

Mastering Motion and Loops with Kit the Fox

Learning objective: To understand how to use repeat loops and motion blocks to create efficient sequences in Scratch.

Read the following questions carefully. Use your knowledge of the Scratch interface, the coordinate system, and algorithmic thinking to solve the puzzles. Show your working where necessary.

Word bank: algorithm · sequence · loop · sprite · coordinate · bug · debug · broadcast

1. Kit wants a sprite to move in a perfect square. If the sprite moves 100 steps, turns 90 degrees, and repeats this four times, explain why this is more efficient than writing out sixteen separate blocks of code. (2 marks)

2. The sprite is currently at coordinates x: 0, y: 0. If you use the block 'change x by 50' followed by 'change y by 50', what will the sprite's new coordinates be? (2 marks)

3. If your program has a 'bug' and the sprite stops moving halfway through a sequence, what is the first step you should take to 'debug' your code? (2 marks)

4. Compare and contrast the 'forever' loop and the 'repeat' loop. When would you justify choosing a 'forever' loop over a 'repeat' loop? (3 marks)

5. What might happen if you forget to include a 'wait' block inside a loop that changes the colour of a sprite rapidly? (2 marks)

Draw: Sketch a flowchart showing how a sprite moves in a triangle. Use arrows to show the direction and label the 'repeat' block that would be required to complete the shape.



Extension challenge: Design an algorithm for a game where a sprite must navigate a maze. Write out your sequence in plain English, ensuring you include a conditional statement (e.g., 'If the sprite touches the wall, then go back to the start'). Justify why your chosen path is the most efficient one for the player.