Name: _____ **Date:** _____

Answer Key: Wrangle Robot Logic: Advanced 3rd Grade Algorithm Quiz

Students build computational fluency by architecting complex instructions for space missions and botanical growth cycles.

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1. You are designing an algorithm for a robot to plant a community garden. If you want the robot to plant a seed only when it finds an empty hole, which logic component are you using?

Answer: B) Conditional branching (If-Then)

Conditional branching allows an algorithm to make decisions based on specific criteria, such as whether a hole is empty or full.

2. In computational thinking, 'Decomposition' means breaking a large goal, like 'Building a Mars Rover,' into smaller tasks like 'Designing the Wheels.'

Answer: A) True

Decomposition is the process of breaking complex problems into smaller, manageable sub-problems to make them easier to solve.

3. When an architect draws a floor plan before building a house, they are creating a structural _____, which is similar to an algorithm's design phase.

Answer: C) Blueprint

A blueprint serves as a structured sequence of steps or a 'map' for the final product, mirroring how an algorithm guides a computer.

4. An algorithm for a self-driving car in a snowy city must prioritize 'Safety' over 'Speed.' This is an example of what advanced algorithm concept?

Answer: A) Algorithm efficiency and constraints

Efficiency isn't just about speed; it includes working within constraints—like safety rules—to find the best possible solution.

5. If a baker's recipe for 'Supernova Cake' results in a salty cake, the baker must find the mistake in the steps. In computer science, this is called _____.

Answer: C) Debugging

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Debugging is the systematic process of finding and fixing errors within an algorithm or program.

6. An efficient algorithm is one that takes the longest possible number of steps to reach a correct answer.

Answer: B) False

Efficiency in algorithms means reaching the correct solution using the fewest resources, such as time or computer memory.

7. You are organizing a library with 1,000 books. Instead of checking every book one by one, you split the library into 'Fiction' and 'Non-Fiction' first. What are you doing?

Answer: B) Optimizing a search algorithm

By categorizing first, you reduce the number of steps required to find a specific item, making the search algorithm more efficient.

8. In a video game, the computer follows a _____ to decide how an enemy character moves when it sees the player.

Answer: D) Logical sequence

Enemy AI uses a logical sequence of steps (an algorithm) to respond to the player's actions in real-time.

9. If an algorithm for an umbrella-bot says 'Open if it is raining', and it is sunny out, the umbrella-bot will stay closed.

Answer: A) True

Because the condition 'is it raining' is False, the 'Open' action will not be triggered by the algorithm.

10. Which of these is the MOST complex sub-problem when decomposing the task: 'Host a Virtual Talent Show'?

Answer: C) Coding a voting system for the audience

Creating a voting system requires complex algorithm design including logic, data storage, and user input, making it a significant sub-problem.