

Originally, we had implemented the arrays in the data (stations in route, distances between stations, etc.) as a sort of linked list, however the TA suggested keeping the arrays in the table. Some queries were much easier to implement with this format, some harder. Other than that, the design of the database is driven by the functions listed in the assignment. For most every required function (of the overall project) there is a sql query in the `expressRailwayQueries.sql` file, however some of the sorting is done by queries written in the java program. This was done as it was needed for a specific query, so it is not specifically in the sql file. Reservations presented a problem in that there are a lot of considerations and no great way (at least that we could see) to account for all of them, so the reservations are made for the entirety of a route rather than between stations on a route. The biggest issue is the multi route search. We have come up with many solutions that theoretically work (work with smaller data such as 5 routes with a handful of stops on each) but with the number of routes in this project causes a stack overflow from the depth of recursion. On any given day there are 200-300 distinct routes active, and we didn't find a cost-effective way to find combinations of these routes. Another issue, which we mitigated, was the times for routes. When searching for a route it does not good to get back a time at which the train will be at the beginning of its route, but that's what is required to reserve a seat on a scheduled route as reserving at the time at which the train would be at x station would cause many problems when figuring out what is available.

In addition to an origin time lookup for the routes that was made necessary by the design of the queries, there are a few more database actions in the java program than necessary. In addition to a deletion and rebuild of the data in the db as is specced in the project there are options to do the same with functions (originally to allow for updating of functions without having to run through datagrip as multiple jetbeans programs do not like to be open simultaneously) should that be needed.