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CSE 444 Lab 1 Write-up

For the implementation of `Catalog.java`, I used `Map<Integer, Table>` as a private field, which has `file.getId` (the identifier of this file) as key and a helper class `Table` as value. The helper class `Table` stores all information about a table, including the contents of the table, the table's name, and the name of table's primary key. I used a map because a lot of methods in `Catalog.java` have `tableid` as parameter, so it would be efficient to make the `tableid` the key.

For the implementation of `BufferPool.java`, I used `Map<PageId, Page>` as a private field. I mapped from `PageId` to `Page` because it allows quick lookup of a `PageId` to determine if it is already in the `BufferPool`, and it allows quick access to the corresponding `Page`.

For the implementation of `HeapPage`'s iterator method, I created a helper class called `HPTupleIterator`, which takes the list of used slots as parameter, and returns an iterator over these used tuples. I implemented this way because calling `remove` on this iterator should throw an `UnsupportedOperationException`.

For the implementation of `HeapFile.java`'s iterator, I created a helper class called `HFTupleIterator`, which takes the list of tuples in the pages in this `HeapFile` as parameter. I implemented this way because calling `next()` on the iterator should throw a `NoSuchElementException` if the iterator is uninitialized or `hasNext() == false`, instead of returning `null`.

I did not make changes to the API.

In BufferPool.java, if there is insufficient space in the buffer pool, a page should be evicted and the new page should be added in its place. However, for lab 1, I just throw a DbException instead. Also, all the methods and classes that has a TransactionId are also incomplete.

I spend approximately 2 days on this lab, and I think keeping track of all the useful methods for each class is the difficult point, ie. knowing where to find the information I need.