

## Think You Can Outsmart the Logic? 6th Grade Code Master Challenge

Navigate 10 high-level logic puzzles requiring recursive analysis and sequence evaluation to prove your algorithmic thinking skills.

---

**1. Scenario: An autonomous drone uses a variable 'altitude'. If the drone must maintain a height between 50m and 100m, which complex conditional logic correctly handles a sudden descent to 45m?**

- A. If altitude < 50, decrease power to descend further.
- B. If altitude < 50 AND altitude > 100, trigger emergency landing.
- C. If altitude < 50, increment power until altitude  $\geq 50$ .
- D. If altitude == 50 OR altitude == 100, shut down all systems.

**2. Refined functions allow a programmer to update a specific calculation in one location, and that change will automatically apply every time the function is called throughout the program.**

- A. True
- B. False

**3. If a Smart Home system uses a loop to check 50 different security sensors every second, what is the most likely 'exit condition' for that loop to stop running?**

- A. When the sensor count reaches 0
- B. When the variable 'systemActive' becomes False
- C. When a single sensor detects motion
- D. When the user opens the mobile app

**4. Analyze this logic: A digital library sets 'access' to True only if (hasSubscription == True OR dayPass == True) AND (userIsBanned == False). Who can enter?**

- A. A subscriber who has been banned for late returns.
- B. A guest with a dayPass who is not banned.
- C. A regular user with no subscription and no dayPass.
- D. Anyone with a dayPass, regardless of their ban status.

**5. In a physics simulation, a variable named 'gravity' is set to 9.8. If the programmer changes this to 1.6 to simulate the Moon, why is it better to use a variable than typing '9.8' manually 100 times?**

- A. Variables make the code execute faster.
- B. It prevents 'hard-coding' errors and improves scalability.
- C. Computers cannot read numbers unless they are variables.
- D. Variables automatically calculate the Moon's weight.

**6. An 'Infinite Loop' is a programming error that occurs when the condition to stop a loop is never met, potentially causing the system to crash.**

- A. True

Name: \_\_\_\_\_

Date: \_\_\_\_\_

B. False

**7. You are designing a traffic light controller. Which programming concept is BEST for ensuring the light changes from Green to Yellow to Red in a specific, timed sequence?**

- A. A single variable labeled 'Color'.
- B. A function that only runs once during the day.
- C. A conditional that only checks if it is raining.
- D. A loop containing nested conditionals and timers.

**8. When a function requires specific information to perform its task—like a 'send\_email' function needing an 'address'—that piece of information is called a/an \_\_\_\_\_.**

- A. Instruction
- B. Output
- C. Parameter
- D. Loop-hole

**9. If you are debugging a program where a character moves left even when you press the 'Right' key, which part of the code is most likely broken?**

- A. The variable initialization.
- B. The conditional logic inside the input handler.
- C. The function that deletes the character.
- D. The loop speed controller.

**10. In 6th-grade programming terms, 'nested' code refers to placing one structure (like an 'if' statement) inside another structure (like a 'loop').**

- A. True
- B. False