**Virtual Initio Programming: Command Line Input/Output**

**AIM:** After completing this worksheet you should be able to get input from a user to control your program and compare strings.

**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 sensors (WS4). You should be able to use If statements (WS7), while loops (WS8 & WS10) and variables (WS12) 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).**

It is often useful to get input from a user about how they want a program to run. To do this you can use the Python command input.

Create a file containing the following program and run it.

import simclient.simrobot as initio

initio.init()

input(['Press any key to get a distance reading'])

print(initio.getDistance())

**Question 1:** What happens when you press any key after this program runs?

Obviously, it would be good to access the input from the user. This is easy since input returns the value that the user enters. The value that the user enters is a *string.*

Try running the following program:

import simclient.simrobot as initio

initio.init()

name = input(['Please enter your name'])

print("Hello")

print(name)

print("The Distance reading is")

print(initio.getDistance())

**Question 2:** What does this print out?

It would be nicer if we could join together the Hello and the name. If something appears in a Python program between " symbols then it is also a string. So, "Hello" is also a string in the program. You can join two strings together using +. So, for instance, you could change

print("Hello")

print(name)

to

print("Hello " + name)

**Question 3:** Modify the program and run it again.

Did this work? Y/N

**Question 4:** Now try changing

print("The Distance reading is")

print(initio.getDistance())

to

print("The Distance reading is " + initio.getDistance())

Did this work? Y/N

You probably got an error that looked something like:

TypeError: can only concatenate str (not "float") to str

This is because initio.getDistance() returns a real number (called a *float*) not a string. If we want to join a string and a number together we have to convert the number into a string. This is can be done using the Python command str.

Try changing the line to

print("The Distance reading is " + str(initio.getDistance()))

Just like you can use str to change a number to a string, you can use int to turn a string to a whole number (an integer) and float to turn a string to a real number.

**Exercise 1:** Use str to write a program which asks the user how many distance readings they would like to get and then prints out that number of readings.

Another big use for input is to ask the user if they would like something done. For instance, you might want the program only to print out the distance reading if the user responds Y to a question. To do this you can use == to compare to strings, for instance with the line

if (input == ‘Y’):

**Exercise 2:** Use string comparison to write a program that asks the user if they want a distance reading. If they do it prints out the reading, if not then the program exits.



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