Algorithms in pseudocode and flow diagrams

Teacher's Notes

Lesson Plan

Length	60 mins	Specification Link	2.1.7/ab	Algorithms in pseudocode and flow diagrams
Learning objective		Understand algorithms written in a flow diagram or pseudocode, explain what they do, complete or correct them Produce algorithms in pseudocode or flow diagrams to solve problems		

Time (min)	Activity	Further Notes
5	Introduction: What is an algorithm? • Explain that an algorithm is simply a sequence of steps for completing a task. • Show Screen 1 of Demonstration – cake ingredients. • Explain that cooking is all about algorithms. Look at the recipe – it is a series of steps. • With cakes you can see what stage you are at – what ingredients you have left, whether the cake springs back when you get it out of the oven. The big difference with computer algorithms is you **can't see** what's going on – you have to track the current 'state' of everything in your head. • Flowcharts can help with that.	You may add that it must be done in the correct order, and can contain loops (doing things a certain number of times or until something happens) and make decisions.
10	• Explain that algorithms can be represented in many ways including flow charts and pseudocode. • A flowchart lets you leverage the visual part of your brain to 'see' how the algorithm functions. • Show Screen 2 of Demonstration – baking cake in a flowchart. • Pseudocode allows you to 'get your ideas down' as step by step code-ish statements, without getting bogged down in the specifics of a particular language's syntax.	You could also explain that computer variables are often likened to named boxes containing a value. If they were, at least we'd be able to look inside the box to see the value. But we can't. When you're trying to understand a computer algorithm you can't see into the computer's brain to determine the current value of x, or what number is in 'secondElapsed'. Note: there are many tools available for creating flowcharts and many word processing applications have a system for creating flowchart symbols & connecting them: Flowcharts palette in OpenOffice
5	Watch the set of videos.	
5	Check students' understanding of the video by asking for definitions of key terms such as. • Flowchart • Algorithm • Pseudocode	Flowcharts are ways of representing steps in a process visually. An algorithm is a step by step solution to a problem. Pseudocode uses the structure of a programming language, but is intended for humans, not computers, to read.

Time (min)	Activity	Further Notes
5	**Interactive activity 1** Students match the flowchart symbols to their names.	
10	**Worksheet 1** Ask students to write down an algorithm for an everyday process (making tea, tying your shoelace, crossing the road) in a flowchart and/or in pseudocode.	
10	**Interactive activity 2** Explain that the tool Proganimate allows you to build programs using flowcharts. The activity shows students how this works – the flowchart is built on the left and the code (Java or Visual Basic) is displayed on the right. They can then try out the tool for themselves as a follow up session.	
5	**Homework** Ask students to complete Worksheet 2.	
5	**Plenary** Class discussion of any misunderstandings, or clarifications required.	

WORKSHEET 2 ANSWERS

1 **(a) A user enters £3. Explain what will happen.**

The user's money is greater than £2 so the system will accept it, but the user will be given the message that they have overpaid. They will have the option to confirm or cancel.

(b) State *two* decisions which have to be made in this process.

Two from:

- Is the money less than £2?
- Does the money = £2
- Which button was pressed?

(c) A user is issued this ticket from the system:

19/07/2013 £3.00
You can park until 14.21h

State *three* facts you can work out from this ticket.

Three from:

- The date of issue of the ticket is 19th July 2013
- The user overpaid by £1
- The ticket was issued at 12.21pm