

Kit's Code-Cracking Challenge: Mastering Debugging

Learning objective: To identify, explain, and correct logical and syntax errors in algorithms to ensure a program functions as intended.

Read each scenario carefully. Use your knowledge of sequencing and logic to spot the 'bug' and explain how to fix it. Remember to check for logical errors where the steps are in the wrong order!

Kit the fox is building a program to help his friends navigate the forest. However, Kit has noticed that his instructions are not working perfectly. He needs your help to find the errors—or 'bugs'—in his code and fix them so the program runs smoothly.

Word bank: algorithm · debug · bug · sequence · syntax · logical error · execute · input

1. Kit wrote an algorithm to make a robot move: 1. Put down the pen. 2. Move forward 5 steps. 3. Draw a circle. 4. Pick up the pen. Explain why this sequence will result in an error if the robot needs to draw before moving. (2 marks)

2. Identify the logical error in this sequence for brushing teeth: 1. Put toothpaste on brush. 2. Rinse mouth. 3. Brush teeth. 4. Put brush away. Describe the correct order. (2 marks)

3. If a program is designed to calculate the total cost of items (e.g., £2.50 + £1.20) but it returns a result of £13.70, what type of error has likely occurred? Justify your answer. (2 marks)

4. Compare and contrast a 'syntax error' (a spelling mistake in code) with a 'logical error' (the code runs, but does the wrong thing). (3 marks)

5. Kit's code for a sandwich-making robot is: 1. Spread butter. 2. Put bread on plate. 3. Add cheese. 4. Close sandwich. What might happen if the robot executes these steps exactly as written? (2 marks)

Draw: Draw a 'Bug-Finder' machine that Kit the fox might use to scan his computer screen. Label the parts of the machine that help it detect mistakes in the code.



Extension challenge: Imagine you are designing a game where a character must collect a coin worth £0.50. Write a 5-step algorithm for this action. Then, intentionally introduce one logical error into your sequence and write a short paragraph explaining how a friend would need to 'debug' your work.