

Unit 2—Intro to coding...

HCCS STEM—Computer Science, IT, Engineering, Food/Nutrition, Business Studies

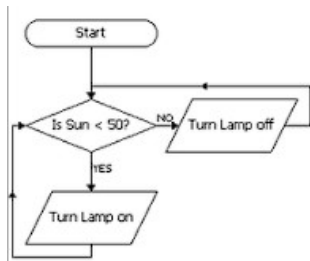
What do I need to be able to do?

I must be able to know and use the three main ways computers follow instructions: doing things one step after another (a sequence), making choices (a decision), and repeating things (a loop).

I must be able to make computer programs using tools like **Flowol** to plan how things work (such as basic flowcharts and mimics like traffic lights), and **Logo** or **EduBlocks** to draw geometric shapes and use clever repeating code.

I must be able to say what an algorithm is and write clear, step-by-step instructions that are precise and always lead to the same result, so others can follow them perfectly.

A key part of the unit involves designing precise algorithms with step-by-step instructions that are consistent, accurate, and can be successfully copied and understood by others. You will use Flowol to visually plan these algorithms and see them in action, for example, designing traffic light sequences or fairground mimics. You will also create programs to draw geometric shapes in Logo and EduBlocks, and apply loops for efficient coding.



Keywords

Iteration: Iteration, also known as repetition, is the process of repeating a task or set of instructions multiple times.

Sequence: A sequence is a series of commands or instructions that are executed in a specific order.

Count-Controlled Loop: A count-controlled loop is a type of iteration where you know exactly how many times a task needs to be performed.

Condition-Controlled Loop: A condition-controlled loop is a type of iteration where you do not know exactly how many times a task needs to be performed, but you know the conditions that will cause it to stop.

Flowchart: A flowchart is a diagram that visually represents a sequence of instructions or steps, commonly used for planning algorithms.

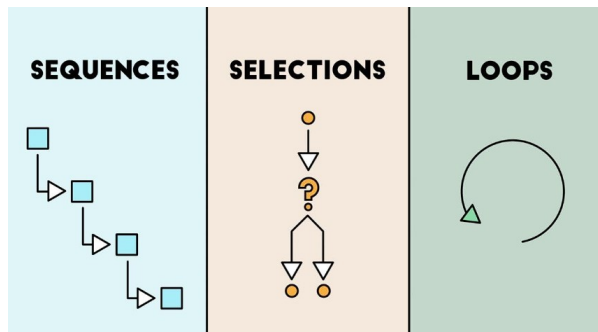
Procedure: A procedure refers to encapsulating a set of instructions for specific tasks, such as drawing geometric shapes, so they can be treated as a single unit or subprogram.

Algorithm: An algorithm is a precise, step-by-step series of instructions or a plan designed to solve a problem consistently and accurately every time.

Abstraction: Abstraction is the process of removing unnecessary detail from a problem to focus on the essential aspects needed for a solution.

Decomposition: Decomposition is the process of breaking down a large problem into smaller, more manageable sub-problems to make it easier to solve.

In this unit, you learn the **main ideas about how computers follow instructions**, which is called programming. You explore the **three core ways computers work**: **Sequence** is about giving instructions one after another, in a clear order, like steps in a recipe. **Selection** (or decision) teaches computers to make choices, where they do different things based on a condition, like whether it's safe to cross the road. **Iteration** (or loops) means getting the computer to repeat instructions many times, making your code much more efficient. You'll also discover what an **algorithm** is – basically, a super clear, step-by-step plan for the computer to solve a problem every time.



At the end of this unit, on **Lesson 9**, your understanding will be assessed with a **test**. This will be a 50-question set of multiple-choice questions and the reason that you computer science units are done in this way is because that is the way that you are assessed on the GCSE Computer Science course.

10 Test your understanding questions

Here are 10 multiple-choice questions summarising the whole unit:

1. What are the three basic parts that all computer programs have?
a) Start, Middle, and End, b) Sequence, Selection, and Iteration, c) Input, Process, and Output, d) Predict, Run, and Make
2. What is a flowchart used for in programming?
a) Writing long stories, b) Drawing pictures for fun, c) Drawing a visual map of step-by-step instructions for a program, d) Counting how many lines of code you wrote
3. Which tool helps you design algorithms visually for things like traffic lights or fairground rides?
a) Sphero, b) EduBlocks, c) Logo, d) Flowol
4. When a computer program needs to repeat a set of instructions over and over again, what is this concept called?
a) Sequencing, b) Selection, c) Iteration (or a loop), d) Decision-making
5. If you want your program to make a choice and do different things based on a condition (like "if it's raining, take an umbrella"), what core programming concept would you use?
a) Sequence, b) Iteration, c) Selection, d) Procedure
6. Which programming environment uses a "turtle" to draw geometric shapes by moving it forward, backward, left, or right?
a) Flowol, b) Sphero, c) Logo (or EduBlocks), d) Python text-based coding
7. What is an algorithm?
a) A secret code only computers understand, b) A type of computer game, c) A precise, step-by-step plan or set of instructions to solve a problem, d) A way to draw colorful pictures
8. What kind of loop is it when you know exactly how many times a task needs to be done?
a) Condition-controlled loop, b) Endless loop, c) Count-controlled loop, d) Random loop
9. What is a common task in Flowol where you make a model (mimic) like a Ferris wheel move continuously?
a) Creating a game character, b) Making a one-time animation, c) Making a fairground mimic move in a continuous loop, d) Solving a maths problem
10. When you have a big problem in programming and you break it down into smaller, easier-to-solve pieces, what is this called?
a) Abstraction, b) Iteration, c) Decomposition, d) Sequencing

10 Test your understanding answers

1. b), 2. c), 3. d), 4. c), 5. c), 6. c), 7. c), 8. c), 9. c), 10. c)