

## Kit's Code-Cracking Challenge

*Learning objective: To understand algorithms, identify and debug errors in sequences, and predict the output of a simple program.*

Read each task carefully. Use your logical thinking skills to help Kit the Fox organise his computer programs. Ensure your explanations are clear and use correct technical terminology.

*Word bank: algorithm · debug · sequence · input · output · variable · loop · syntax*

**1. Kit has written an algorithm to make a robot move: 1. Move forward 2 steps, 2. Turn left, 3. Move forward 2 steps, 4. Jump. If the robot follows this sequence, explain why it might fail if there is a wall directly in front of it at step 3. (2 marks)**

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**2. Define the term 'debug' in your own words. Why is it an essential part of the coding process for a computer scientist? (2 marks)**

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**3. Kit wants his program to repeat the action 'Clap hands' five times. Write the instruction using a 'loop' structure rather than writing 'Clap hands' five times. (2 marks)**

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**4. Compare and contrast a computer algorithm with a recipe for baking a cake. How are they similar in their structure and purpose? (3 marks)**

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**5. Justify why it is important for the steps in an algorithm to be in a specific, logical order. What might happen if the sequence is changed? (3 marks)**

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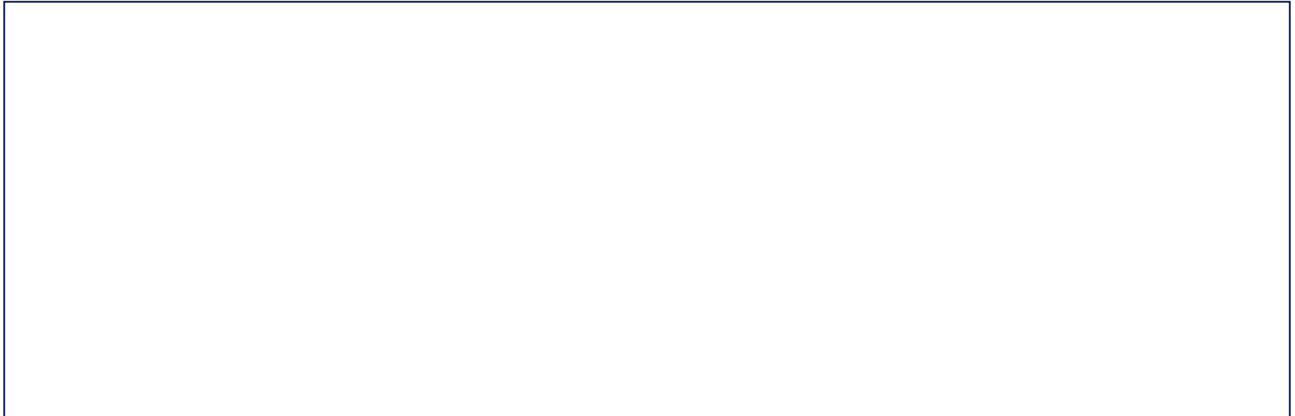
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6. If a computer program costs £2.50 to develop and Kit sells 12 copies, how much profit does he make? If he wants to add a new feature that costs £8.00, how many more copies must he sell to cover the cost? (4 marks)

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**Draw:** Draw a flow chart showing the 'algorithm' for making a cup of tea or getting ready for school. Use labelled boxes for each step in the sequence.



*Extension challenge: Design a 'pseudo-code' for a new robot character. Imagine your robot has to navigate a maze to find a treasure chest. Write a sequence of commands (such as Forward, Backward, Turn Left, Turn Right) and include one 'loop' to make the code more efficient. Explain why your chosen sequence is the most effective path.*