

Kit's Logic Lab: Designing an Algorithm

Learning objective: To design an algorithm for a sprite to follow a specific route and understand the concept of decomposition in programming.

Help Kit the fox program his robot, 'Bolt', to navigate through the forest maze to reach the prize. Use the word bank to label the components of your program and draw the path Bolt needs to take.

Draw: Draw a top-down view of a forest maze on a grid. In the style of a technical diagram, include Kit the fox holding a tablet in the corner. Bolt the robot should be depicted as a small, friendly metallic cube with wheels. Use clean, bold lines for the grid and bright, contrasting colors for the path Bolt takes. Ensure there is plenty of space around the grid for labels from the word bank.



Label words: Algorithm · Sequence · Bug · Debug · Input · Output · Loop

Steps:

1. Step 1: Draw a 5x5 grid in the center of your page. Place a 'Start' icon at the bottom-left square and a 'Finish' icon at the top-right square. Draw a line showing the path Bolt must take.
2. Step 2: Label the path you have drawn with 'Forward', 'Turn Left', or 'Turn Right' instructions. Explain why it is important for these instructions to be in the correct sequence.
3. Step 3: What might happen if Bolt encounters an unexpected obstacle like a fallen log? How would you

update your algorithm to 'debug' the situation?

4. Step 4: Compare and contrast a computer algorithm with a recipe for baking a cake. Justify why both require precise instructions.

5. Step 5: If you wanted Bolt to repeat the same movement three times, what programming term would you use to make the code more efficient?

6. Step 6: Creative Extension: Design a new obstacle for the grid. Write a short paragraph explaining how you would change your program to navigate around it.