
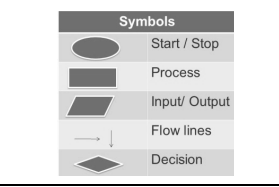




Y9—Programming

Important ideas

	<p>Computers are binary devices. They can only process binary inputs and can only output in binary. They can only store binary information. Computer programs direct the CPU to carry out binary functions. Programs translate binary computer language into something understandable to us.</p>
	<p>Programming is a logical process. Programming needs careful planning. Flow charts are a good way of representing what a CPU should do—an algorithm</p>
	<p>There are lots of different programming languages which convert human inputs into binary language. All programming languages have the same basic logical structure.</p>
	<p>Programming is a skill that you can learn. It helps to develop problem-solving, error checking and logical skills.</p>

Important vocabulary

Variable	Something stored (a data record)
Assign	Give a value or name to something
Input/output	What goes in and out
Syntax	The correct spelling and order of things
Selection	Decision making (select an outcome)
Iteration	Doing things again (looping)
Algorithm	A logical solution to a problem
Pseudocode	A simple (text based) algorithm
Debugging	Finding solutions to errors

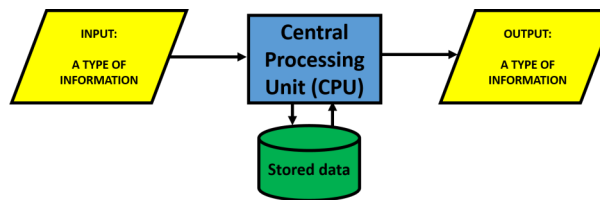
Quick recall facts

Variable	You store data as variables. You have to assign a name and a 'type' to them.
Sequence	This is the order that you want the CPU to follow your code. This can be linear or it can be branched. Flow charts are a good way of organising a sequence.
Selection	Sometimes you want the CPU to carry out different algorithms based on a decision. You will recognise selection by IF, THEN or ELSE statements.
Iteration	Sometimes you want a computer to repeat the same algorithm again (for a set number of times, until a condition is met or until you want it stopped). You will recognise this by FOR and WHILE .

How it connects...

Computers are **logic machines**. They can only follow instructions given to them.



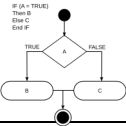
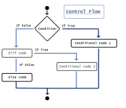
Computers can receive inputs, process them, store or output them. Programming is creating the logical (step-by-step) sequence of **algorithms** for a computer to follow.



As computers are **binary** machines then they will follow exactly what they are instructed to do. They cannot make **decisions** for themselves. If a computer does not do what it is expected to do... then that is because there is a problem with the 'sequence'. This is called a '**bug**'.

There are lots of types of programming language which are designed to do particular jobs. For example, HTML5 is a language used to create hypertext (web pages). It is not good at doing other things. Each language has its own **syntax** and structure.

Important examples

<p>Assigning a variable</p> 	<p>You assign (declare) a variable with a name. You should use CamelCase. A variable for a user name would be 'UserName'. You also need to know the type: integer, string, float etc</p>
<p>Sequencing</p> 	<p>A set of instructions is called an algorithm. The order of algorithms followed is called a sequence. Flow charts, pseudocode are tools for used by programmers for sequencing.</p>
<p>Selection</p> 	<p>Selection allows a CPU to follow different algorithms based on logical decisions. This means following a different path. IF, THEN, ELSE are for single paths and EL(SE)IF for multiple.</p>
<p>Iteration</p> 	<p>Iteration (repeating or looping) can be set by a condition (WHILE) or by count (FOR). If you want to repeat a certain algorithm, you can use a FUNCTION.</p>

I must be able to...

<p>List the three most important programming skills</p>	<ul style="list-style-type: none"> • Sequencing (ordering algorithms) • Selection (choosing algorithms) • Iteration (Repeating algorithms)
<p>Define, assign and call variables</p>	<ul style="list-style-type: none"> • A variable is something that you want to store on a computer. • You have to give them a name and a value. You have to tell a computer what type of variable it is (eg text).
<p>Recognise and use selection</p>	<ul style="list-style-type: none"> • IF, THEN or ELSE are for single path selection • IF and EL(SE)IF are used for multiple path selection
<p>Recognise and use iteration</p>	<ul style="list-style-type: none"> • WHILE is used for repeating a function or algorithm until a condition is met or while a condition is met. • FOR is used when you want a certain number of repeats