

Year 5 Computing Assessment: Algorithmic Thinking

Learning objective: To demonstrate an understanding of algorithms, debugging, and logical sequencing in computing.

Read each question carefully. Use the word bank to help you with terminology. Write your answers clearly in the spaces provided. Ensure your explanations are precise.

Kit the fox is designing a computer programme to help his friends navigate the forest safely. He needs to create a set of precise instructions that his friends can follow, even if they encounter unexpected obstacles along the way. Kit knows that a computer will only do exactly what it is told, so his instructions must be logical and efficient.

Word bank: Algorithm · Sequence · Selection · Iteration · Debug · Bug · Variable · Decomposition

1. Define the term 'algorithm' in your own words. Why is it essential for an algorithm to be precise? (2 marks)

2. Kit has written an algorithm for making a cup of tea, but the water is cold. Identify the term for this error and explain the process required to fix it. (2 marks)

3. Explain the difference between 'selection' and 'iteration' within a programme. Give a real-world example for each. (4 marks)

4. Kit is building a programme to track how many apples Max the monkey collects. Why does Kit need to use a 'variable' in his code? (3 marks)

5. Describe the process of 'decomposition'. How does breaking a large, complex task into smaller parts help a programmer? (4 marks)

6. Compare and contrast a 'sequence' algorithm with one that uses a 'loop'. In what situation would a loop be more efficient? (4 marks)

7. Write a 5-step algorithm for a robot to move from the entrance of the classroom to your desk. You must include at least one 'selection' (if/then) instruction to account for a potential obstacle (e.g., a chair). (5 marks)

Draw: Draw a flowchart that represents a simple decision-making process for Kit the fox: 'If it is raining, take an umbrella; otherwise, take a sun hat'. Use standard flowchart symbols.



Extension challenge: Justify your answer: If you were designing an algorithm for a self-driving car, why is 'selection' more critical than 'sequence'? What might happen if an algorithm fails to account for a variable?
Total: /25