

Kit's Computing: Mastering Debugging

Learning objective: To understand the process of debugging, identify common programming errors, and apply logical reasoning to correct code.

Read the front of each card to test your knowledge of debugging terminology and techniques. Use the answers on the back to verify your understanding.

What is a 'bug' in a computer program?

A bug is an unexpected error, flaw, or fault in a computer program that prevents it from running as intended.

Define 'debugging'.

Debugging is the systematic process of identifying, analysing, and removing errors from computer software.

Explain the difference between a syntax error and a logical error.

A syntax error is a mistake in the language rules (e.g., a missing bracket), whereas a logical error occurs when the code runs but produces the wrong result due to a flaw in the algorithm.

What is a 'breakpoint' in programming?

A breakpoint is a intentional stopping point in a program that allows a programmer to pause execution and inspect the state of the code.

Why is decomposition a useful strategy when debugging complex code?

Decomposition involves breaking a large, complex problem into smaller, manageable parts, making it easier to isolate exactly where a bug is hiding.

If Kit the fox writes code for a robot to move forward but it turns left instead, what type of error is this?

This is a logical error, as the program is executing commands but the algorithm's logic does not achieve the desired outcome.

Explain why testing code with different 'inputs' is important.

Testing with various inputs helps ensure the program is robust and behaves correctly in different scenarios, rather than just the one the programmer initially expected.

Justify your answer: Is it better to write a long, complex program all at once or to debug in stages?

Debugging in stages is more efficient because it allows the programmer to verify that each small section of code works correctly before adding more complexity.

What might happen if a programmer ignores a minor bug during the development phase?

The minor bug could cause unexpected 'cascading' failures later on, making the program unstable or causing it to crash when integrated with other features.

Compare and contrast: How is debugging similar to solving a mystery?

Like a mystery, debugging requires gathering clues (error messages), forming hypotheses about the cause, and testing those hypotheses to find the truth.

What is an algorithm in the context of debugging?

An algorithm is the sequence of instructions designed to perform a task; debugging often involves re-evaluating these instructions to ensure they are in the correct order.

Why do programmers often 'comment out' lines of code during the debugging process?

Commenting out code allows a programmer to temporarily ignore specific lines to see if they are the source of the error without deleting the work entirely.