Detective Kit's Guide to Debugging Code

1. The algorithm is missing the step to remove the tea bag before drinking. (2 marks)

Working: Step 3 is adding milk, but the tea bag remains in the mug, making it unpleasant to drink.

1 mark for identifying the missing step (remove tea bag), 1 mark for explaining why (e.g., it makes the tea taste bitter or is unpleasant).

2. The code uses addition instead of multiplication. It should be: Total = 30 * 5. (2 marks)

Look for: The student must identify that the operator is wrong (addition vs multiplication) and provide the correct calculation.

Good: The code is wrong because it uses plus instead of times.

Better: It is a logic error because adding 30 and 5 only equals 35p, but you need to multiply 30p by 5 apples to get 150p.

Best: This is a logic error because the computer follows the instruction literally, adding the numbers instead of calculating the total cost. The correct code should be: Total = 30 * 5.

What moves an answer up: Moving from good to best requires identifying the specific type of error and showing the correct mathematical operation.

3. No, there is no bug. The logic is correct for drawing a square. (2 marks)

Working: A square has 4 equal sides and 4 right angles (90 degrees). Repeating the move and turn 4 times completes the shape.

1 mark for saying no, 1 mark for explaining the geometry of a square (4 sides/90 degree turns).

4. The error is the time unit. 50 milliseconds is too short. The fix is to change it to 5000 milliseconds (or 5 seconds). (2 marks)

Working: 1 second = 1000 milliseconds. 5 seconds = 5000 milliseconds.

1 mark for identifying the time unit error, 1 mark for the correct conversion.

5. If key_collected = True AND door_touched = True, then open door. (3 marks)

Look for: The student must include a condition that checks for both the key and the door.

Good: If you have the key, then the door opens when you touch it.

Better: The code should check if the player has the key first. If key = true and door = touched, then open.

Best: The logic needs an 'AND' operator: 'If key_collected is true AND door_touched is true, then open door.' This ensures the door stays locked until both conditions are met.

What moves an answer up: The best answer uses formal logic terminology like 'AND' operators to show how the program evaluates multiple conditions.

What a secure answer looks like

A secure answer demonstrates an understanding that computers follow literal instructions and that logic errors occur when the sequence or operator does not match the intended outcome.

If your child is stuck

Ask the child to 'be the robot' and physically act out the steps. If they reach a point where the action doesn't make sense, that is where the bug is hiding.

Common mistakes to watch for

Children often confuse 'syntax errors' (typos in code) with 'logic errors' (the code runs but does the wrong thing). Also, they frequently forget that computers need explicit instructions for every single step.