Boolean Operators and Sensors

Introduction

You will aim to learn the following objectives and keywords during this lesson.

Learning Objective	• To describe what a sensor and Boolean operator are • To demonstrate the use of a Boolean operator and sensor
Keywords	• Boolean operators • Sensor

Setting the Scene

Concept	How it is used
A sensor can detect, for example, movement or light and depending on this individually or combined, an output can be activated.	When you write code, parts of the code can be activated by a sensor and if more than one sensor, it can be activated with one or both.

Can you think of when you have made a decision based on what you sense?

Boolean operators include 'AND' and 'OR' and can be used with, for example, variables or sensors.

Activity 1

Scenario 1	Scenario 2
You are sitting in a restaurant and reading the menu, how do you choose? Do you have one or more factors that help you decide? 1. The cost? 2. The Image? 3. The description 4. The one you had before?	You need to decide what shoes to wear for the day. Do you have one or more factors that help you decide? 1. Is it cold? 2. Is it raining? 3. Is it sunny? 4. Do you need specific footwear for an activity?

Small Group Activity

In your group, I want you to read the scenario and decide which Boolean operator is needed; AND / OR

You use ***sensors*** and ***Boolean operators*** yourselves. Many computing devices use these to enable the system to work fully. An example: an automatic door can open when movement is sensed OR a button is pressed.

Additional Small Activity

The use of a boolean operator within programming can be within a conditional statement; an if statement.

Below is the code for a program asking the user to add a number between 1 and 10 and if the number is less than 10 and greater than 5 then the output with be 'condition met' otherwise it will be 'condition NOT met' The use of **'AND'** within the two conditional statements is the **Boolean Operator**.

Example python code:

```
number = int(input('Add a number between 1 and 10: '))
if number < 10 and number > 5:
  print('condition met')
else:
  print('condition NOT met')
```

Can you write a similar python program that uses a boolean operator?

Activity 2 Part 1

How can we get MiRo to use the cliff sensors and stop falling off the table?
We are going to use an OR to allow MiRo to use both sensors to detect the edge.

What would happen if we used 'AND' instead?

Algorithm planning

1. IF the left OR right cliff sensor is false
   a. Move forward
2. IF the left sensor is true
   a. Stop moving
   b. Turn right fast
3. IF the right sensor is true
   a. Stop moving
   b. Turn left fast

Which sensor is being used?

Which Boolean operator is being used?

Using this algorithm as your plan, create and run the program in the MiRoSIM.

Summary Self-Assessment

Question	Got it	Got it with help	Unsure
Can you identify a sensor?	☐	☐	☐
Can you describe what a Boolean operator is?	☐	☐	☐
Can you create and use a Boolean operator and sensor in the MiRo simulator?	☐	☐	☐