**Virtual Initio: Using Logic in Conditions**



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

**You Need:** To complete this worksheet you need to have a virtual Initio simulator (see WS1), and be able to use files to store programs (see WS5). You also need to know the commands to operate the Initio motors and sensors (see WS3 & WS4) and how to use if and while statements in Python (see WS7 & WS8).

**If the simulator isn’t already running:**

Start it (see WS1), and select the Initio robot and default\_world.xml. Now open a new IDLE window.

**Problem:** When you program a real Initio robot, it has to be connected to a keyboard and monitor which is very cumbersome.

Ideally you want to have time after the program has started running to disconnect everything, before the robot starts to move.

Consider the program below

import simclient.simrobot as initio, time

initio.init()

while (initio.getDistance() > 50):

print(“Waiting”)

initio.setServo(1, 20)

time.sleep(1)

initio.setServo(1, 0)



What do you expect this program to do?

Execute the program. Did it do what you expected? YES/NO.

**Exercise:**  Modify the program by adding a second while loop so that the Initio ultrasonic sensor continues to be tilted upwards until something gets closer than 50cm to it a second time.

**Logic in conditions:** You can use *logic* to make the conditions of your Python while and if statements more flexible. 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 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 an obstacle on the Right *or* one on the Left. |
| (initio.irRight() and initio.irLeft()) | returns True if there is an obstacle on the Right *and* one on the Left. |

**Exercise:** 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 (if statement)?

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

**Exercise:** 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 your robot type: **initio.cleanup()**

When you want to exit the simulator, select the simulator window and type Q.



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