Name: _____ **Date:** _____

Do You Have the Logic to Architect This Grade 12 Advanced Code?

Evaluate high-level algorithmic patterns and memory management through code synthesis exercises designed for future software engineers.

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1. Which programming paradigm focuses on the use of 'Pure Functions' to ensure that the output is determined solely by input values without observable side effects?

A. Imperative Programming
B. Functional Programming
C. Object-Oriented Programming
D. Procedural Programming

2. In the context of Big O notation and algorithm efficiency, a nested loop structure where the inner loop depends on the outer loop's size typically results in a time complexity of _____.

A. O(log n)
B. O(n)
C. O(n^2)
D. O(1)

3. Recursion is always more space-efficient than iterative loops because it leverages the call stack to manage local variables.

A. True
B. False

4. Consider a scenario where you must pass a large object to a function. Which method prevents the creation of a local copy, thereby optimizing memory usage in languages like C++?

A. Pass-by-value
B. Pass-by-reference
C. Global instantiation
D. Encapsulation

5. Which conditional logic structure is best suited for scenarios with a high number of discrete, mutually exclusive constant values to improve readability and potentially performance via jump tables?

A. Ternary operator
B. If-else if ladder
C. Switch/Case statement
D. Boolean toggle

6. The concept of 'Scope' refers to the visibility of variables. A variable defined inside a function that cannot be accessed outside of it is known as a _____ variable.

A. Global

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B. Static
C. Constant
D. Local

7. In short-circuit evaluation of a logical AND (&&) operation, if the first condition is false, the second condition is never evaluated.

A. True
B. False

8. In object-oriented design, what is the process of hiding the internal details of a function's implementation while only showing the necessary interface to the user?

A. Inheritance
B. Polymorphism
C. Abstraction
D. Recursion

9. A loop that fails to reach its termination condition and continues to execute indefinitely is referred to as an _____ loop.

A. Recursive
B. Infinite
C. Nested
D. Null

10. A 'Function' can only return a single primitive data value, and never an object or a pointer to a memory address.

A. True
B. False