

Kit's Forest Path Algorithm Challenge

Learning objective: To design, write, and debug programs that accomplish specific goals, using sequence and logical reasoning.

Kit the fox is trying to navigate through the Whispering Woods to find a hidden library. Below is a grid representing the forest. Use the provided command set to write an algorithm to guide Kit from the 'Start' (0,0) to the 'Library' (4,4). Remember: an algorithm must be precise and follow a logical sequence. After writing your code, review it to check for 'bugs' (errors).

Word bank: Algorithm · Sequence · Debug · Program · Command · Logic · Input · Output

1. Write a sequence of commands (e.g., 'Move North 1 square') to help Kit reach the Library. Avoid the 'Thorny Bush' at (2,2). (4 marks)

2. Explain why it is important for an algorithm to be written in a specific sequence. What might happen if you swapped two steps? (3 marks)

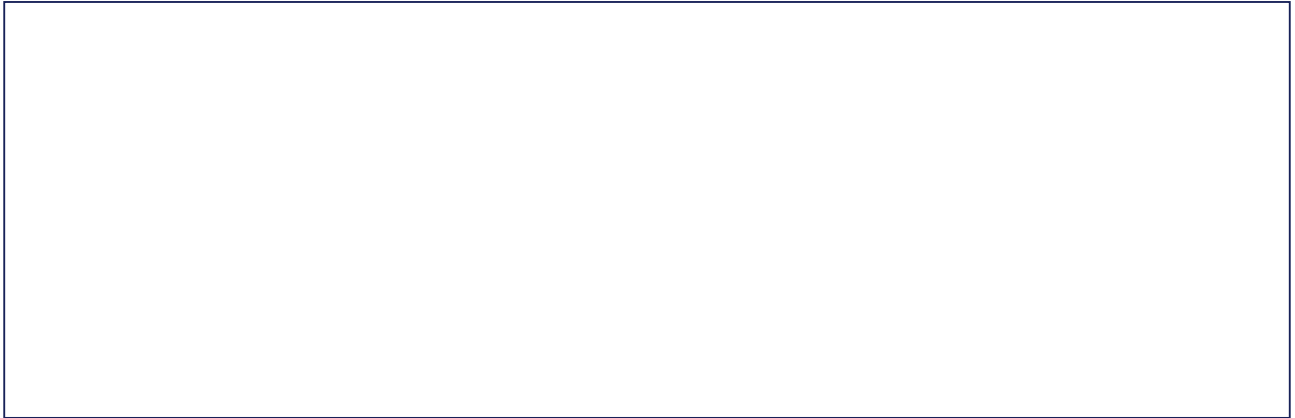
3. Kit encounters a fallen log at (1,3). How would you modify your original algorithm to navigate around this new obstacle? (3 marks)

4. Define the term 'debug' in your own words and explain how you would identify a bug in your pathfinding code. (3 marks)

5. Compare and contrast a human giving directions to a friend versus writing an algorithm for a computer. Justify your answer. (4 marks)

6. If Kit had a loop command (e.g., 'Repeat 3 times: Move East 1'), how would this change the efficiency of your code? (3 marks)

Draw: Draw a 5x5 grid. Mark (0,0) as 'Start', (4,4) as 'Library', and place a 'Thorny Bush' at (2,2). Draw Kit the fox following your successful path through the forest.



Extension challenge: Design a set of 'conditional' commands for Kit. For example: 'IF you see a blue flower, turn left, ELSE move forward.' Explain why using conditionals makes a program more powerful than a simple list of instructions.