**Practical Exercise 2**

**The "AI Assistant" Challenge**

**Objective:** Students will act as a prompt engineer to create an "AI Assistant" that can perform a specific task by utilizing and combining various prompting techniques.

**Instructions:**

1. **Choose Your Assistant's Persona and Task:**
   * Select a role for your AI Assistant (e.g., a travel agent, a personal chef, a coding tutor, a movie critic).
   * Define a specific, measurable task for your assistant (e.g., "Create a 3-day travel itinerary for a family of four visiting Paris, France," or "Generate a healthy 7-day meal plan for someone with a gluten allergy").
2. **Develop Your Prompts:**
   * **Phase 1: Zero-Shot Prompting.** Create a single prompt without any examples to try and get the desired output. Note the results and any shortcomings.
   * **Phase 2: Few-Shot Prompting.** Provide at least three examples to the model to demonstrate the desired output structure, tone, or content. Explain why you chose these specific examples and how they guide the model.
   * **Phase 3: System, Contextual, and Role Prompting.**
     + Write a

**system prompt** that defines the assistant's overall purpose and output requirements (e.g., "Always return your response in a numbered list," or "Only provide output in a JSON format").

* + - Craft a

**role prompt** that assigns the specific persona you chose in Step 1 (e.g., "You are a friendly and knowledgeable travel guide").

* + - Incorporate a
    - **Step-back Prompting:** Ask a more general question first, and then use the answer from that general question to inform a more specific prompt.
    - **ReAct (Reason & Act):** If using an agent-based system, instruct the model to reason about the problem and then **contextual prompt** that provides specific, dynamic information related to the current task (e.g., details about the users' dietary restrictions, age of the kids, etc.).
  + **Phase 4: Reasoning Techniques.** Apply at least one of the following advanced techniques to improve your prompt:
    - **Chain of Thought (CoT):** Instruct the model to "think step-by-step" before providing the final answer. This is especially useful for tasks that require a sequence of reasoning.
    - act by using a tool (like search) to find the information it needs.

1. **Incorporate Multimodal Prompting (Optional/Advanced):**
   * For a more advanced exercise, think about how you could use multimodal input to improve your assistant. For example, if your assistant is a personal trainer, you could include an image of a person's current physical state in the prompt and ask for a workout plan tailored to that image. Describe how including a visual input would change the model's output.
2. **Analyze and Deliver:**
   * For each prompt you create, document the results, including the output and a short analysis of why it succeeded or failed.
   * Compare the outputs from your various prompting techniques. Which one performed best for your task? Why?
   * Prepare a short presentation or a written report to present your findings to the class, showing the evolution of your prompts and the final result of your AI Assistant.