Logical Operators

Inputs		&&	||	^^
False	False	False	False	False
False	True	False	True	True
True	False	False	True	True
True	True	True	True	False

Dan McElroy

Sept 2018

Logical Operators

Most computer languages support the following logical operators

 AND   OR   NOT

 Exclusive-Or (XOR or EOR)

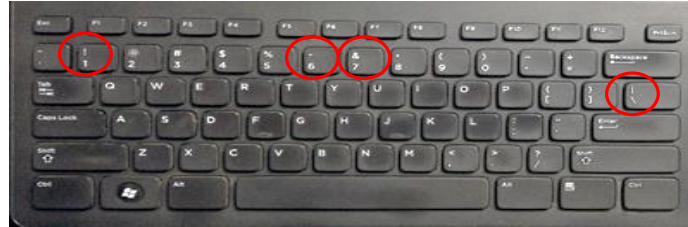This discussion covers logical operators as used by Java, C and C++

Logical Operators
AND   OR   Exclusive-OR

&& is Logical AND
|| is Logical OR
^^ is Logical XOR
 ! is Logical NOT

Logical Operators
AND   OR   Exclusive-OR   NOT

&& is Logical AND
|| is Logical OR
^^ is Logical XOR
 ! is Logical NOT

Truth Table

Inputs		&&	||	^^
False	False	False	False	False
False	True	False	True	True
True	False	False	True	True
True	True	True	True	False

Logical Operators
AND   OR   Exclusive-OR   NOT

&& is Logical AND
|| is Logical OR
^^ is Logical XOR
 ! is Logical NOT

Truth Table

Inputs				
False	False			
False	True			
True	False			
True	True			

There are only four possible combinations when there are two inputs

Logical Operators
AND   OR   Exclusive-OR   NOT

&& is Logical AND
|| is Logical OR
^^ is Logical XOR
 ! is Logical NOT

Inputs		&&	||	^^
False	False	False	False	False
False	True	False	True	True
True	False	False	True	True
True	True	True	True	False

3

Logical Operators
__AND__ OR Exclusive-OR NOT

&& is Logical AND
|| is Logical OR
^^ is Logical XOR
! is Logical NOT

Inputs		&&	||	^^
False	False	False		
False	True	False		
True	False	False		
True	True	True		

AND
If both inputs are TRUE, the output is TRUE

Logical Operators
__AND__ OR Exclusive-OR NOT

&& is Logical AND
|| is Logical OR
^^ is Logical XOR

Test for time from 8:00am to 6:00pm

12:00am	8:00am	6:00pm	11:59pm
0	800	1800	2359

False	True	False

```
if ( time >= 800 && time <= 1800 )
{
    // do something
}
```

Inputs		&&	||	^^
False	False	False		
False	True	False		
True	False	False		
True	True	True		

AND
If both inputs are TRUE, the output is TRUE

Logical Operators
AND **OR** Exclusive-OR NOT

&& is Logical AND
|| is Logical OR
^^ is Logical XOR

Inputs		&&	||	^^
False	False	False	False	False
False	True	False	True	True
True	False	False	True	True
True	True	True	True	False

OR
If either input is TRUE, the output is TRUE

Logical Operators
AND **OR** Exclusive-OR NOT

&& is Logical AND
|| is Logical OR
^^ is Logical XOR

Inputs		&&	||	^^
False	False	False	False	False
False	True	False	True	True
True	False	False	True	True
True	True	True	True	False

Test for time before 8:00am or after 6:00pm

12:00am	8:00am	6:00pm	11:59pm
0	800	1800	2359

True ← False → True

```
if ( time < 800  ||  time  >1800 )
{
    //  do something
}
```

OR
If either input is TRUE, the output is TRUE

Logical Operators
AND   OR   **Exclusive-OR**   NOT

&& is Logical AND
|| is Logical OR
^^ is Logical XOR

Inputs		&&	||	^^
False	False	False	False	False
False	True	False	True	True
True	False	False	True	True
True	True	True	True	False

XOR
If either input, but not both
is TRUE, the output is TRUE

Logical Operators
AND   OR   Exclusive-OR   **NOT**

&& is Logical AND
|| is Logical OR
^^ is Logical XOR
 ! is Logical NOT

nput	NOT
False	True
True	False

NOT
Inverts the input

The End