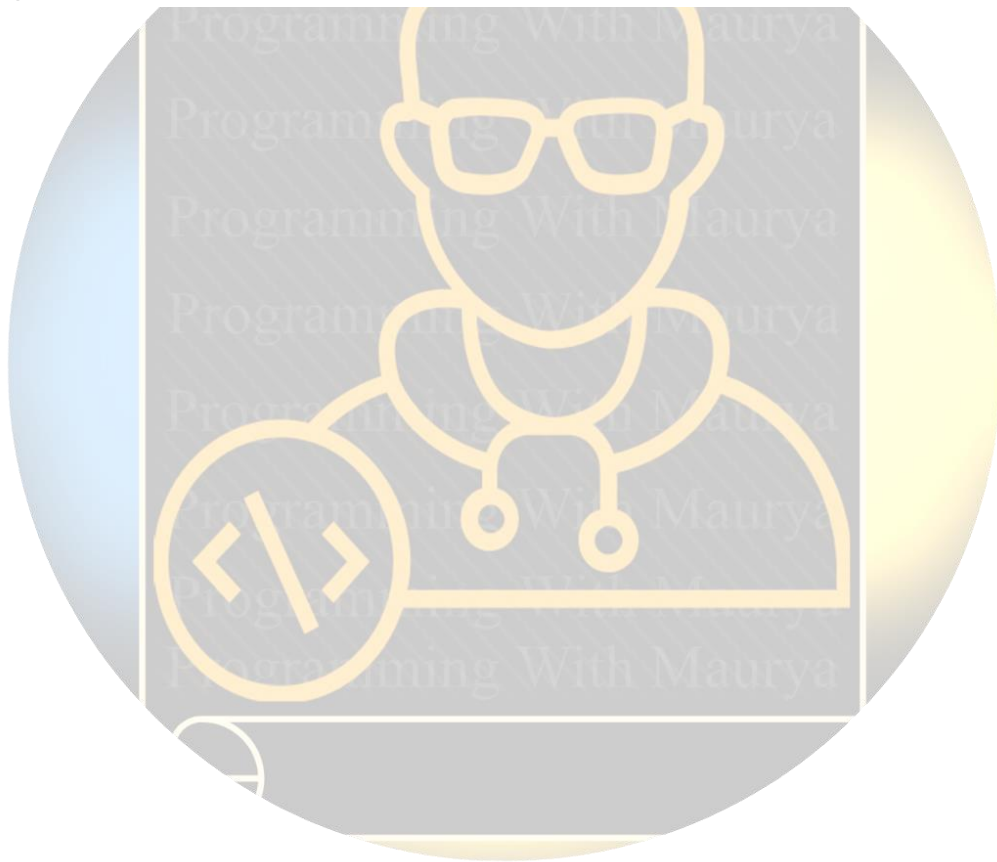
OR

Using OR, this search would retrieve results with peanut butter, with jelly, and with both.



NOT

Using NOT, this search would retrieve results with peanut butter, and exclude those with jelly or PB with jelly.



PROGRAMMING WITH MAURYA
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