**Design Document**

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The Davisbase project is written in java. This project consists of 3 parts, which are defining the datatypes, the file operations, and parsing the queries. For this reason, 3 packages were defined plus an extra “commons” package that has a helper class with different constants and helper methods.

1. **The DataFormat** package defines the required datatypes, their serial types, and comparison operators. It consists of three classes:
2. Datatype: A generic abstract class that implements the Comparable interface and which includes all required datatypes, has utility methods such as toByteArray for converting the data to a byte array to be written into a file without having to check with if statements what type of data it is, and of course the compareTo method, getSerialTypeCode… among others.
3. SerialType: An enum containing all required serial types and functions, plus an utility method for parsing text to a SerialType enum.
4. Operator: An enum containing different comparison operators used at the condition part of the queries. The operators include a compare(Datatype a, Datatype b) method which returns true if the comparison satisfies the operator’s specific condition. The operators included are the following: =, <, <=, >, >=, !=, IS NULL, IS NOT NULL.
5. **The FileFormat** package defines the format of pages and their cell and has a class for manipulating files input and output. It consists of the following three classes:
6. Cell: An abstract cell class that defines the two required types of cells, InteriorCell and LeafCell which have different methods such as computing the size of the cell when written to file (important for computing the offsets).
7. Page: Holds all fields required for reading and writing from/to files including a TreeMap<Integer, Cell> for holding the cells, and a reflective TreeMap<Integer, offset> for holding the cells offset. This way the data is sorted by their keys for easier lookups and to maintain the structure of the page required in the project description.
8. FileOperations: A class with static methods where writing/reading from files happens with java’s RandomAccessFile. This class includes all the methods to perform the required operations, such as insertion, deletion, updates and selection with or without a condition. Insertion is applied using the pseudocode from the book. Deletion simply removes a record and its offset pointer from a page, this simplifies the update operations which consist of a deletion followed by insertion. Note that, since the TEXT datatype is variable, simply changing a record in a cell when doing un update might corrupt the data, therefore the decision to implement updates with deletions followed by insertions was taken.
9. **The Query** package is quite straightforward, it includes classes for parsing different type of queries and then displaying the results. The main classes included in this package are the following:
10. Prompt: simply displays the prompt for user input and executes queries separated by “;” sequentially.
11. QueryEecutor: parses the first few words of the query to check to which type it corresponds (DDL, DML, VDL) and acts accordingly.
12. Error: has static methods for displaying different error messages for user input.
13. TableMetaData: a class that contains the metadata of a given table (its key at the davisbase\_tables.tbl and davisbase\_columns.tbl files, table name and all columns). The metadata of all tables is fetched from the davisbase\_tables.tbl and davisbase\_columns.tbl files at the start of the program.
14. Column: displays column metadata fetched from the davisbase\_columns.tbl file.
15. TableDisplay: Used for displaying a table in the same fashion as in MySQL.

A demo file is included which goes through the different functionalities covered by this implementation of DavisBase.