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Practice Questions for Students

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

```
Input: num1, num2, num3 (three numbers)

Output: max (the maximum of the three numbers)

Begin

max ← num1

If num2 > max Then

       max ← num2

End If If num3 > max Then

      max ← num3

End If Return max

End
```

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

Feature	Python	C++
Syntax	Python has simple, clean, and highly readable syntax, making it beginner-friendly.	C++ has more complex syntax with many low-level programming constructs, making it harder for beginners.

Performance	Slower execution due to being an interpreted language.	Faster execution as it is a compiled language with direct memory management.
Ease of Use	Focuses on simplicity and ease of learning, suitable for quick prototyping.	Offers flexibility and power for complex, performance-critical applications.
Memory Management	Abstracted with automatic garbage collection.	Manual memory management with constructs like pointers and destructors.
Library Support	Rich standard library and extensive third-party packages via PyPI.	Standard Template Library (STL) provides robust containers, algorithms, and utilities.
Typing	Dynamically typed, making development faster but prone to runtime errors.	Statically typed, ensuring type safety and better error detection during compilation.
Application Areas	Ideal for web development, data science, machine learning, scripting, and rapid prototyping.	Suitable for system-level programming, game development, real-time systems, and high-performance tasks.
Community Support	Large and active community with many learning resources.	Strong community, especially among system programmers and game developers.
Debugging and Testing	Easier to debug and test due to its simplicity and rich debugging tools.	Debugging can be complex due to intricate syntax and memory-related issues.

Cross-Platform Support	Portable and easily runs on multiple platforms using interpreters.	Portable but requires recompilation for different platforms.

Strengths of Python

1. **Ease of Use**
2. **Rapid Development**
3. **Rich Ecosystem**

Weaknesses of Python

1. **Performance**:
2. **Limited Control**

Strengths of C++

1. **Performance**
2. **Flexibility**
3. **Object-Oriented Features**:

Weaknesses of C++

1. **Complexity**:
2. **Error-Prone**:

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

Compilation:

- Translates the entire source code into machine code before execution.
- Produces an executable file.
- Faster during runtime since code is precompiled.
- Example languages: C, Java (bytecode compiled).

Interpretation:

- Translates code line-by-line during execution.
- No separate executable file.
- Slower during runtime due to real-time translation.
- Example languages: Python, JavaScript.

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

```
 Start

 Input the number N

Initialize Factorial = 1

 If N > 0:

Multiply Factorial = Factorial * N

Decrease N = N - 1

Repeat step 4.

Output Factorial

End
```

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

```
l =int(input("lenght:"))

b= int(input("breath:"))

area = l*b

print(area)
```