

Name: _____ **Date:** _____

Glitch in the Matrix: 7th Grade Algorithmic Logic Quest

Evaluate multi-step heuristic efficiency and troubleshoot recursive simulations through high-level computational thinking exercises.

1. You are designing a routing algorithm for a global delivery drone. To ensure the drone finds the fastest path through a shifting wind storm while avoiding skyscrapers, which advanced strategy is most vital?

- A. Linear iteration of all possible global coordinates
- B. Heuristic-based search to prioritize paths closer to the destination
- C. Alphabetical sorting of all city landmarks
- D. Randomized movement to ensure no predicted patterns are followed

2. When a developer analyzes how the execution time of an algorithm grows as the input size increases toward infinity, they are measuring _____.

- A. User Interface responsiveness
- B. Computational complexity
- C. Storage capacity
- D. Peripheral throughput

3. A 'Greedy Algorithm' always produces the globally optimal solution for any complex problem because it makes the best choice at each small step.

- A. True
- B. False

4. You are creating an algorithm for a Smart Home system to manage energy consumption. The system should prioritize high-power appliances only when solar production is above 80%. Which logic structure is being used?

- A. Infinite recursive loop
- B. Conditional Branching
- C. LIFO (Last In, First Out) Data Stack
- D. Linear Sequence without parameters

5. In a simulation of a colony of ants, each individual ant follows a set of simple rules to perform complex tasks. This is an example of _____ behavior in algorithm design.

- A. Emergent
- B. Monolithic
- C. Stagnant
- D. Synchronous

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6. Abstraction is the process of hiding the complex background details of an algorithm and focusing only on the high-level logic needed to solve the problem.

- A. True
- B. False

7. To optimize a search engine for a library containing 10 billion research papers, which data structure would provide the fastest access to a specific keyword?

- A. An unsorted linked list
- B. A standard array
- C. An inverted index (map)
- D. A circular queue

8. An algorithm that calls itself within its own definition to solve smaller versions of the same problem is known as a _____ function.

- A. Static
- B. Recursive
- C. Boolean
- D. Refractive

9. Standard algorithmic testing only requires checking if the code works with 'perfect' data that follows all instructions.

- A. True
- B. False

10. In 'Parallel Processing,' how is an algorithm's execution changed to improve efficiency over a large dataset?

- A. It executes tasks one by one in a single line.
- B. It repeats the same step until the computer overheats.
- C. It splits the problem into sub-tasks performed simultaneously on multiple processors.
- D. It deletes half the data to make the processing time faster.