

Name: _____ Date: _____

Glitch Hunter: An Advanced 7th Grade Logic Expedition

Recursive patterns, Boolean logic, and scope inheritance — essential tools for architecting sophisticated digital solutions and debugging complex systems.

1. Imagine you are designing a navigation system for a Mars Rover. You need a structure that continuously checks the battery level and only proceeds with the mission if power is above 15%. If it drops below that, the rover must switch to 'Sleep Mode.' Which programming concept best handles this continuous checking and branching?

- A. A static variable assigned at launch
- B. A nested loop with global scope
- C. A conditional statement inside a loop
- D. A one-time function call in the setup

2. In advanced software architecture, utilizing 'Functions' is considered inefficient because it forces the computer to jump to different memory locations, which significantly slows down complex 7th-grade level algorithms.

- A. True
- B. False

3. You define a variable named 'playerHealth' inside a specific function called 'StartBattle'. When you try to access 'playerHealth' from a different function called 'EndGame', the program crashes. This is because the variable has a limited ____.

- A. Data Type
- B. Local Scope
- C. Iterative Value
- D. System Memory

4. Environmental scientists use code to simulate forest growth. If they want to simulate the growth of 1,000 different trees, and for each tree, they must simulate 50 years of growth, what is the most efficient way to structure the logic?

- A. Create 50,000 independent variables
- B. A single while loop that runs 50 times
- C. A nested loop (a loop within a loop)
- D. A conditional staircase with 50 branches

5. A programmer is writing a script for a smart thermostat. They use the statement: 'IF humidity > 60 AND temp > 75 THEN start_AC()'. The use of 'AND' here is an example of a ____ operator used to combine multiple conditions.

- A. Boolean
- B. Arithmetic

Name: _____ **Date:** _____

- C. Variable
- D. Recursive

6. An 'Infinite Loop' is a common logic error where the exit condition of a loop is never met, causing the program to run indefinitely until it is force-closed or the system crashes.

- A. True
- B. False

7. In a social media algorithm, you need to calculate the 'Engagement Score' for a post multiple times throughout the day based on different user interactions. Instead of writing the calculation logic 20 different times, you should use a:

- A. Global Variable
- B. Function
- C. Constant
- D. Boolean Flag

8. You are creating a banking app. When a user tries to withdraw money, the system must perform a check: IF balance \geq withdrawal_amount. This process of the CPU choosing between two different paths of execution is called ____.

- A. Iteration
- B. Selection
- C. Initialization
- D. Concatenation

9. A 'Variable' in programming can only store numerical values like integers or decimals; storing text or 'Yes/No' values requires a different concept called a 'Function'.

- A. True
- B. False

10. Consider an AI that sorts recycling. It has a list of items. It takes the first item, checks it, moves to the second, checks it, and so on until the box is empty. This 'step-by-step through a list' process is known as:

- A. Binary Variable Mapping
- B. Iterative Array Processing
- C. Function Overloading
- D. Conditional Logic Nesting