Name: _____ **Date:** _____

Answer Key: Blueprint Architect: 5th Grade Logical Scaffolding Quiz

Students dismantle towering computational puzzles and construct sturdy, efficient pathways to solve high-stakes automation challenges through rigorous mental modeling.

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1. A city needs an automated system to sort recycling. To create an efficient algorithm, which sub-problem should you solve FIRST?

Answer: B) Identifying the material type of a single item

Problem decomposition requires identifying the core action that must happen repeatedly; identifying the material is the essential first step to sorting.

2. True or False: If two different algorithms provide the correct answer to a problem, they are considered equally 'good' even if one takes 100 more steps than the other.

Answer: B) False

Efficiency is a key part of algorithm design. An algorithm that takes fewer steps is more optimized and generally preferred in computer science.

3. When designing a system for a solar-powered rover, checking the battery level before every movement is an example of a physical _____.

Answer: C) Conditional logic step

Algorithms use conditions (if/then) to make decisions based on changing data, like battery levels, to ensure the outcome is safe and successful.

4. You are writing steps for a robot to navigate a library. The robot keeps hitting a wall because it turns left 90 degrees instead of 45. What process are you performing when you find and fix this error?

Answer: B) Debugging

Debugging is the specific process of testing an algorithm, identifying where it fails to meet the goal, and correcting the logic.

5. To find a specific book in an unorganized pile of 500 books by checking them one by one, you are using a technique called _____ search.

Answer: A) Linear

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A linear search checks every item in a sequence until the target is found, which is thorough but often less efficient than other methods.

6. True or False: Breaking a large project into smaller parts (decomposition) makes it easier to assign specific tasks to different team members.

Answer: A) True

Decomposition allows complex systems to be built in parallel by different people, as each small piece can be designed and tested independently.

7. In a logistics algorithm designed to deliver packages, which factor would be the MOST important 'efficiency consideration' for a delivery drone?

Answer: C) The total distance traveled to all stops

Minimizing distance directly relates to time and energy efficiency, which are the primary goals when optimizing navigation algorithms.

8. An algorithm that repeats a set of instructions until a specific goal is met (like 'stir until smooth') is using a technical structure called a _____.

Answer: B) Loop

Loops are fundamental structures in algorithm design that allow for the efficient repetition of tasks without writing the same instruction multiple times.

9. True or False: In a 'Search' algorithm, 'Input' refers to the information the computer outputs after it finds a solution.

Answer: B) False

Input refers to the data provided to the algorithm (like the list to be searched), whereas the result found is called the output.

10. If you are designing a high-speed traffic light system, why is it critical to test 'edge cases,' such as what happens during a power outage?

Answer: B) To ensure the algorithm handles unusual but dangerous situations safely

Advanced algorithm testing involves looking at extreme or rare 'edge cases' to ensure the logic doesn't break when something unexpected occurs.