Name: _____ **Date:** _____

Answer Key: Your Blueprint for Digital Choreography: 6th Grade Algorithm Quiz

Students construct logical sequences for autonomous vehicles and automated kitchen systems while analyzing how conditional logic prevents real-world system failures.

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1. An engineer is designing a smart thermostat. They decide to tackle the temperature sensor script, the WiFi connection module, and the user interface display separately. Which computational thinking pillar are they practicing?

Answer: B) Problem Decomposition

Decomposition involves breaking a large, complex problem (the thermostat) into smaller, more manageable sub-problems.

2. A logical error in an algorithm, such as an infinite loop, will always cause the computer hardware to catch on fire physically.

Answer: B) False

Logical errors or 'bugs' affect the software's behavior or efficiency, but modern computer hardware is designed with safety features to prevent physical fire from software loops.

3. Imagine an algorithm for an automated plant waterer. If the sensor reads 'dry' AND the clock says '6:00 AM', then water the plant. This 'IF-THEN' structure is known as a _____.

Answer: C) Conditional Statement

Conditionals allow an algorithm to make decisions based on specific criteria or inputs.

4. A drone's navigation algorithm is failing to avoid tall trees. After investigating, the programmer finds that the drone ignores any object taller than 10 meters. What stage of the problem-solving process is the programmer currently in?

Answer: C) Debugging

Debugging is the specific process of identifying, tracing, and fixing errors (bugs) within an existing algorithm.

5. In computer science, 'efficiency' refers only to how much electricity the computer uses while running the program.

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Answer: B) False

Efficiency primarily refers to time complexity (how fast it runs) and space complexity (how much memory it uses).

6. When a music app suggests a new song based on what you previously liked, it is using a(n) _____ to analyze your listening habits and provide a result.

Answer: A) Algorithm

An algorithm is a set of rules or steps followed by a computer to perform a task, such as recommending music.

7. You are creating a game where a character must find a key in one of 1,000 locked boxes. Which method of searching would be the LEAST efficient?

Answer: A) Opening boxes at random

Random searching has no logical structure and may result in checking the same box twice, making it the least efficient method.

8. Before writing code for a self-driving car, engineers often write out the steps in 'pseudocode,' which is a plain-language version of the algorithm.

Answer: A) True

Pseudocode helps programmers plan the logic of their algorithm without worrying about specific programming language syntax.

9. If an algorithm is designed to repeat a specific set of instructions until a goal is reached (like a robot vacuum cleaning until the battery is at 5%), this repetition is called a _____.

Answer: C) Loop

Loops (iteration) allow algorithms to repeat tasks efficiently until a certain condition is met.

10. NASA engineers are optimizing the landing sequence for a Mars rover. They find that 'Algorithm A' takes 10 seconds to calculate, while 'Algorithm B' takes 2 seconds using the same data. Why would they choose 'Algorithm B'?

Answer: A) It has better time complexity and efficiency

Choosing the faster algorithm for time-sensitive tasks is a core part of evaluating algorithmic efficiency.