Year 8 – Programming

Computing@ Shuttleworth

What do I need to be able to do?

By the end of this unit, you should be able to:

- Understand what is meant by Decomposition
- Understand what is meant by abstraction
- Understand what is meant by algorithmic thinking
- Create a flowchart for a given scenario
- Identify what a variable is
- Debug and fix own errors
- Identify what makes a game successful
- Create own game using Scratch

Keywords

Decomposition: Breaking down a problem step by step
Abstraction: removing unnecessary data
Algorithm: step by step instructions
Programming: the process or activity of writing computer programs.
Debug: identify and remove errors
Variable: used to store a piece of data that may be needed later in a program. It can be changed whilst the program is running
Objective: A goal - what needs to be achieved?
Genre: A style or category (shooter, RPG etc)
Concept: A plan or intention - what is the idea of the game?
Sprite: The images used in Scratch - these can be programmed. The default one is the cat.
Sequence: The program follows these instructions step by step
Selection: The program allows a choice to be made (if…else)
Iteration: The program repeats a set of instructions a set amount of times or until a condition has been met

Decomposition

- **Decomposition** is breaking a problem down into more manageable chunks.

Abstraction

- **Abstraction** is used to simplifying complex information by removing unnecessary details

Algorithmic Thinking

- An **algorithm** is a plan, including a set of step-by-step instructions to resolve a problem

Start and Stop

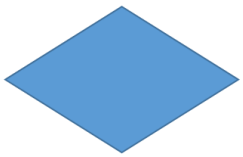
The beginning and end points in a sequence

Process

An instruction or command to do something

Input or Output

Data received or sent from the computer



Decision

A decision with different possible outputs

Game Objectives

Capture/Destroy

Race

Solve a puzzle

Build

Escape

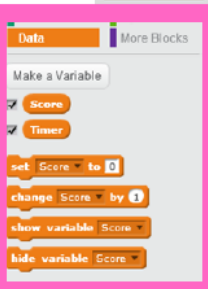
Kill enemies

Using Scratch

Sprites: the characters in Scratch

Loop (Repeating steps of instructions)

Using movement (Motion)



Variable - something that can be changed (usually a score)

Looks

Use these blocks to change the appearance of your sprite, such as changing its costume or its size. You may also apply colour effects, or make a speech or thought bubble appear from your sprite.

Motion

Use these blocks to move or rotate your sprite, or to access its position as a number.

Events

Use these blocks to trigger when algorithms should run. Use the 'Green Flag' block to run code when the program runs.

Control

Use these blocks to adjust the flow of instructions from one block to another.

Access **repeat** loops and **if** blocks here.

Sound

Use these blocks to play sounds, drums and notes.

Different sprites come with different sounds, or you can add your own via the 'Sounds' Tab.

Sensing

Use these blocks to sense for interaction between sprites or with a user of the program.

Use these with 'Control' blocks to make your program react to its environment somehow.

Pen

Use these blocks to turn on or off a pen line that draws behind a moving sprite, or to change the appearance of the pen. Finally, use the 'stamp' block to add a picture of the spite to the stage at its present position.

Data

Use these blocks to create, access and change the values of variables.

Use lists to store related variables in a single place.

More Blocks

Create your own blocks here that can carry out common, repeated tasks.

You can also access blocks for interacting with external equipment, such as Lego Robotics kits.

Operators

Use these blocks to carry out calculations on numbers, to generate random numbers or to compare numbers.