**Code Design and Implementation Process:**

The general design framework for the MCQ application goes as specified in Figure 1

A diagram of a process

Description automatically generated

Figure Modules used in the MCQ application.

For the first step, I prepared the prompt template that will be passed for the Chat OpenAI library by the Langchain module the prompt template follows the following format:

template = """

        You are an expert quiz maker.

        create a quiz with {num\_questions} Multiple-choice questions about the following topic: {quiz\_topic}.

        The format of the output will be returned as: json object only with keys: Q1, O1, A1 without any other text

        <Q1>: Question1

        <O1>: <a. Answer 1>| <b. Answer 2>| <c. Answer 3>| <d. Answer 4>

        <A1>: <a|b|c|d>

        <Q2>: Question2

        <O2>: <a. Answer 1>| <b. Answer 2>| <c. Answer 3>| <d. Answer 4>

        <A2>: <a|b|c|d>

    """

The prompt asks the LLM to return the questions, the answer choices, and the correct answers in a JSON format to be convenient for parsing later in the code.

After that, I prepared some utility functions that help in different tasks. Convert choices to indices, Create the chain for the quiz app, function to display the questions and choices as well, and compare the picked answer with the correct answer to track the score. Then before starting the core code, I set up initial values for streamlit session states.

The main code goes as follows:

1- create the quiz prompt template()

2- create ChatOpenAI() Instance

3- create a quiz chain

4- accept the topic and number of questions from the user

5- each time the generate question button is pressed :

1-run the chain

2- save the result as python dict on the session state

3-Parse questions and answers from the saved result

4-loop through each question and choice and display them

5- compare selected answers with the correct answer

6- display the score result

7- display correct answers

**User guide:**

1. input the topic in the specified field.
2. Input the number of the required questions in the specified field.
3. Press on ‘generate quiz’ to get your quiz.
4. Answer the question by choosing one choice for each question.
5. Get your result by pressing the result button.
6. You can check the correct answers with the answers button.