

Farmbot - Unit Overview

Farmbot Breakdown - [View Resources Here](#)

Cover the very basics of programming in Python while controlling a brightly coloured farming robot to move around the screen, plant, harvest and ship crops. Start by filling in missing blocks of scaffolded code before progressing to typing code and being mindful of syntax while writing farming algorithms from scratch.

#	Title	Details	Brief Overview	Learning Objectives
Stage 1: Write basic algorithms to control our virtual farming robot				
1	Movement	Lesson 7 Slides, inc: 2 Missing-Block 2 MCQs	Your first computer program Get familiarised with the development environment and create a simple computer program.	Understand <ul style="list-style-type: none"> • what is meant by a <i>command</i> • what is meant by a <i>computer program</i> • what is meant by a <i>text editor</i> Use <ul style="list-style-type: none"> • the <code>move_forward</code> function to move the farmbot forward
2	Starting your farm	Lesson 15 Slides, inc: 6 Missing-Block 2 Parsons Problem 4 MCQs	Writing basic algorithms Create simple algorithms using function calls requiring strings as arguments to control a farming robot. Practice computational thinking through different examples.	Understand <ul style="list-style-type: none"> • what is meant by calling a <i>function</i> • what <i>arguments</i> are and how to <i>pass</i> them to functions • what is meant by an <i>algorithm</i> • what is meant by a <i>string</i> Use <ul style="list-style-type: none"> • the <code>prepare_soil</code> command to get the farmbot to prepare a square of soil • the <code>return_home</code> command to return the farmbot to it's charging station • the <code>plant</code> command to control the farmbot to plant a crop
3	Planting the farm	Lesson	Sequence, strings and syntax	Understand <ul style="list-style-type: none"> • what is meant by a <i>string</i>

		<p>13 Slides, inc:</p> <p>3 Missing-Type 3 Missing-Block 2 Parsons Problem 2 MCQs</p>	<p>Develop an understanding of the importance of syntax while being given more control over simple algorithms.</p>	<ul style="list-style-type: none"> • what is meant by <i>sequence</i> • the importance of <i>syntax</i>: quotes, brackets <p>Identify</p> <ul style="list-style-type: none"> • a <i>function call</i> within a computer program <p>Use</p> <ul style="list-style-type: none"> • a string as an <i>argument</i> in a function • the `turn` command to rotate the farmbot
<p>Stage 2: A first chance to test your new knowledge</p>				
4	Using functions, strings and sequence	<p>Quiz</p> <p>10 Questions, inc:</p> <p>2 Missing-Type 2 Missing-Block 1 Parsons Problem 5 MCQ</p>	<p>Time to test your knowledge of sequential algorithms, strings and commands.</p>	<p>Understand</p> <ul style="list-style-type: none"> • what is a <i>function call</i> • how a <i>sequential algorithm</i> can modify the virtual farmbot world <p>Identify</p> <ul style="list-style-type: none"> • an <i>argument</i> within a computer program • a <i>string</i> within a program • an <i>algorithm</i> that performs a simple task 'to prepare soil and then plant a crop' <p>Use</p> <ul style="list-style-type: none"> • <i>syntax</i> to complete a python program <p>Create</p> <ul style="list-style-type: none"> • an algorithm based upon a simple task • an algorithm that requires <i>sequential understanding</i> • an algorithm that requires use of <i>python syntax and farmbot commands</i>
<p>Stage 3: Learn to debug before writing an algorithm from scratch</p>				
5	Bugs on the farm	<p>Lesson</p> <p>15 Slides, inc:</p> <p>1 Missing-Type 1 Missing-Block 4 Starter-Code 1 Code from Scratch</p>	<p>Bugs and Debugging</p> <p>Learn the fundamentals of debugging code as a precursor to writing computer programs from scratch.</p>	<p>Understand</p> <ul style="list-style-type: none"> • the importance of <i>naming conventions</i>: camel and snake case • the importance of using the <i>exact spelling</i> for function names: capitalisation, dashes • what is meant by a <i>bug</i> in coding • what is meant by <i>debugging</i> in coding • what is meant by a <i>console</i> and why it is useful • the difference between a <i>syntax, logic, name and</i>

				<p><i>indentation errors</i></p> <p>Identify</p> <ul style="list-style-type: none"> snake-case function names <p>Modify</p> <ul style="list-style-type: none"> code to <i>remove any bugs</i> code to <i>remove several bugs</i> from a computer program <p>Create</p> <ul style="list-style-type: none"> a computer program <i>without causing bugs</i>
6	Three rows of crops	<p>Challenge</p> <p>4 Requirements</p> <p>Code from Scratch</p>	<p>Creating your first program from scratch</p> <p>The first time you will face an empty editor. Time to use knowledge, documentation and built-in help to create a bug-free computer program</p>	<p>Create an algorithm without mistakes that will plant three rows of crops</p>
<p>Stage 4: Build your debugging muscle further while writing maintainable code</p>				
7	Time to Harvest	<p>Lesson</p> <p>15 Slides, inc:</p> <p>2 Missing-Type</p> <p>6 Missing-Blocks</p> <p>1 Parsons Problem</p> <p>1 Code from Scratch</p> <p>3 MCQ</p>	<p>Comments and writing maintainable code</p> <p>Start to think about maintainability in the code you're writing. Use comments to add clarity and aid with debugging as challenges become more complex</p>	<p>Understand</p> <ul style="list-style-type: none"> the difference between poorly and properly commented code what is meant by a comment and how to use them to increase code maintainability <p>Identify</p> <ul style="list-style-type: none"> the correct code that harvests a row of crops a line of code which will not run due to a comment <p>Modify</p> <ul style="list-style-type: none"> the flow of control in a buggy computer program to fix the code <p>Use</p> <ul style="list-style-type: none"> comments to add structure to a computer program the <code>'harvest_crop'</code> command to control the farmbot to harvest crops the <code>'ship_crops'</code> command to ship crops collected by the farmbot <p>Create</p>

				<ul style="list-style-type: none"> algorithms to complex sequential tasks
8	Bugs and navigation	<p>Quiz</p> <p>10 Questions, inc:</p> <p>3 Missing-Blocks</p> <p>2 Starter-Code</p> <p>5 MCQ</p>	<p>Test bugs and errors in programs</p> <p>Test your knowledge of bugs and debugging ability</p>	<p>Understand</p> <ul style="list-style-type: none"> common error messages what is meant by debugging <p>Identify</p> <ul style="list-style-type: none"> the use of the snake-case naming convention the correct bug provided a computer program the correct algorithm for a given solution <p>Modify</p> <ul style="list-style-type: none"> a computer program to remove a bug <p>Use</p> <ul style="list-style-type: none"> comments to correctly comment a computer program <p>Create</p> <ul style="list-style-type: none"> an algorithm using sequential commands
Stage 5: Write more complex algorithms from scratch				
9	Planting the Farm	<p>Challenge</p> <p>2 Requirements</p> <p>Code from Scratch</p>	Write a planting algorithm from scratch	Create an algorithm to plant a checkerboard pattern of crops.
10	Harvest the Farm	<p>Challenge</p> <p>3 Requirements</p> <p>Code from Scratch</p>	Write a harvesting algorithm from scratch.	Create an algorithm to harvest alternating rows of tomatoes and aubergines.
Stage 6: A first look at working with loops				
11	Let's code quicker	<p>Lesson</p> <p>12 Slides, inc:</p> <p>3 Missing-Blocks</p> <p>3 Missing-Type</p> <p>1 Code from Scratch</p>	<p>Iteration and for loops</p> <p>Start optimising your algorithms by using for loops to create code that doesn't repeat itself</p>	<p>Understand</p> <ul style="list-style-type: none"> what is meant by a for loop what is meant by a Python Keyword: for what indentation is and when to use whitespace what is meant by iteration when to use a for loop to create better code <p>Use</p> <ul style="list-style-type: none"> a for loop to write more succinct code

		2 MCQ		<ul style="list-style-type: none">• whitespace to correctly write a for loop Create <ul style="list-style-type: none">• an algorithm using a for loop
12	Plant, harvest and ship	Challenge 3 Requirements Code from Scratch	Writing algorithms with loops Use loops to write an efficient farming algorithm from scratch	Create an algorithm that uses multiple for loops to control the Farmbot