Week 2 Quiz 2

1. When prompting an LLM to generate a query for your database, which of the following would it help to include in your prompt to improve the quality of the results. Select all that apply.

   - Assign a role to the LLM, for example a database querying expert

     Assigning a relevant role can often lead to higher quality results

   - Include the schema of your database

     Providing the schema of your database will help the LLM write queries that will correctly use it

   - Include the library you will use for querying, for example SQLAlchemy

     Details like this can help an LLM use the correct libraries when writing your queries

   - The contents of your database in an easily shareable format like CSV or JSON

2. Which of the following best describes the benefits of indexing columns in a database?

   - Indexing generally cannot improve the performance of an application.
   - Indexing additional columns will always result in greater application performance
   - Column indexing decisions made by LLMs can be trusted without testing
   - Indexing, when done sparingly and with attention to properties of the column data, can result in better performing applications

     Indexing can often yield performance boosts if done sparingly and with attention to the properties of the columns being indexed.

3. Which of the following best describes query caching?

   - Query caching stores all SQL queries made on a database to help identify the most common queries that are called
   - Query caching stores the results of queries, potentially saving resources that would be used to run commonly-called but expensive queries
   - Query caching saves the state of the database at different points in time so that the same queries can be run on historical versions of your data
   - Query caching stores smaller chunks of your database in order to speed up expensive queries by running them on a smaller amount of data

     Query caching stores the results of queries so that they can be returned when that query is received again without actually performing the query in your database. Especially with commonly-called an expensive queries, this practice can save resources and improve application performance.

4. When debugging your database, which processes is an LLM able to support you with?

   - Translating the results of an EXPLAIN query to a more human-readable format to help you interpret result

     As shown in the lecture, LLMs can support you with this process

   - Running test queries on your database for you to identify unexpected behavior
   - Brainstorm potential libraries and commands that can be used to brainstorm various issues

     As in many programming contexts, brainstorming potential solutions to problems is an area where LLMs are very capable.

   - Rewriting parts of your code to implement useful debugging features like logging

     LLMs will be able to help rewrite your code to implement useful features like logging at your direction.

5. What debugging process is the following code designed to implement?

```python
def explain_query(query):
    result = session.execute(text(f"EXPLAIN {query}"))
    return result.fetchall()

query = "SELECT * FROM users WHERE id = 1"
explain_result = explain_query(query)
print(explain_result)
```

   - Logging queries to a file to be reviewed later
   - List the order in which a query accesses tables
   - Identify records in a table that make duplicate use of the same unique id
   - Cache the results of the provided query to be accessed later

     The EXPLAIN command does exactly this, helping reveal the execution plan of your query.