# Expertise Progression: Computer Science

| F2 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|---|
| **CSF.1** | **CS1.1** | **CS2.1** | **CS3.1** | **CS4.1** | **CS5.1** | **CS6.1** |
| Be able to control a range of 'toys' using remote controls. | Be able to say what an 'algorithm' is. | Be able to give control devices instructions that contain numerical data (e.g. move 2 steps etc). | To sequence a list of commands/blocks to produce an output e.g. a light comes on or a robot follows a defined route. | Design, test and amend programs to achieve an intended objective, including controlling an external output. | Can use decomposition when solving problems (break the code/problem into smaller parts). | Be able to use logical operations (not, or, and) to alter and control the outcome of a series of commands. |
| **CSF.2** | **CS1.2** | **CS2.2** | **CS3.2** | **CS4.2** | **CS5.2** | **CS6.2** |
| Be able to explore the language needed to direct a floor robot, to achieve a specific outcome. | Be able to use the appropriate keys or commands to make a virtual or floor robot go forward, backward, left and right. | Can use the repeat command (loops) to program more efficiently. | Is able to use 'repeat' and 'repeat until' loops when appropriate. | Be able to use nested loops to increase the efficiency of a program. | Can explain what happens when a variable changes and can use this within a computer program to manipulate data. | Can use variables efficiently. Be able to create their own variable and use this within a computer program to manipulate data. |
| **CSF.3** | **CS1.3** | **CS2.3** | **CS3.3** | **CS4.3** | **CS5.3** | **CS6.3** |
| Be able to use step by step commands to program a floor | Be able to program a bot or sprite by giving simple sequences of | Can use logical reasoning to predict the outcome of a | Can use simple conditional statements (if and | Can use and change a pre-written function. | Show an understanding of when to use 'while', | Can demonstrate an understanding of what subroutines |

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| or virtual robot to move. | commands with an immediate outcome. | sequence of instructions and test the sequence, amending if necessary. | when commands) and understands the importance of time within a program (e.g. using wait), with support. | | 'repeat until' and 'forever if' loops to make programs shorter and more efficient and can use them appropriately (understanding the differences between them). | (e.g. functions and procedures) are, and be able to create them within a computer program to store and retrieve data. |
|---|---|---|---|---|---|---|
| **CSF.4** | **CS1.4** | **CS2.4** | **CS3.4** | **CS4.4** | **CS5.4** | **CS6.4** |
| Begin to use basic symbols to represent and record directional instruction. | Can use basic symbols to record directional instruction and attempt to identify a bug in their code. | Is able to make use of simple events e.g. mouse clicks/tap on screen. | Can make use of an input 'event' within a simple program e.g. when the start button is clicked. | Understands a wider range of 'events' such as sprite interactions and button presses, and can use them within programs. | Can use and change a pre-written function as part of a longer program or sequence. | Be able to use a wider range of events (such as broadcasts) and use them efficiently within programs to start and stop scripts. |
| | **CS1.5** | **CS2.5** | **CS3.5** | **CS4.5** | **CS5.5** | **CS6.5** |
| | Be able to use a developing range of language and styles of control e.g. tilt and turn/instructional to direct a robot. | Be able to find a bug in simple code and attempt to debug errors. | Be able to find errors in a simple program, and successfully debug to make the program work. | Be able to find errors in a program of their own design, and successfully debug to achieve a specific goal. | Be able to use a greater range of conditionals (selection) including "whilst", "if else", "repeat until". | When debugging, can use abstraction to filter out extraneous detail and debug the program. |

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