AI Programming Best Practices for Prompting (Copilot, ChatGPT, Claude)

1. Be Specific in Your Requests

- **What to do:** Clearly describe the task you want the AI to assist with. Vague prompts lead to generic results.
- **Example Prompt:**
  - *Weak:* "Write some code in Python."
  - *Strong:* "Write a Python function that takes a list of numbers and returns a list of squares of those numbers, excluding any negative values."

2. Break Complex Tasks into Smaller Steps

- **What to do:** For multi-step processes, provide context in increments. AI works best with manageable chunks.
- **Example Prompt:**
  - Start with: "Create a basic class in Python for handling HTTP requests."
  - Follow up with: "Now add methods for GET and POST requests with error handling."

3. Set Constraints and Expectations

- **What to do:** Specify constraints such as runtime, compatibility, libraries, or coding style.
- **Example Prompt:**
  - "Generate a Python script that uses `asyncio` for concurrent tasks, ensuring compatibility with Python 3.9."

4. Iterative Refinement

- **What to do:** Review initial AI responses and refine your prompt if needed. AI tools improve their responses as you give more context.
- **Example Process:**
  - First Prompt: "Write a function to search a file."
  - Refinement: "Write a Python function to search for a keyword in a text file and return the line numbers where the keyword appears."

5. Add a Persona

- **What to do:** Specify the persona for the AI to use.
- **Example Prompt:**
  - "You are a Python and Data Science expert. Write a program that…"

6. Ask for Explanations and Comments

- **What to do:** Request detailed explanations or comments within code to ensure you understand the AI's suggestions.
- **Example Prompt:**

- ▸ "Write a Python function that implements bubble sort, and add inline comments explaining each step."

7. Provide Contextual Examples

- **What to do:** When prompting for a coding solution, provide examples of expected input and output to guide the AI more precisely.
- **Example Prompt:**
  - ▸ "Write a function to convert temperature from Celsius to Fahrenheit. For example, input 0°C should return 32°F."

8. Use AI to Explore Alternatives

- **What to do:** Ask the AI to offer alternative solutions, allowing you to compare different methods.
- **Example Prompt:**
  - ▸ "Can you show me another way to handle this recursion problem without using recursion?"

9. Generate Unit Tests Alongside Code

- **What to do:** After generating a function, prompt the AI to create unit tests to validate the code.
- **Example Prompt:**
  - ▸ "Generate unit tests for this function using `pytest` to ensure all edge cases are covered."

10. Verify, Don't Trust Blindly

- **What to do:** Always test and verify AI-generated code for accuracy and edge cases. AI tools can suggest code that appears correct but may miss subtle bugs.
- **Example Practice:** Run the generated code through linters, type checkers, or your CI pipeline to ensure quality.