## Introduction to Coding

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<tr>
<th>Key Stage</th>
<th>New 2014 Computing curriculum – the computer science strand</th>
<th>Rapid Router coding vocabulary</th>
<th>Progression through teaching resources</th>
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<tr>
<td><strong>Key Stage 1</strong>&lt;br&gt;Ages 5–7</td>
<td>• Understand what algorithms are; how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions&lt;br&gt;• Create and debug simple programs&lt;br&gt;• Use logical reasoning to predict the behaviour of simple programs&lt;br&gt;• Use technology purposefully to create, organise, store, manipulate and retrieve digital content&lt;br&gt;• Recognise common uses of technology beyond school</td>
<td>• Algorithm&lt;br&gt;• Program&lt;br&gt;• Debug&lt;br&gt;<strong>Sequence instructions:</strong>&lt;br&gt;• Move forwards&lt;br&gt;• Turn left&lt;br&gt;• Turn right&lt;br&gt;<strong>Repetition:</strong>&lt;br&gt;• Repeat x times</td>
<td><strong>Rapid Router levels 1 to 28:</strong>&lt;br&gt;• Creating algorithms for physical movement&lt;br&gt;• Controlling van on screen app using movement commands&lt;br&gt;• Working out the shortest route to a destination&lt;br&gt;• Understanding the repeat function&lt;br&gt;• Creating and evaluating their own challenges and programs</td>
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<td><strong>Lower Key Stage 2</strong>&lt;br&gt;Ages 7–9</td>
<td>• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts use sequence, selection, and repetition in programs; work with variables and various forms of input and output&lt;br&gt;• Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs&lt;br&gt;• Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals</td>
<td>• Algorithm&lt;br&gt;• Program&lt;br&gt;• Debug&lt;br&gt;<strong>Sequence instructions:</strong>&lt;br&gt;• Move forwards&lt;br&gt;• Turn left&lt;br&gt;• Turn right&lt;br&gt;• Wait&lt;br&gt;<strong>Repetition:</strong>&lt;br&gt;• Repeat x times&lt;br&gt;• Repeat until&lt;br&gt;<strong>Selection:</strong>&lt;br&gt;• If... do...&lt;br&gt;• If... else if...&lt;br&gt;<strong>Variables:</strong>&lt;br&gt;• Traffic lights are red/green</td>
<td><strong>Rapid Router levels 29 to 48:</strong>&lt;br&gt;• Understanding the repeat until function&lt;br&gt;• Using the if statement to decide on movement along the route&lt;br&gt;• Beginning to understand the else if extension to the if statement&lt;br&gt;• Using variables in the context of the colour of traffic lights&lt;br&gt;• Creating and evaluating their own challenges and programs using the code skills learnt</td>
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## Introduction to Coding

### Key Stage

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<tr>
<th>Upper Key stage 2</th>
<th>Ages 10 – 11</th>
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- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- Use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that can accomplish given goals, including collecting, analysing, evaluating and presenting data and information

### New 2014 Computing curriculum – the computer science strand

#### Rapid Router Python coding vocabulary

- **Algorithm**
- **Program**
- **Debug**

**Sequence instructions:**
- `v.move_forwards()`
- `v.turn_left()`
- `v.turn_right()`
- `v.wait()`

**Repetition:**
- for count in range (3)

**Selection:**
- if …… ():
- elif …… ():
- else :

**Procedures:**
- Define – def proctype ():
- Call – proctype()

**Variables:**
- `length = 10`
- `length = length + 5`

### Progression through teaching resources

#### Rapid Router Levels 51–109:

- Use the core programming commands appropriately in a visual language
- Understand the repeat while command
- Decompose the programming task into smaller parts
- Identify sections of code which can be used several times and write a procedure for that section
- Use repeat loops within procedures
- Develop an initial understanding of Python as a text based language
- Understand that Python has precise syntax
- Identify characteristics of Python and compare this with Blockly
- Use and understand the movement instructions in Python code
- Use and understand repeat loops in Python (for count in range (n))
- Create the core program in visual Blockly and understand it in Python code
- Understand how the syntax of selection statements works in Python
- Understand Python while, if, elif, else commands
- Analyse how procedures work in Python (extension)
- Write code in Python without the support of Blockly
- Write simple programs in Python using code for simple movement e.g. `v.move_forwards()`
- Use the print command in Python (not available in Blockly)
- Debug their Python programs, demonstrating an understanding of the appropriate syntax
- Use indents correctly in Python
- Use the Repeat loop … for count in range (n):
- Design and write programs independently in Python using repetition and selection:
  - for count in range (n): and while, if, else
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<td>Rapid Router Levels 51–109:</td>
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<td>• Use comments in Python to explain how the program works</td>
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<td>Extension:</td>
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<td>• Define new procedures in Python (also called functions)</td>
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