

Kit's Coding Conundrum: Sequencing and Debugging

Learning objective: To understand how to design and debug programs by sequencing instructions correctly and identifying logical errors.

Kit the Fox is building a robot to help in the garden. However, the robot's code is currently jumbled! Read the sequence of instructions below. Your task is to reorder the steps logically so the robot can plant a seed, then identify the 'bug' in the list and explain how to fix it.

Word bank: Sequence · Algorithm · Debug · Input · Output · Loop · Instruction · Error

1. The robot's current code is: 1) Pat soil down, 2) Dig a small hole, 3) Cover seed with soil, 4) Place seed in hole. Reorder these steps into the correct sequence for a successful algorithm. (2 marks)

2. If the robot was programmed to 'Water the plant' before 'Digging a hole', explain why this would cause an error in the program's logic. (2 marks)

3. Kit wants the robot to plant 5 seeds in a row. Instead of writing the instruction 'Dig, Seed, Cover' five times, what programming concept could Kit use to make the code more efficient? (2 marks)

4. Justify your answer: Why is it important for a programmer to test their code (debugging) before letting the robot work in the garden? (3 marks)

5. Compare and contrast: How is a computer algorithm similar to a recipe for baking a cake? What happens if you miss out a step in both? (3 marks)

6. What might happen if the robot receives an 'Input' that it has not been programmed to understand? Use the word 'bug' in your answer. (2 marks)

Draw: Draw a flowchart showing the steps a robot would take to walk from the garden gate to the flowerbed, including a 'decision' diamond (e.g., 'Is there an obstacle?') to show how the robot might change direction.



Extension challenge: Design a 'Loop' for Kit's robot. If the robot has a budget of £10.00 and each packet of seeds costs £1.50, write a short algorithm or pseudocode that tells the robot how many packets it can buy and when it must stop adding packets to its basket.