Boolean Logic Operators

(using AND OR in conditions)

This means "AND"

```
If (SensorValue(touch1)==1 && SensorValue(light < =1))
```

This means "OR"

```
While (SensorValue(touch1)==1 || SensorValue(light < =1))
```

When creating a program for a computer we might want to take into **account more one then one condition** when making a decision.

Maybe you only want the robot to drive forward **if** a traffic light is green **AND** there's no object in front of it.

Logical operators are used to **combine multiple** decisions or "checks" into **one single decision** or "check".

Logic operators are fundamental part of programming and a powerful tool if you understand how and when to use them.

Examples:

```
if (x == 10)              if x equal to 10
if (x <= 10)              if x less than and equal to 10
if (x > 10 || y > 20)     if x is greater than 10 or y greater than 20
if (x <= 10 && y <= 20)   if x <= 10 and y <= 20
if (x <= 5 || y <= 5)     if either x OR y are less than or equal to 5
if (!(x==10))             if x is NOT equal to 10.
if (!(x>7 || y >7))       if either x or y is NOT greater than 7
```

Boolean Logic Practice:

What does each of the following statements mean?

Examples:

```
(x==4 && y ==17)
```
true only if x=4 AND y=7

```
While (!(SensorValue(touchsensor)==1))
```
true if TouchSensor is not equal to 1

Try These:

```
1.   if ((SensorValue(Light)<=14 || SensorValue(Sonar)>30))


2.   if ((SensorValue [Leftlimit] ==0) && (SensorValue[Rightlimit] ==0))


3.   if (x > 6 || x < -6)


4.   if (time!=330)


5.   if (!(x==5 || x==8))


6.   if (!(x==5 && y==6))
```

Answers:

if *light* is less than or equal to 14 **OR** *sonar* is greater than 30
if Leftlimit is equal to 0 AND Rightlimit is equal to zero
if x greater than six OR if x is less than negative 6
if time is NOT equal to 330
if x is **NOT** equal to **EITHER 5 OR** 8
same as (x not equal to 5) OR (y not equal to 6)

Introduction to **Boolean Logic** Assignment:

Create two separate programs that:

1. Opens a gate when the sonar sensor is less than 15cm **AND** the touch sensor is being pressed.

2. Beeps or sounds when EITHER the sonar sensor reads less than 15cm **OR** the light sensor is "seeing" black.

Both programs should have appropriate TEXT DISPLAYED to help the user during the program.

If you wish to demonstrate your understanding of how **Boolean Operators** work using *some other cool project*, just let me know and we will see what we can do.

You only need to hand in the code for each of these. **Staple them both together** with the title "Boolean Assignment".