COP6726 – Database System Implementation

Project 2 (Milestone Two) Report

Team members:

1. Akshay Ganapathy (UFID: 3684-6922)
2. Riyaz Shaik (UFID: 4360-0170)

Steps to execute project code:

The code was executed using **Windows Subsystem for Linux (Ubuntu 18.04)** environment.

1. The project source code is in the folder "a2-2test". Its contents include the following:
    a. Code needed to run test.cc.
    b. All ".bin" files should be included in the "bin" folder.
    c. Google test framework has been added in the directory "googletest". This framework is needed to run gtest unit test cases.
    d. All the gtest unit test cases have been added in "test" folder. DBFileTest.cc & HeapDBFileTest.cc contains the unit test cases for methods in DBFile class and HeapDBFile class, respectively. Make sure to include "nation.bin", "nation.bin.meta", "region.bin", "region.bin.meta" files in the directory, "test/data".
    e. Makefile to compile test.cc and gtest unit test cases.
2. To run test.cc, from project root execute command "make test.out" and then execute "./test.out" and follow the on-screen instructions.
   This test driver gives a menu-based interface to three options that allows you to test the code:
        1. Create a sorted DBfile
        2. Scan a DBfile
        3. Run some query
3. To run gtest unit test cases, from project root execute command "make gtests" and then execute "./gtests".

The following are the methods with their description:

Method	Description
int MetaDataHandler::Open();	Opens the .meta file and reads its contents.
int MetaDataHandler::Close();	Closes the .meta file.
void MetaDataHandler::IncrementNumberOfPages();	Increments number of pages.
int MetaDataHandler::GetPages();	Returns number of pages.

fType MetaDataHandler::GetType();	Returns whether type is heap or sorted.
OrderMaker *MetaDataHandler::GetOrderMaker();	Returns the sort order of file.
int MetaDataHandler::GetRunLength();	Returns run length.
void GenericDBFile::MoveFirst();	Move to the first record on the first page.
int GenericDBFile::Close();	Closes the file.
int GenericDBFile::GetNext(Record &fetchme);	Fetches the next record on that page. If page is full, retrieves first record from next page. Returns 1 on successful retrieval, otherwise, returns 0.
int GenericDBFile::GetNext(Record &fetchme, CNF &cnf, Record &literal);	Retrieves next record according to the given CNF expression.
void GenericDBFile::Load(Schema &myschema, const char *loadpath);	Load the file with respect to the appropriate schema.
File GenericDBFile::GetFile();	Returns the file.
int GenericDBFile::GetLength();	Returns the current length of the file.
int SortedDBFile::Add(Record &addme);	Adds a record to the input pipe.
void SortedDBFile::SetAttribute(OrderMaker *o, int run);	Creates an instance of Bigq class.
int SortedDBFile::Close();	Shuts down the input pipe and closes the file.
int SortedDBFile::GetNext(Record &fetchme, CNF &cnf, Record &literal);	Gets the next record in the sorted file according to cnf.
int SortedDBFile::PerformBinarySearch(Record &fetchme, OrderMaker &queryorder, Record &literal, OrderMaker &cnforder, ComparisonEngine &cmp);	Performs a binary search according to the cnf expression and the sort order of the file.
int HeapDBFile::Add(Record &rec);	Adds a record to the file.
GenericDBFile *DBFile::GetDBfile();	Gets the DBFile.
int DBFile::GetLength();	Gets the current length of the file.

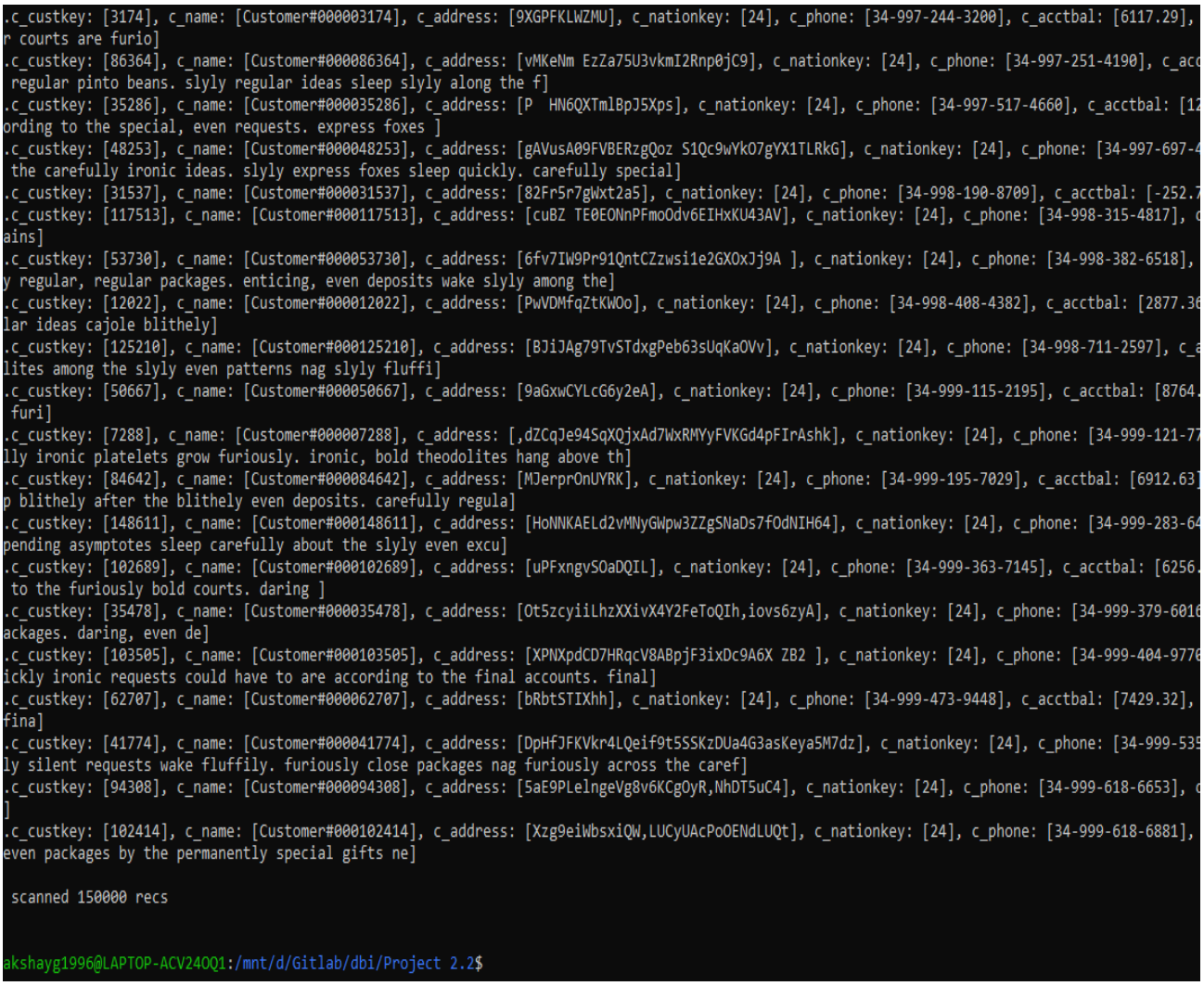
The following are the screenshots of the output after executing the 3 testcases.

The following results are obtained by using 1 GB TPCH data generated from tpch-dbgen.

1)

```
akshayg1996@LAPTOP-ACV24OQ1:/mnt/d/Gitlab/dbi/Project 2.2$ ./test.out

** IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT **
 catalog location:      catalog
 tpch files dir:        tpch-dbgen/
 heap files dir:        bin/


 select test option:
        1. create sorted dbfile
        2. scan a dbfile
        3. run some query
        1

 select table:
        1. nation
        2. region
        3. customer
        4. part
        5. partsupp
        6. supplier
        7. orders
        8. lineitem
        3

 specify sort ordering (when done press ctrl-D):
        (c_phone)
 specify runlength:
        8

 output to dbfile : bin/customer.bin
 input from file : tpch-dbgen/customer.tbl

 select option for : bin/customer.bin
        1. add a few (1 to 1k recs)
        2. add a lot (1k to 1e+06 recs)
        3. run some query
        4. finish
       2
File present at path: tempFile.bin is now opened.
        .......
        added 150000 recs..so far 150000

 create finished.. 150000 recs inserted


akshayg1996@LAPTOP-ACV24OQ1:/mnt/d/Gitlab/dbi/Project 2.2$
```

2)


.c_custkey: [3174], c_name: [Customer#000003174], c_address: [9XGPFKLWZMU], c_nationkey: [24], c_phone: [34-997-244-3200], c_acctbal: [6117.29],
r courts are furio]
.c_custkey: [86364], c_name: [Customer#000086364], c_address: [vMKeNm EzZa75U3vkmI2Rnp0jC9], c_nationkey: [24], c_phone: [34-997-251-4190], c_acc
regular pinto beans. slyly regular ideas sleep slyly along the f]
.c_custkey: [35286], c_name: [Customer#000035286], c_address: [P HN6QXTmlBpJ5Xps], c_nationkey: [24], c_phone: [34-997-517-4660], c_acctbal: [12
ording to the special, even requests. express foxes]
.c_custkey: [48253], c_name: [Customer#000048253], c_address: [gAVusA09FVBERzgQoz S1Qc9wYkO7gYX1TLRkG], c_nationkey: [24], c_phone: [34-997-697-4
the carefully ironic ideas. slyly express foxes sleep quickly. carefully special]
.c_custkey: [31537], c_name: [Customer#000031537], c_address: [82Fr5r7gWxt2a5], c_nationkey: [24], c_phone: [34-998-190-8709], c_acctbal: [-252.7
.c_custkey: [117513], c_name: [Customer#000117513], c_address: [cuBZ TE0EONnPFmoOdv6EIHxKU43AV], c_nationkey: [24], c_phone: [34-998-315-4817], c
ains]
.c_custkey: [53730], c_name: [Customer#000053730], c_address: [6fv7IW9Pr91QntCZzwsi1e2GXOxJj9A], c_nationkey: [24], c_phone: [34-998-382-6518],
y regular, regular packages. enticing, even deposits wake slyly among the]
.c_custkey: [12022], c_name: [Customer#000012022], c_address: [PwVDMfqZtKWOo], c_nationkey: [24], c_phone: [34-998-408-4382], c_acctbal: [2877.36
lar ideas cajole blithely]
.c_custkey: [125210], c_name: [Customer#000125210], c_address: [BJiJAg79TvSTdxgPeb63sUqKaOVv], c_nationkey: [24], c_phone: [34-998-711-2597], c_a
lites among the slyly even patterns nag slyly fluffi]
.c_custkey: [50667], c_name: [Customer#000050667], c_address: [9aGxwCYLcG6y2eA], c_nationkey: [24], c_phone: [34-999-115-2195], c_acctbal: [8764.
furi]
.c_custkey: [7288], c_name: [Customer#000007288], c_address: [,dZCqJe94SqXQjxAd7WxRMYyFVKGd4pFIrAshk], c_nationkey: [24], c_phone: [34-999-121-77
lly ironic platelets grow furiously. ironic, bold theodolites hang above th]
.c_custkey: [84642], c_name: [Customer#000084642], c_address: [MJerprOnUYRK], c_nationkey: [24], c_phone: [34-999-195-7029], c_acctbal: [6912.63]
p blithely after the blithely even deposits. carefully regula]
.c_custkey: [148611], c_name: [Customer#000148611], c_address: [HoNNKAELd2vMNyGWpw3ZZgSNaDs7fOdNIH64], c_nationkey: [24], c_phone: [34-999-283-64
pending asymptotes sleep carefully about the slyly even excu]
.c_custkey: [102689], c_name: [Customer#000102689], c_address: [uPFxngvSOaDQIL], c_nationkey: [24], c_phone: [34-999-363-7145], c_acctbal: [6256.
to the furiously bold courts. daring]
.c_custkey: [35478], c_name: [Customer#000035478], c_address: [Ot5zcyiiLhzXXivX4Y2FeToQIh,iovs6zyA], c_nationkey: [24], c_phone: [34-999-379-6016
ackages. daring, even de]
.c_custkey: [103505], c_name: [Customer#000103505], c_address: [XPNXpdCD7HRqcV8ABpjF3ixDc9A6X ZB2], c_nationkey: [24], c_phone: [34-999-404-9776
ickly ironic requests could have to are according to the final accounts. final]
.c_custkey: [62707], c_name: [Customer#000062707], c_address: [bRbtSTIXhh], c_nationkey: [24], c_phone: [34-999-473-9448], c_acctbal: [7429.32],
fina]
.c_custkey: [41774], c_name: [Customer#000041774], c_address: [DpHfJFKVkr4LQeif9t5SSKzDUa4G3asKeya5M7dz], c_nationkey: [24], c_phone: [34-999-535
ly silent requests wake fluffily. furiously close packages nag furiously across the caref]
.c_custkey: [94308], c_name: [Customer#000094308], c_address: [5aE9PLelngeVg8v6KCgOyR,NhDT5uC4], c_nationkey: [24], c_phone: [34-999-618-6653], c
]
.c_custkey: [102414], c_name: [Customer#000102414], c_address: [Xzg9eiWbsxiQW,LUCyUAcPoOENdLUQt], c_nationkey: [24], c_phone: [34-999-618-6881],
even packages by the permanently special gifts ne]
scanned 150000 recs
akshayg1996@LAPTOP-ACV24OQ1:/mnt/d/Gitlab/dbi/Project 2.2$

3)

```
akshayg1996@LAPTOP-ACV24OQ1:/mnt/d/Gitlab/dbi/Project 2.2$ ./test.out

** IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT **
 catalog location:      catalog
 tpch files dir:        tpch-dbgen/
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 select test option:
        1. create sorted dbfile
        2. scan a dbfile
        3. run some query
        3

 select table:
        1. nation
        2. region
        3. customer
        4. part
        5. partsupp
        6. supplier
        7. orders
        8. lineitem
        3

 enter CNF predicate (when done press ctrl-D):
       (c_phone > '34-999-195-7029') AND (c_mktsegment = 'FURNITURE')File present at path: tempFile.bin is now opened.
       c_custkey: [103505], c_name: [Customer#000103505], c_address: [XPNXpdCD7HRqcV8ABpjF3ixDc9A6X ZB2 ], c_nationkey: [24], c_phone: [34-99
ost. quickly ironic requests could have to are according to the final accounts. final]
c_custkey: [62707], c_name: [Customer#000062707], c_address: [bRbtSTIXhh], c_nationkey: [24], c_phone: [34-999-473-9448], c_acctbal: [7429.32]
ina]
c_custkey: [41774], c_name: [Customer#000041774], c_address: [DpHfJFKVkr4LQeif9t5SSKzDUa4G3asKeya5M7dz], c_nationkey: [24], c_phone: [34-999-5
y silent requests wake fluffily. furiously close packages nag furiously across the caref]
c_custkey: [94308], c_name: [Customer#000094308], c_address: [5aE9PLelngeVg8v6KCgOyR,NhDT5uC4], c_nationkey: [24], c_phone: [34-999-618-6653],


 query over bin/customer.bin returned 4 recs


akshayg1996@LAPTOP-ACV24OQ1:/mnt/d/Gitlab/dbi/Project 2.2$
```

The following are the results of gtest unit test cases:

Result: All the unit test cases passed

DBFileTest.cc & HeapDBFileTest.cc contains the unit test cases for methods in DBFile class and HeapDBFile class, respectively.

To run gtest unit test cases, from project root execute command “make gtests” and then execute “./gtests”.

Make sure to include “nation.bin”, “nation.bin.meta”, “region.bin”, “region.bin.meta” files in the directory, “test/data”.