

Mastering Algorithms with Kit the Fox

Learning objective: To understand, create, and debug simple algorithms using logical sequencing and precise instructions.

Read each flashcard carefully. Try to explain the concept in your own words before checking the answer. Use these cards to test your knowledge of how computers process instructions.

What is an algorithm?

An algorithm is a precise, step-by-step set of instructions designed to complete a specific task or solve a problem.

Why is the 'sequence' of steps important in an algorithm?

Computers follow instructions in the exact order they are given. If the sequence is incorrect, the desired output will not be achieved.

Kit the Fox is writing a program to make a robot move. What is 'debugging'?

Debugging is the process of identifying, finding, and fixing errors or 'bugs' in an algorithm or computer program.

Define 'decomposition' in the context of computing.

Decomposition is the act of breaking down a large, complex problem into smaller, more manageable parts that are easier to solve.

What is an 'input' in a computing system?

An input is the data or information sent to a computer or system to be processed, such as pressing a key on a keyboard.

What is an 'output' in a computing system?

An output is the information or action produced by the computer after it has processed the input, such as words appearing on a screen.

Explain why we use 'logical reasoning' when creating algorithms.

Logical reasoning helps us predict the behavior of our program and ensures that our instructions lead to the correct result every time.

If a robot fails to follow a dance move, what is the first step you should take?

You should review the sequence of the algorithm to find the exact step where the error occurred (the bug) and rewrite that instruction.

Compare and contrast a recipe for baking a cake with a computer algorithm.

Both are sets of step-by-step instructions. However, a recipe is followed by a human, while an algorithm is designed to be followed by a computer or machine.

Justify why an algorithm must be precise.

Computers lack human intuition, they cannot 'guess' what you mean. If instructions are vague, the computer cannot execute the task correctly.

What might happen if you skip a step in an algorithm?

The program might fail to run, or it might produce an incorrect result (an error), because the computer is missing essential information needed to complete the task.

Explain why it is helpful to test an algorithm multiple times.

Testing helps to uncover 'hidden bugs' or scenarios you might not have thought of, ensuring the algorithm is robust and works reliably in different situations.