The programming assignment was completed by Jingyu Su (U58115442) and Xingkun Yin(U44255956)

There was one major implementation decision that we made. That is when implementing TupleDesc, Catalog, and BufferPool, do we apply lists or maps to store the data. Choosing lists will make the implementation easier and more straightforward, whereas using maps will be more efficient. We finally decided to use maps because lists takes O(n) time to retrieve a certain item in worst case, whereas maps take O(1) time. Under the context of a database, where queries of items are numerous, such difference in efficiency overwhelms the easiness of implementation that lists would bring, if any.

A decision that follows is whether or not to use hash code as the key for the map in BufferPool that maps a page id to a physical page. Considering the fact that illy-implemented hash codes may have many collisions, cause operations on wrong pages that might crash the data, we decided to use table id and page id as separate keys to retrieve data from the map.

We did not make any changes to the API, yet we did create an inner class called Table in Catalog.java to aid the implementation, and also some other helper methods.

There are currently no missing or incomplete components in the scope of this programming assignment. But none of our methods or classes are thread-safe at this moment, so we might run into some troubles in the future should multithread be introduced.

We spent approximately 20 hours each person on this project, as we agreed to implement it first individually then merge our design. We met some troubles caused by unfamiliarity of java, some rounding errors and unexpected method behavior such as putIfAbsent(key, value) first calculates value then check if key is present caused unexpected errors and made our lives hard. The fact that this project contains a good number of classes also makes it hard to memorize the location of certain methods or fields.

As described above, we finished the assignment individually, then discussed and merged our designs.