**Initio Programming: Using Logic in Conditions**

**AIM:** After completing this worksheet you should be able to use logic to construct more complex conditions for If statements.

**You Need:** To complete this worksheet you need to have an Initio that is connected to a keyboard, mouse and monitor (see WS1), to understand how to start and stop IDLE from the Linux Command Line (see WS2), and to be able to use files to store Programs (WS5). You also need to know the commands to operate the Initio motors and sensors (WS3 & WS4) and how to use while statements in Python (WS7).

**Problem:** You will have noticed that it is very cumbersome to operate your Initio while it is connected to the keyboard, mouse and monitor. Ideally you would have time after your program started running to disconnect everything.

Consider the program below

import robohat as initio, time

initio.init()

while (initio.getDistance() > 5):

print(“Waiting”)

initio.setServo(0, 20)

time.sleep(1)

initio.setServo(0, 0)

**Question 1:** What do you expect this program to do?

**Question 2:** Execute the program. Did it do what you expected? YES/NO.

**Exercise 1:**  Modify the program by adding a second while loop so that the Initio ultrasonic sensor continues to be tilted upwards until the object closer than 5cm moves away.

**Logic in conditions:** You can use *logic* to make the conditions of your Python loops and if statements more complex. The main *logical operators* are not, and and or.

We can use these to build up logical expressions so, for instance:

|  |  |
| --- | --- |
| initio.irLeft() | returns True if the there is is an obstacle on the Left. |
| not (initio.irLeft()) | returns True if there is not an obstacle on the Left. |
| (initio.irRight() or initio.irLeft()) | returns True if there is and obstacle on the Right or the Left. |
| (initio.irRight() and initio.irLeft()) | returns True if tthere is and obstacle on the Right and the Left. |

**Exercise 2:** Modify your program so that if there is nothing closer to the robot than 5cm then the Initio moves forward. Then when something gets closer than 5cm, the Initio stops moving.

What expression are you using in the condition?

You can make conditions more and more complex by composing the logical operators.

**Exercise 3:** Create a program so that if there is no obstacle on the Left or the Right then the Initio goes forward. Then when there is an obstacle on either side the Initio stops moving.

What expression are you using in the condition?

**Remember:** When you have finished working with the robot, type pi2go.cleanup()at the command line, quit IDLE, then select Shutdown from the Raspberry Pi menu item. Once the robot has shut down, switch it off.



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