**Virtual Initio Programming: If**



**AIM:** After completing this worksheet you should be able to use **if, elif** and **else** statements in Python to create more complex programs.

**You Need:** To complete this worksheet you need to have a virtual Initio simulation (see WS1), and to be able to use files to store programs (see WS5). You also need to know the commands to operate the virtual Initio motors and sensors, and the time.sleep command (see WS3, WS4 and WS6).

**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.

We want programs to be more flexible than simply following a series of instructions. We might want them to do different things in different circumstances. For instance, we might want our Initio robot to move backwards if there is an obstacle in front of it and forwards otherwise.

The following program will do this:

import simclient.simrobot as initio, time

initio.init()

if (initio.getDistance() < 50):

 print(initio.getDistance())

 initio.reverse(10)

else:

 initio.forward(10)

time.sleep(10)

initio.stop()

There are a few things to note here. Python uses spaces to tell when something is part of a block of code inside an if statement. This feature is unique to Python and is not used in many other programming languages.

So in the program above, Python knows that it should print out the value from the ultrasonic sensor and then execute initio.reverse(10) if there is an obstacle closer than 50 cm, because these statements follow after the if and are indented.

Similarly it knows that initio.forward(10) should be executed if there is no obstacle because it follows after the else and is indented.

Note also that we have colons after the if and the else.

**Question 1:** Create a file containing this program and execute it. What happens?

**Question 2:** Describe how you would test your program to make sure it was working correctly both when there was an obstacle and when there wasn’t.

**Question 3:** Perform your tests. Is your program working correctly? YES/NO

**Exercise 1:** Write a program using an if statement that will turn in one direction if there is an obstacle on the right and turn in the other if there is an obstacle on the left.

*Hint:* To do this you may want to use elif which means (else if) - e.g.

elif (initio.irLeft()):

instead of else:

**Question 4:** How many cases do you need to consider to test your program?

**Question 5:** Does the description of the exercise tell you what the program should do in all cases? YES/NO

**Exercise 2:** Modify the program so that the robot reverses for 10 seconds if there is an obstacle and then turns for 10 seconds.

If there isn’t an obstacle the robot moves forward.

Write your program below and test it

**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.



 University of Liverpool, 2019

This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).