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1. Write a simple algorithm for finding the maximum of three numbers using pseudo code.

```
START
  INPUT num1, num2, num3
  IF num1 > num2 AND num1 > num3 THEN
    max ← num1
  ELSE IF num2 > num1 AND num2 > num3 THEN
    max ← num2
  ELSE
    max ← num3
  ENDIF
  OUTPUT max
END
```

2. Compare and contrast two different programming languages, highlighting their strengths and weaknesses.

Aspect	Python	Java
Ease of Use	Simple syntax, beginner-friendly.	Verbose syntax, steeper learning curve.
Performance	Slower due to interpretation.	Faster due to Just-In-Time (JIT) compilation.
Typing	Dynamically typed.	Statically typed.
Platform	Platform-independent, runs via CPython.	Platform-independent via JVM.
Use Cases	Data science, web development, scripting.	Enterprise applications, Android apps.
Error Handling	Runtime errors due to dynamic typing.	Errors caught during compile-time.

Strengths of Python: Easier to write and read, suitable for rapid prototyping.
Strengths of Java: High performance, robust, better for large-scale applications.

3. Explain the compilation process and how it differs from interpretation.

Compilation:

- Converts source code into machine code.
- Creates an executable file.
- Errors are detected during the compilation phase.
- Example: C, C++.

Interpretation:

- Executes code line by line.
- No intermediate machine code is generated.
- Errors are detected during runtime.
- Example: Python, JavaScript.

Key Difference: Compilation produces a complete executable before running, whereas interpretation directly executes the code.

4. Create a flowchart for a program that calculates the factorial of a given number.

[Start] → [Input Number n] → [Initialize result = 1]
↓
[Is n > 1?] → Yes → [result = result * n, n = n - 1] → Loop
↓
No
[Output result] → [End]

5. Write a function in your preferred programming language to calculate the area of a rectangle.

```
def area(length, width):
    if length <= 0 or width <= 0:
        return "Length and width must be positive values."
    return length * width

a = area(5, 10)
print(f"The area of the rectangle is {a}.")
```