

Kit's Computing Conundrum: The Debugging Detective

Learning objective: To identify, predict, and correct errors (bugs) in logical sequences, demonstrating an understanding of how algorithms function.

Kit the fox has written a set of instructions for a robot to bake a simple cake, but there are three 'bugs' hidden in the sequence. Read the algorithm carefully. Identify where the logic fails, explain why it is incorrect, and rewrite the step to ensure the robot succeeds. You must provide a clear justification for your changes.

Word bank: Algorithm · Bug · Debug · Sequence · Input · Output · Logic · Error

1. The Algorithm: 1. Preheat oven to 180°C. 2. Crack eggs into the bowl. 3. Put the empty eggshells in the cake mixture. 4. Add flour and sugar. 5. Bake for 30 minutes. 6. Remove cake from oven. 7. Put the cake into the oven. Identify the first bug. Why is this a problem for the robot? (2 marks)

2. Look at steps 5, 6, and 7. There is a logical error in the sequence. Explain why this sequence would cause the robot to fail. (2 marks)

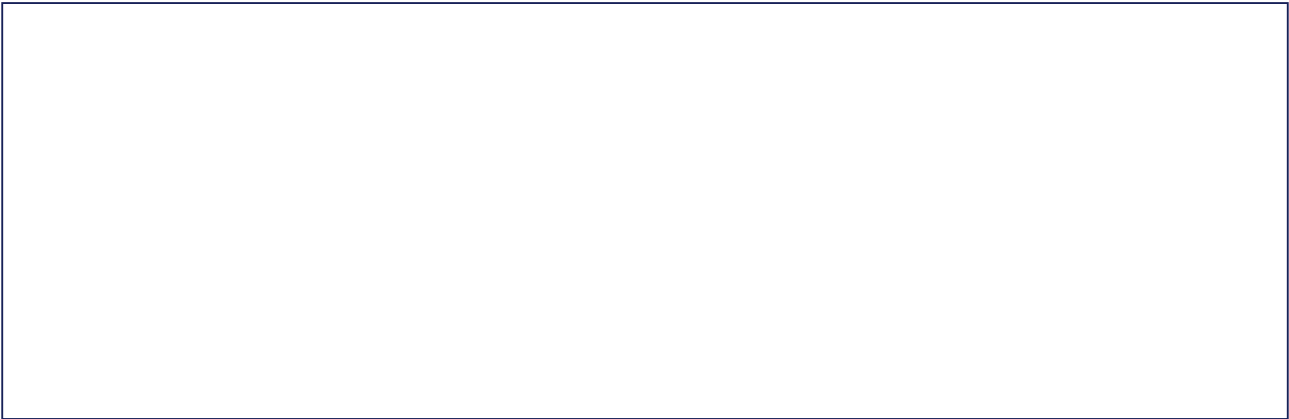
3. Justify your answer: Why is it important for a computer scientist to test an algorithm before letting a robot perform the task? (2 marks)

4. Rewrite the algorithm in the correct, logical order to ensure the cake is baked successfully. (3 marks)

5. Compare and contrast: How is 'debugging' code similar to fixing a mistake in a math calculation? What steps are the same? (2 marks)

6. What might happen if a computer program had a bug that the user did not notice until after the program had finished running? Explain the potential consequences. (3 marks)

Draw: Draw a 'before' and 'after' diagram of Kit the fox's robot. Show the messy 'buggy' result on the left and the perfect cake result on the right after your debugging is complete.



Extension challenge: Imagine you are programming a robot to tidy your bedroom. Write a 5-step algorithm for picking up a toy and putting it in a box. Deliberately insert one 'bug' into your instructions and challenge a partner to find it and debug it.