Vision for NSU.CS Team Project

Team composition:
- Sidorenko Sofia, 24215
- Munkuev Vladislav, 24215
- Obraztsov Dmitry, 24214
- Romanenko Nikita, 24214

1. Project topic and description

A columnar SQLite-like database. As part of the project, it is necessary to implement a custom columnar SQLite-like JDBC driver.

2. What problem are we solving?

In many small applications, using full-fledged server-based DBMSs is excessive: they require a separate process, configuration, and maintenance, while developers still need a convenient and familiar SQL interface for querying and filtering data. Existing embedded solutions like SQLite solve part of the problem but store data row-wise, which is inefficient and increases storage size. Therefore, there is a need for a lightweight driver without a separate server that provides SQL-like access and uses columnar storage for fast reading.

3. Why the problem needs to be solved

In small projects, using a large SQLite application might not be the best use of resources. Therefore, writing a custom, SQLite-like, column-based driver could help optimize resource usage.

4. What is the proposed solution scenario for this software?

- Implement a basic set of database driver functions like CREATE, DROP, SELECT, etc. Data will be stored in JSON format at this stage.
- Add advanced aggregate functions and switch the data storage to a binary format for better performance.
- (Optional) Implement support for JDBC.

5. Expected project result

A custom database similar to sqlite. It should implement some functions that will allow you to work with it quite comfortably and widely.

6. Main functions

The following functions should be implemented during the project:

- basic functions for working with tables (select, update, delete, insert).
- rollup and group by functions (minimum set: sum, count, avg)
- basic operations for creating and managing tables (create table, alter table add column, drop table)
- indexes (minimum balanced binary tree)