**Project Title**: AI Chatbot to Help Students Revise for Exams

**Chosen Use Case**:  
The chatbot helps students revise for exams by generating multiple-choice questions (MCQs), flashcards, or summaries based on a given topic. It uses AI to understand the input, track the revision state, plan the next task, and generate clear, helpful content.

**Prompt Design: 4 Layers**

1. **Input Understanding**
   * **Prompt**:

"A student just typed: ‘Give me MCQs on photosynthesis.’ What is the user asking for? Identify the topic, subject (if any), and type of content expected."

* + **Expected Output**:
  + {
  + "topic": "photosynthesis",
  + "subject": "biology",
  + "content\_type": "MCQ"
  + }

1. **State Tracker**
   * **Prompt**:

"Update the session memory. If the user has already studied biology earlier, keep track of completed topics. If new, start tracking the topic."

* + **Expected Output**:
  + {
  + "subject": "biology",
  + "topics\_covered": ["photosynthesis"],
  + "content\_types\_used": ["MCQ"]
  + }

1. **Task Planner**
   * **Prompt**:

"The user wants MCQs on photosynthesis. Plan the task into steps. Assume access to a biology knowledge base."

* + **Expected Output**:
    1. Search biology database for core concepts of photosynthesis
    2. Generate 5 multiple-choice questions with 4 options each
    3. Mark the correct answer
    4. Provide one-line explanations (optional)

1. **Output Generator**
   * **Prompt**:

"Based on the topic 'photosynthesis', generate 5 MCQs with 4 options each. Format neatly, highlight the correct answer, and optionally add 1-line explanations."

* + **Expected Output**:

**MCQ 1:** What is the main site of photosynthesis in a plant?  
A) Root  
B) Stem  
✅ C) Leaf  
D) Flower  
📌 *Explanation: Leaves contain chloroplasts which carry out photosynthesis.*

**ChatGPT Interactions (Logs)**:

* User: Give me MCQs on photosynthesis
* ChatGPT: Identified topic as "photosynthesis" and subject as "biology"
* ChatGPT generated 5 MCQs with correct options and explanations

**Learnings & Obstacles**:

* **Learned** how layered prompting improves control and clarity.
* **Stuck** initially on how to extract intent from mixed user input (e.g., "Revise chapter 2 for biology paper").
* **Solution**: Added prompt conditioning and fuzzy keyword matching using in and .lower() in Python parsing logic.

**Code Sample (Python prototype)**:

from typing import Dict

def extract\_request(input\_text: str) -> Dict:

input\_text = input\_text.lower()

if "mcq" in input\_text:

content\_type = "MCQ"

elif "flashcard" in input\_text:

content\_type = "flashcard"

else:

content\_type = "summary"

# crude topic extraction (custom LLM logic can replace this)

words = input\_text.split(" on ")

topic = words[1] if len(words) > 1 else "unknown"

return {

"topic": topic.strip(),

"subject": "biology", # default for test case

"content\_type": content\_type

}

**System Messages**:

* Prompted GPT-4 with roles: "You are an exam revision agent that provides accurate and student-friendly revision material for any topic."