

# Unit: 5.1 Coding



## Key Learning

- To begin to simplify code.
- To create a playable game.
- To understand what a simulation is.
- To program a simulation using 2Code.
- To know what decomposition and abstraction are in computer science.
- To take a real-life situation, decompose it and think about the level of abstraction.
- To understand how to use friction in code.
- To begin to understand what a function is and how functions work in code.
- To understand what the different variables types are and how they are used differently.
- To understand how to create a string.
- To understand what concatenation is and how it works.

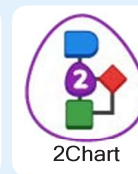
## Key Resources



Tools



2Dos



2Chart



Free code gorilla

## Key Vocabulary

### Action

Types of commands, which are run on an object. They could be used to move an object or change a property.

### Button

An object that can trigger an event in response to being clicked.

### Decomposition

A method of breaking down a task into manageable components. This makes coding easier as the components can then be coded separately and then brought back together in the program.

### Abstraction

A way of de-cluttering and removing unnecessary details to get a program functioning.

### Called

A line of code that triggers a function to be executed.

### Event

Something that causes a block of code to be run.

### Algorithm

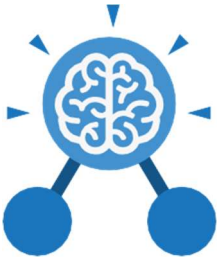
A precise step by step set of instructions used to solve a problem or achieve an objective.

### Co-ordinates

Numbers which determine the position of a point, shape or object in a particular space.

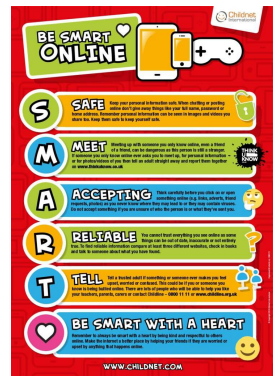
### Function

A block or sequence of code that you can access when you need it, so you don't have to rewrite the code repeatedly. Instead, you simply 'call' the function each time you want it.



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### Key Vocabulary

#### If

A conditional command. This tests a statement. If the condition is true, then the commands inside the block will be run.

#### Nesting

When you write a command inside something else e.g. a block of commands could be nested inside a timer.

#### Object

An element in a computer program that can be changed using actions or properties. In 2Code, buttons, characters and vehicles are types of objects.

#### Physical System

A system or process which happen in the real world using robotics, sensors or motors e.g. traffic lights.

#### Properties

All objects have properties that can be changed in design or by writing code e.g. image, colour and scale properties.

#### Run

To cause the instruction in a program to be carried out.

#### Repeat

This command can be used to make a block of commands run a set number of times or forever.

#### Score

A record of points won or lost in a game.

#### Sequence

This is when a computer program runs commands in order. In 2Code this can also include "repeat" or a timer.

#### Simplify/Simplified

To make something easier.

#### Simulation

A model that represents a real or imaginary situation.

#### Tab

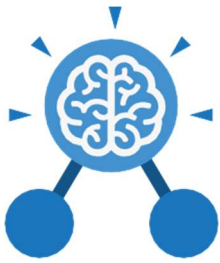
In 2Code, this is a way to organise a program into separate pages (tabs) of code.

#### Timer

Use this command to run a block of commands after a timed delay or at regular intervals.

#### Variable

A named area in computer memory. A variable has a name and a value. The program can change this variable value.



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### Key Images



Design

Open design mode in 2Code.

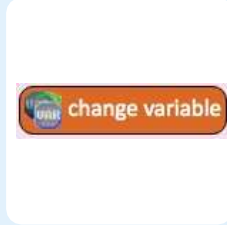


Exit Design

Switch to code mode in 2Code.



Add a new Tab to your code



A change variable block.



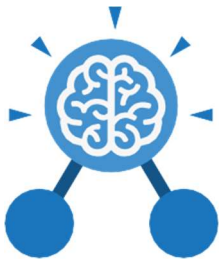
Example of combining variables and strings to print to the screen



Creating a variable in 2Code

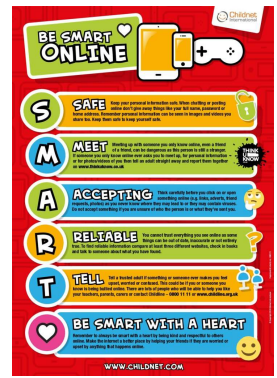


Creating a variable in 2Code



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### Key Questions

#### What does simulating a physical system mean?

Creating a program where the objects behave as they would in the real world. For example, a football program that uses angles, speed and friction to simulate kicking a football. When simulating a physical system, you first must break the system down into parts that can be coded (decomposition). The different parts will come together to make the full simulation.

#### Describe how you would use variables to make a timer countdown and a scorepad for a game.

**Timer countdown:**  
Create a timer variable and set it to the starting number of seconds. Add a Timer command that repeats and subtracts 1 every second. Add a text object in design view to display this number.

**Score:**  
Create a variable to store the score, each time the user gains a point, change and display the value of the variable.

#### What do the terms decomposition and abstraction mean? Use examples to explain them.

Decomposition is breaking a task into its component parts so that each part can be coded separately. If you were coding a game of chess, you could decompose into the moves of the different pieces and the setup of the playing space.

Abstraction is removing unnecessary details to get the program functioning. In the example, the colour and size of the squares is not important to game play.