

# SUBJECT: Computing

## UNIT: 8.3 Programming in Python: Turing Lab Farmbot



### What is a Computer Program?

A computer program is a set of instructions that a computer follows precisely.

This means that a computer program must accurately describe what the computer has to do if it is to work as we expect it to.

The instructions must also be correctly sequenced because the computer will carry out each instruction in turn.

### Data Types:

There are three data types.

#### 1. Integers

These are whole numbers. 1, 10 and -100 are all integers.

#### 2. Real or floating point numbers

These are numbers with decimal parts. 2.2, 3.33 and -33.3 are all real or floating point numbers.

#### 3. Strings

These are strings of characters. 'Hello', '%^\$&\*' and '12345' are all strings.

### Sequential Programming:

Sequential programming refers to the practice of executing one task at a time in a program, with each step completed before moving on to the next.

### Iteration:

When writing for loops to solve coding problems you are using a programming construct called iteration.

Iteration is the repeating of instructions, typically using loops. This allows algorithms to be designed quickly and with fewer unnecessary lines of code.

### Common bugs:

#### Syntax Errors

- Missing quote marks. Either one or both of them may be missing around a string.
- Missing brackets at the end of a function call.

#### Name Errors

- Misspelling a function name or argument value
- Accidentally including, or forgetting to include, a capital letter

#### Indentation Errors

- These haven't been covered yet - however using indentation (spaces, tabs, new lines) incorrectly can cause these errors.

#### Logic Errors

- Code may run with a logic error, however it won't do what the programmer expects it to do. For example: the Farmbot may turn left when the programmer expects it to turn right.

### Error Messages

Python will often send error messages to the console when there is a bug.

#### Error Message:

An error message is a message that indicates there is an error in your code. Often this will appear in the console.

These are common error messages

- Line 10, SyntaxError: unexpected EOF  
EOF means End Of File.
- Line 8, NameError: name is not defined
- Line 12, SyntaxError: invalid Syntax  
(unexpected closing bracket)