Petrolink Challenge

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1 Approach

Considering the challenge description, the tasks to perform are:

1. Read data from the provided SQLite database;
2. Perform the Minimum Curvature Method calculations to determine the experienced progress: *i)* Determine Beta, RF; *ii)* Determine North, East and TVD; *iii)* With the Values from *ii*), calculate new coordinates. Repeat from step 1;
3. Output the results in different formats.

1.1 Proposed Architecture

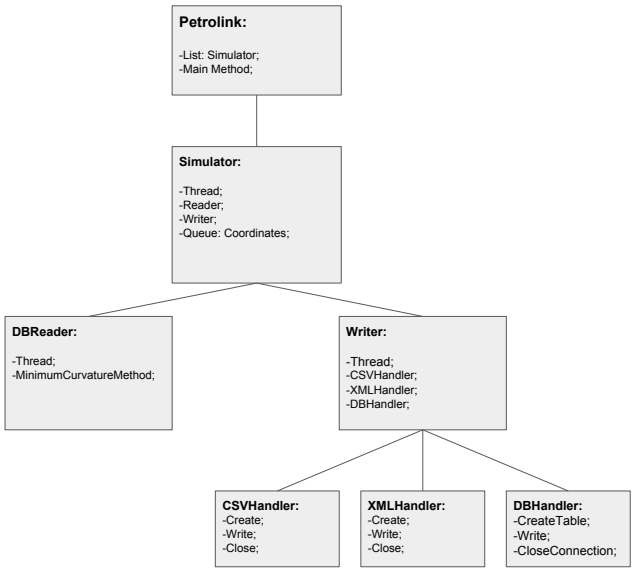

Figure 1: Simplified Class Diagram

Figure 1 provides a very basic representation of the implemented Class Diagram. The Petrolink class allows the system to perform various simulations at the same time, with each Simulator working independently.

Each Simulator contains a DBReader, which is a Thread (it needn't be in the scenario where no concurrency is considered however it was still implemented that way). Each Simulator also contains a writer (responsible for writing results) and a shared queue, where the Reader inserts the calculated results and, "at the same time", the writer extracts data so it may save results in the requested formats. This means that both actions can happen separately/concurrently, as logically demonstrated in Figure 2.

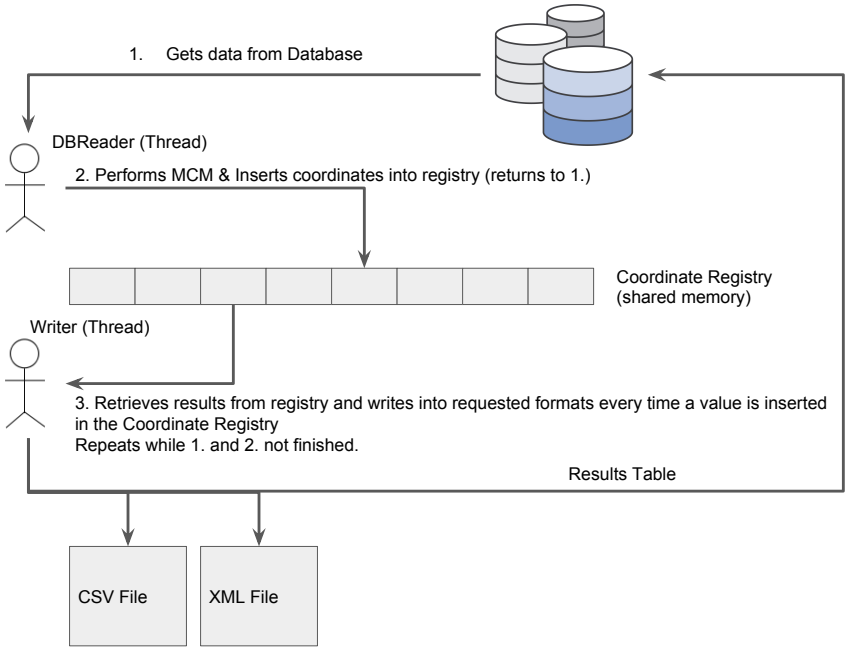

Figure 2: Simplified Class Diagram

2 Performance

While the (time) gains from implementing the system in a concurrent manner don't seem big, with a bigger dataset the difference would expand. On average, a 100ms time gain was noticed.