Kit the Fox's Debugging Detectives

1. The bug is the number 3 (or 'Move forward 3 squares'). (1 mark)

Working: If the robot hits a wall after step 1, the distance is too long for the grid.

Accept any answer identifying the number 3 or the instruction 'Move forward 3' as the error.

2. Step 3 is in the wrong order. You should put your coat on before you open the door to go outside. (2 marks)

Look for: Identification of step 3 and a logical reason regarding the sequence of getting ready.

Good: Step 3 is wrong because you need your coat.

Better: Step 3 is wrong because you should put your coat on before you walk outside.

Best: Step 3 is the bug because the sequence is wrong; you must put on your coat before you open the door to go out.

What moves an answer up: Moving from a simple statement to a clear explanation of the logical sequence improves the answer.

3. To debug means to find a mistake in a set of instructions and fix it so the program works properly. (2 marks)

Look for: Mentioning both 'finding' and 'fixing' the error.

Good: It means fixing a mistake.

Better: It means finding a bug in your code and changing it to make it work.

Best: Debugging is the process of finding a mistake, or 'bug', in your instructions and correcting it so the program runs correctly.

What moves an answer up: Using the term 'process' and explaining the outcome makes the answer more precise.

4. The program is not working because the water is cold. It is missing the instruction to boil the water or use hot water. (4 marks)

Look for: Identifying that cold water makes bad tea and suggesting the need for heat/boiling.

Good: It is wrong because the water is cold.

Better: The program is wrong because you cannot make tea with cold water. It is missing a step to boil the water.

Best: The bug is in step 2; using cold water will not make tea. The program is missing an instruction to boil the water first.

What moves an answer up: Identifying the specific step (step 2) and the logical requirement (boiling) creates a complete answer.

5. 1. Stand up. 2. Walk forward 5 steps. 3. Turn left. 4. Walk into the wall. Fix: Change step 4 to 'Walk to the door handle'. (6 marks)

Look for: Four logical steps, one clear bug, and a valid fix.

Good: 1. Stand. 2. Walk. 3. Turn. 4. Walk into wall. Fix: Don't walk into wall.

Better: 1. Stand up. 2. Walk 3 steps. 3. Turn left. 4. Walk into the wall. The bug is step 4. Fix: Walk 2 steps instead.

Best: 1. Stand up. 2. Walk forward 4 steps. 3. Turn left. 4. Walk into the wall. The bug is step 4 because it makes him hit the wall. Fix: Change step 4 to 'Walk forward 1 step'.

What moves an answer up: Providing a specific, measurable fix (changing the number of steps) is more accurate than a vague instruction.

6. Debugging is like solving a puzzle. It is okay to make mistakes because that is how we learn what works. Testing is important because it shows us where the robot gets stuck so we can fix it. (10 marks)

Look for: A friendly tone, the idea that mistakes are part of learning, and the importance of testing to find errors.

Good: It is okay to make mistakes because you can fix them. Testing is good to see if it works.

Better: Making mistakes is part of coding. When you test your code, you can see where the bug is and fix it so the robot moves correctly.

Best: Don't worry about bugs! Everyone makes them. Making mistakes helps you learn how to code better.

> Testing is important because it lets you see exactly where the robot stops, so you can fix the bug and finish your program.
>
> *What moves an answer up: Encouraging language combined with a clear explanation of the 'why' behind testing makes this the best answer.*

What a secure answer looks like

A secure answer demonstrates an understanding that an algorithm is a sequence and that bugs are logical errors in that sequence. Pupils should be able to identify the error and provide a logical correction.

If your child is stuck

Ask the child to act out the instructions physically. If they hit a wall or get confused, they have found the bug!

Common mistakes to watch for

Children often think a bug is a 'broken' computer rather than a mistake in the instructions. They also sometimes struggle to realise that the order of steps (sequence) is just as important as the steps themselves.