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REPORT

GROUP MEMBER NAMES

Individual Project

RUNNING THE CODE

Run Main (main.cc)

```
make main
./main
```

Run Test (test.cc)

```
make test.out
./test.out
```

Run gtest (dbfile_test.cc)

```
make dbfile_test.out
./dbfile_test.out
```

FUNCTION DESCRIPTION

1. Create
   a. It creates a file to which the data will be written, using the 'Open' function of the File instance.
   b. The first parameter of '0' to the 'Open' tells it to create a new object irrespective of a file with the same name present at that location.
   c. Create function also reports 'Implementation Error' if the file type is other than 'heap' since the 'sorted' and 'tree' is a part of the upcoming projects.

2. Open
   a. It opens an already existing file (assumed to be earlier created by Create) for reading/writing using the 'Open' function of the File instance.
   b. The first parameter of '1' to the 'Open' tells it to open an existing file

3. SwitchToWriteMode
   a. This is used to switch from a read mode to a write mode
   b. Essentially, it will fetch the last page of the file so that the new records are added at the end of the file (heap implementation)

4. SwitchToReadMode
   a. This is used to switch from a write mode to a read mode
   b. There may be a page which is not yet full and hence not been added to the file (secondary memory), in which case this function will write out this page to the file.

5. GetNext
   a. This function gets the record that is after the current record
   b. If the current page has a next records then it fetches it using 'GetFirst' of the Page instance
   c. If the current page is consumed then it sees if the File has more pages.
   d. If the File has a next page then it fetches the next page and fetches the record from it

6. GetNext with CNF
   a. It fetches the next record which satisfies a given CNF
   b. It repeatedly makes use of GetNext to get the next record until a record which satisfies the CNF is found.

7. MoveFirst
   a. It loads the first page(with records) into the main memory(Page instance) and gets the first record from it, to update the pointer to the current record.

8. Add
   a. It adds a record to the current page if it has space
   b. If the current page has no space then it adds the page to the file
   c. It then empties out the current page and adds the record to this page

9. Load
   a. It opens a given file with records, reads and adds the records to File one by one.
   b. In the end it commits the last page to the file to ensure that the last page is committed to the disk even though it wasn't full.

10. Close
    a. It uses 'Close' function of the File instance to close the file and release memory

TEST.OUT RESULTS

TPCH data size=1GB

Test 1
Time=0.016ms

```
stuxen@Omen:~/stuxen/DBI/P1/src$ ./test.out

** IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT **
 catalog location:       catalog
 tpch files dir:         ../files/tpch-1gb/
 heap files dir:         ./temp_output_files/


 select test:
         1. load file
         2. scan
         3. scan & filter
         3

 select table:
         1. nation
         2. region
         3. customer
         4. part
         5. partsupp
         6. orders
         7. lineitem
         2
 Filter with CNF for : region
 Enter CNF predicate (when done press ctrl-D):
         (r_name = 'EUROPE')
r_regionkey: [3], r_name: [EUROPE], r_comment: [ly final courts cajole furiously final excuse]
 selected 1 recs
Time: 0.016 ms
stuxen@Omen:~/stuxen/DBI/P1/src$
```

Test 2

Time=0.022ms

```
stuxen@Omen:~/stuxen/DBI/P1/src$ ./test.out

** IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT **
catalog location:       catalog
tpch files dir:         ../files/tpch-1gb/
heap files dir:         ./temp_output_files/


select test:
        1. load file
        2. scan
        3. scan & filter
        3

select table:
        1. nation
        2. region
        3. customer
        4. part
        5. partsupp
        6. orders
        7. lineitem
        2
 Filter with CNF for : region
 Enter CNF predicate (when done press ctrl-D):
        (r_name < 'middle east') AND
(r_regionkey > 1)
r_regionkey: [2], r_name: [ASIA], r_comment: [ges. thinly even pinto beans ca]
r_regionkey: [3], r_name: [EUROPE], r_comment: [ly final courts cajole furiously final excuse]
r_regionkey: [4], r_name: [MIDDLE EAST], r_comment: [uickly special accounts cajole carefully blithely close requests. carefully final asymptotes haggle furiousl]
 selected 3 recs
Time: 0.022 ms
stuxen@Omen:~/stuxen/DBI/P1/src$
```

Test 3
Time=0.005ms

```
stuxen@Omen:~/stuxen/DBI/P1/src$ ./test.out

** IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT **
 catalog location:        catalog
 tpch files dir:          ../files/tpch-1gb/
 heap files dir:          ./temp_output_files/


 select test:
         1. load file
         2. scan
         3. scan & filter
         3

 select table:
         1. nation
         2. region
         3. customer
         4. part
         5. partsupp
         6. orders
         7. lineitem
         1
 Filter with CNF for : nation
 Enter CNF predicate (when done press ctrl-D):
         (n_regionkey = 3) AND
(n_nationkey > 10) AND
(n_name > 'japan')
 selected 0 recs
Time: 0.005 ms
stuxen@Omen:~/stuxen/DBI/P1/src$
```

Test 11

Time=2477.12ms

```
stuxen@Omen:~/stuxen/DBI/P1/src$ ./test.out

** IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT **
 catalog location:      catalog
 tpch files dir:        ../files/tpch-1gb/
 heap files dir:        ./temp_output_files/


 select test:
         1. load file
         2. scan
         3. scan & filter
         3

 select table:
         1. nation
         2. region
         3. customer
         4. part
         5. partsupp
         6. orders
         7. lineitem
         7
 Filter with CNF for : lineitem
 Enter CNF predicate (when done press ctrl-D):
         (l_shipdate > '1994-01-01') AND
(l_shipdate < '1994-01-07') AND
(l_discount > 0.05) AND
(l_discount < 0.06) AND
(l_quantity = 4.00)
 selected 0 recs
Time: 2477.12 ms
stuxen@Omen:~/stuxen/DBI/P1/src$
```

Test 12

Time=2400.33ms

```
stuxen@Omen:~/stuxen/DBI/P1/src$ ./test.out

** IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT **
 catalog location:      catalog
 tpch files dir:        ../files/tpch-1gb/
 heap files dir:        ./temp_output_files/


 select test:
         1. load file
         2. scan
         3. scan & filter
         3

 select table:
         1. nation
         2. region
         3. customer
         4. part
         5. partsupp
         6. orders
         7. lineitem
         7
 Filter with CNF for : lineitem
 Enter CNF predicate (when done press ctrl-D):
         (l_orderkey > 100) AND
(l_orderkey < 1000) AND
(l_partkey > 100) AND
(l_partkey < 5000) AND
(l_shipmode = 'AIR') AND
(l_linestatus = 'F') AND
(l_tax < 0.07)
l_orderkey: [130], l_partkey: [1739], l_suppkey: [4240], l_linenumber: [2], l_quantity: [48], l_extendedprice: [78755], l_discount: [0.03], l_tax: [0.02], l_returnflag: [R], l_linestatus: [F], l_shipdate:
 [1992-07-01], l_commitdate: [1992-07-12], l_receiptdate: [1992-07-24], l_shipinstruct: [NONE], l_shipmode: [AIR], l_comment: [lithely alongside of the regu]
l_orderkey: [194], l_partkey: [2594], l_suppkey: [5095], l_linenumber: [1], l_quantity: [17], l_extendedprice: [25442], l_discount: [0.05], l_tax: [0.04], l_returnflag: [R], l_linestatus: [F], l_shipdate:
 [1992-05-24], l_commitdate: [1992-05-22], l_receiptdate: [1992-05-30], l_shipinstruct: [COLLECT COD], l_shipmode: [AIR], l_comment: [ regular deposi]
 selected 2 recs
Time: 2400.33 ms
stuxen@Omen:~/stuxen/DBI/P1/src$ 
```

GTEST RESULTS

The functions Create, Open and Close of the DBFile are tested for their return values. These functions return 1 on success and this has been tested using the gtest framework.

```
stuxen@Omen:~/stuxen/DBI/P1/src$ ./dbfile_test.out
[==========] Running 3 tests from 3 test cases.
[----------] Global test environment set-up.
[----------] 1 test from CreateTest
[ RUN      ] CreateTest.ReturnValueTest
[       OK ] CreateTest.ReturnValueTest (1 ms)
[----------] 1 test from CreateTest (1 ms total)

[----------] 1 test from OpenTest
[ RUN      ] OpenTest.ReturnValueTest
[       OK ] OpenTest.ReturnValueTest (0 ms)
[----------] 1 test from OpenTest (0 ms total)

[----------] 1 test from CloseTest
[ RUN      ] CloseTest.ReturnValueTest
[       OK ] CloseTest.ReturnValueTest (0 ms)
[----------] 1 test from CloseTest (1 ms total)

[----------] Global test environment tear-down
[==========] 3 tests from 3 test cases ran. (2 ms total)
[  PASSED  ] 3 tests.
stuxen@Omen:~/stuxen/DBI/P1/src$ 
```

CONCLUSION
A very simple version of the database which supports inserts and fetches is ready without focus on optimizing query execution times.