

# STEAM Year 9 - Programming

## You will learn about:

- Basic programming structures
- Python programming syntax
- The user interface (inputs and outputs)
- Decomposition of problems

## STEAM SKILLS

- Using failure to learn and grow
- Accuracy
- Logical reasoning

You will do this by learning various different programming skills to create a basic game to control a robot moving around a grid. The robot will collect points depending on where in the grid they are. This will be done using a text based display but for students demonstrating a high level of independence and skill may be able to turn the game into a graphical version using extra time outside of lessons.

### Lesson Overview

#### Lesson 1 – Intro to Python

Be able to write your first simple program using the Python programming language and an IDE. Be able to store basic values and repeat actions.

#### Lesson 2 – Making decisions 1

Being able to control the flow of a program based on conditions by creating a basic number challenge game.

#### Lesson 3 – Making decisions 2

Control the flow of a program to create a system that will take café orders and create a bill.

#### Lesson 4 – Using lists.

Learn how to create a list that can be added to and altered instead of multiple variables.

#### Lesson 5 – Design a basic game.

Decompose a problem into smaller parts and understand how to create these parts using functions.

#### Lesson 6 – Creating the playing grid

Use a 2-dimensional array to create and display a playing grid for the robot.

#### Lesson 7 - Add the player movement

Understand the basic principles of moving a player within a grid.

#### Lesson 8 – Scoring and rules

Be able to identify when objects are in certain positions to allow scoring and applying rules.

#### Lesson 9 - enhancing and debugging

Adding enhancements to the game and also developing more advance debugging skills.

### Key Words

Python  
IDE (Pycharm)  
Decomposition  
Abstraction

### Assignment

Data type  
Integer  
Character  
Float  
boolean  
Identifiers  
Camel case

### Selection

expression  
Boolean condition (TRUE,FALSE)  
Boolean logic (AND, OR, NOT)

### Iteration

Definite (for loops)  
In-definite (while loops)

### Array

List  
2D table\matrix  
Index

### Function

Input  
Output  
Parameter\argument  
Local scope

	<b>Debugging</b> Syntax error Runtime error Breakpoint Step (into, over, out) Watch window
<b>Suggested reading or support available</b>  <b>Look in your OneNote library where I will put references and links.</b>  <b>Python.org</b> - main reference for Python <b>TutorialsPoint.com</b> - good python reference with examples <b>Pygame.org</b> - add-on to allow graphics (complicated, do the basics first!)  YouTube!	<b>Cross curricular</b> Maths coordinate systems Algorithms to manage movement  <b>Literacy links</b> ....



## SUCCESS CRITERIA

Highlight your starting point for each skill in **PINK**, at the end of the project highlight where you think you got to in **BLUE**.

Grade Range	Using failure to learn and grow	Accuracy	Logical reasoning
<b>0</b>	I presented no work.	I presented no work.	I presented no work.
<b>1</b>	<p>WWW: I can identify some basic errors and mistakes with my work.</p> <p>EBI: I need to reflect more on my mistakes and try to not repeat them.</p>	<p>WWW: I have made an attempt to complete the task with some success.</p> <p>EBI: I need to try and take more time and care with my work to avoid mistakes.</p>	<p>WWW: I understand some of the cause and effect in my work.</p> <p>EBI: I need to try to work out what the other possible choices and results could be in the task.</p>
<b>4</b>	<p>WWW: I can identify some issues and mistakes and overcome them. I can reflect on the causes of mistakes and see why they happened.</p> <p>EBI: I need to think more carefully about past experiences\mistakes so that I do not make the same mistake again.</p>	<p>WWW: I have completed the task with reasonable accuracy and have created a successful piece of work</p> <p>EBI: I need to make sure I have planned and prepared my work beforehand and take more care to avoid errors.</p>	<p>WWW: I clearly understand cause and effect and use them as I work. I make predictions whether something will or will not work and test my hypothesis out.</p> <p>EBI: I need to ensure that I cover more\all possibilities when I test or try to solve my problem..</p>
<b>6</b>	<p>WWW: I managed to independently identify and fix issues and mistakes.</p> <p>EBI: I should refer to my past errors (looking at my past work) and attempt to resolve potential mistakes at the design stages.</p>	<p>WWW: I have consistently completed tasks with care and with few mistakes resulting in a successful piece of work.</p> <p>EBI: I need to ensure my work is planned and prepared thoroughly to ensure I can complete a task without any errors.</p>	<p>WWW: I can apply clear logic thinking as part of my problem solving and regularly rely upon this to know whether something is likely to work or not. I can identify faults effectively.</p> <p>EBI: I should make sure that I work out the logical opposites to my work and use them to aid testing and fault finding.</p>
<b>8</b>	<p>WWW: I can shown and explain, using previous issues and mistakes, why my work or solutions will be more likely to succeed than in previous efforts.</p> <p>EBI: When testing a problem, I need to make sure that I also try to prove something doesn't work as well as what does work to gain a better understanding.</p>	<p>WWW: I always complete the tasks with a high level of precision and accuracy and have produced a quality outcome which is both functional and elegant.</p> <p>EBI I should consider ways of producing every part of my work to a consistently high quality.</p>	<p>WWW: I use logical processes and arguments to confidently ensure an efficient solution is found. I use logic for fault finding frequently and successfully. I understand that inverse operations are used for checking and proof.</p> <p>EBI: Make use of logic tables to prove and test more advanced ideas or concepts.</p>

