

Kit's Computing Challenge: Mastering Algorithms

Learning objective: To understand, design, and debug algorithms, and to explain that programs execute by following precise instructions.

Read each question carefully. Use your knowledge of programming logic to solve Kit the Fox's computing puzzles. Ensure your explanations are clear and use the correct technical vocabulary.

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

1. Kit is writing an algorithm to make a cup of tea. If Kit forgets to include the instruction to 'boil the water', what do we call the error in the sequence, and what is the process of fixing it? (2 marks)

2. Explain the difference between a 'sequence' and a 'loop' when writing a computer program. Give an example of when you might use a loop. (3 marks)

3. If a computer program is a set of instructions, why must they be written in a very specific order? Use the term 'sequence' in your answer. (2 marks)

4. Imagine you are programming a robot to move across a grid. Write a simple sequence of commands (e.g., 'Move forward 2') to help the robot navigate from the starting point to a treasure chest three squares away. (2 marks)

5. What is the role of an 'input' in a computer program? Give an example of an input you might use in a game you have designed. (2 marks)

Draw: Draw a flowchart that shows the steps to get ready for school in the morning. Use boxes for your actions and arrows to show the correct sequence.



Extension challenge: Challenge: Write a piece of 'pseudocode' (plain language instructions) for a program that asks a user for the price of two items (e.g., £2.50 and £1.20) and then calculates the total cost. How would you change the program to include a 10% discount?