**Virtual Initio Programming: More Loops**

**AIM:** After completing this worksheet you should be able to use break, continue and while True: in programs

**You Need:** To complete this worksheet you need to have a virtual Initio simulator (see WS1), 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). You should be able to use If statements (WS7) and while loops (WS8) in Python programs.

**If the simulator isn’t already running: Start the Simulator, Select the Initio Simulation and default\_world.xml, then start IDLE (open a *new IDLE window* if you have used IDLE to start the simulator).**

Loops are fundamental to programming. However, there are a few constructs that make them much more flexible and easy to use.

**Break:** The command break is used to “break out” of a **while** loop. It is normally used inside an **if** statement and will stop the loop without executing anything that comes after it.

Consider the following program

import simclient.simrobot as initio

import time

initio.init()

while (not initio.irLeft()):

 if (initio.irRight()):

 break

 initio.forward(10)

 time.sleep(10)

initio.stop()

**Question 1:** What does it do?

**Continue:** Continue is used to mean start executing the loop back from the beginning, skipping the rest of the code. An obvious use of continue is when you simply want a loop to execute until something happens.

Consider the following program

import simclient.simrobot as initio

import time

initio.init()

while (not initio.irLeft()):

 continue

initio.forward(10)

while (not initio.irRight()):

 continue

initio.stop()

**Question 2:** What does it do?

**While True:** Lastly we can use the construct while True: in order to create a loop that just keeps executing until someone presses Control-C to exit the program or a **break** statement is used.

**Exercise 1:** Write a program using while True: and break. Where the robot starts moving the left IR sensor detects an obstacle and then it stops.

**Exercise 2:** Write a program using break, continue, elif and while True that does the following.

1. If there is something in front of both the right and left IR sensors the program and robot stop.
2. If there is something in front of the right sensor the robot should spin left and print “spinning to avoid obstacle”
3. If there is something in front of the left sensor the robot should spin right and print “spinning to avoid obstacle”
4. Otherwise the robot should move forward and print nothing.
5. Use only one print statement.



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