Practice Questions for Students:

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

Algorithm to FindMaximumOfThree numbers

Input: Three numbers A, B, and C

Output: The maximum of A, B, and C

Step 1: Start

Step 2: Read A, B, C

Step 3: Set Max = A

Step 4: If B > Max, then set Max = B

Step 5: If C > Max, then set Max = C

Step 6: Output "The maximum number is:", Max

Step 7: Stop

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

Here's the comparison of **Python** and **C++**:

Python

Strengths:

1. **Easy to Learn:** Its code looks like English, so it's great for beginners.
2. **Lots of Ready Tools:** It has many libraries for tasks like AI, data science, and web development.
3. **Quick to Write:** You don't need to define variable types, saving time.
4. **Works Everywhere:** Python can run on almost any device.

Weaknesses

1. **Slow:** It's not as fast as C++ because it's interpreted.
2. **Not for Hardware Stuff:** Can't handle low-level tasks like controlling hardware.
3. **Errors Happen Late:** Problems often show up only when running the program.

C++

Strengths

1. **Very Fast:** It's a compiled language, so it runs much faster than Python.
2. **Controls Hardware:** Great for systems like operating systems or embedded systems.
3. **Better Control:** Lets you manage memory and resources directly.
4. **Good for Big Projects:** Supports object-oriented programming, which helps organize complex programs.

Weaknesses

1. **Hard to Learn:** The syntax is complex, and concepts like pointers can be tricky.
2. **Takes Time:** Writing code in C++ takes more effort than Python.
3. **Risk of Errors:** Manual memory management can lead to bugs like memory leaks.

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

Compilation:

- Translates the entire program into machine code **before running**.
- Produces an executable file.
- Faster execution but takes time to compile.
- Example: C, C++.

Interpretation:

- Translates and runs code **line by line** at runtime.
- No executable file is created.
- Slower execution but easier to debug.
- Example: Python, JavaScript.

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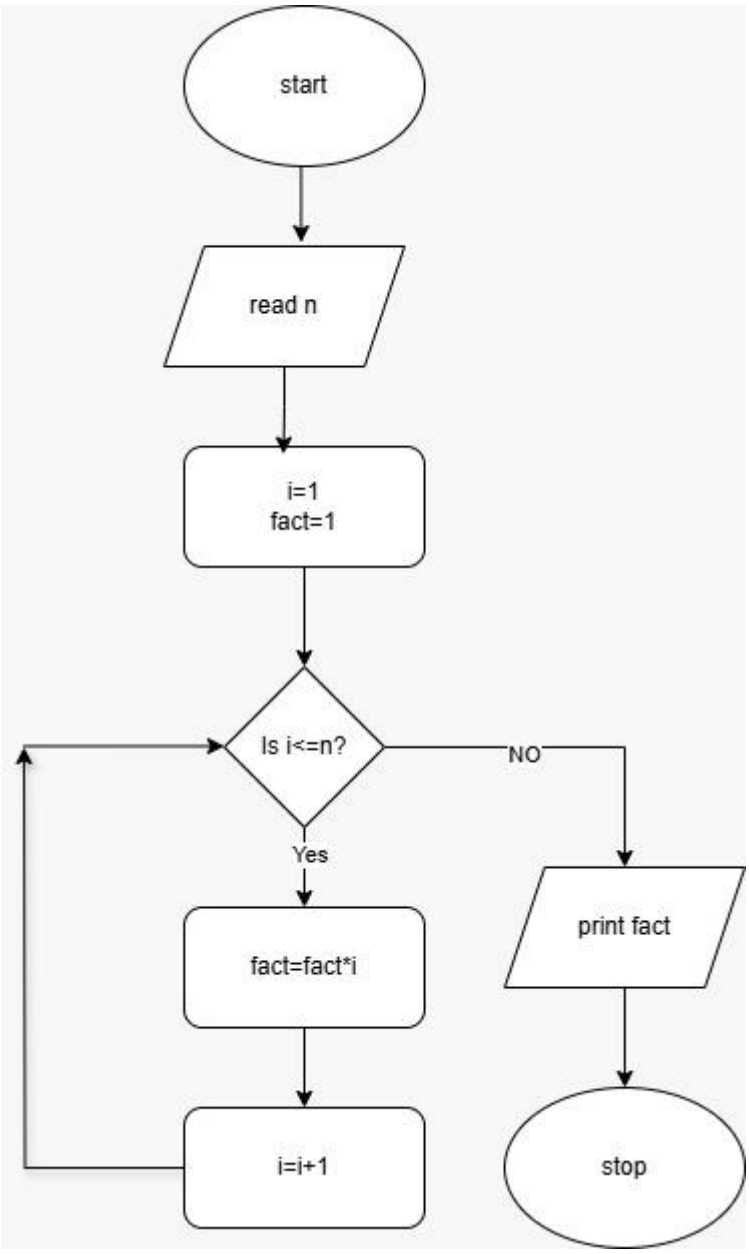
4. Create a flowchart for a program that calculates the factorial of a given number.



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

```
def rectangle_area(length, width):
    return length * width


# Example
print(rectangle_area(5, 3))  # Output: 15
```

This function multiplies length and width to return the area.