

LIn Huang - 0910-7917

## Compiling and running project:

Step of heap files generation (DBFiles are stored in bin/\*.bin):

1. make clean
2. Make test\_p1.out
3. ./generateBins.sh

Step of running test cases script(result will be output1.txt):

1. make clean
2. Make test.out
3. ./runTestCases.sh

Step of running gTest cases script:

1. make clean
2. Make gtest.out
3. ./gtest.out

```
lin@lin-ThinkPad-T490 ~/Documents/GitHub/COP6726-DBI-SPRING22/P3 lhuang ± ./gtest.out
[=====] Running 4 tests from 1 test suite.
[-----] Global test environment set-up.
[-----] 4 tests from RelOp
[ RUN      ] RelOp.SelectFile
[ OK       ] RelOp.SelectFile (233 ms)
[ RUN      ] RelOp.SelectFile2
[ OK       ] RelOp.SelectFile2 (192 ms)
[ RUN      ] RelOp.Project
[ OK       ] RelOp.Project (48 ms)
[ RUN      ] RelOp.GroupBy
[ OK       ] RelOp.GroupBy (5595 ms)
[-----] 4 tests from RelOp (6068 ms total)

[-----] Global test environment tear-down
[=====] 4 tests from 1 test suite ran. (6069 ms total)
[ PASSED  ] 4 tests.
lin@lin-ThinkPad-T490 ~/Documents/GitHub/COP6726-DBI-SPRING22/P3 lhuang ±
```

A thread worker and runlen (default as 1) for all inherited classes' use;

```
class RelationalOp {
protected:
    pthread_t worker;
    int runlen = 1;
public:
    void WaitUntilDone() { pthread_join(worker, NULL); }
    virtual void Use_n_Pages(int n) = 0;
};
```

### 1) SelectFile Operator

```
typedef struct {
    DBFile* inputFile;
    Pipe* outputPipe;
    CNF* selOp;
    Record* literal;
} SelectFileArgs;

pthread_create(&worker, NULL, SelectFileWorker, (void*)SelectFileArgs);
```

### 2) SelectPipe Operator

```
typedef struct {
    Pipe* inputPipe;
    Pipe* outputPipe;
    CNF* selOp;
    Record* literal;
} SelectPipeArgs;

pthread_create(&worker, NULL, SelectPipeWorker, (void*)SelectPipeArgs);
```

### 3) Join Operator

```
typedef struct {  
  
    Pipe* inputPipeL;  
  
    Pipe* inputPipeR;  
  
    Pipe* outputPipe;  
  
    CNF* selOp;  
  
    Record* literal;  
  
    int runLen;  
  
} JoinArgs;  
  
BigQ* bigQLeft = new BigQ(*(joinArg->inputPipeL), *sortedLeftPipe, *leftOrder, joinArg->runLen);  
BigQ* bigQRight = new BigQ(*(joinArg->inputPipeR), *sortedRightPipe, *rightOrder, joinArg->runLen);
```

BigQ class is a data structure with input and output pipe, order and run length, and associated methods.

**BigQ :: BigQ (Pipe &in, Pipe &out, OrderMaker &sortorder, int runlen);**

Construct method for BigQ, it contains the data used for worker' function. Then it will create worker thread, and let worker thread to do rest of things.

The sorted pipes (sortedLeftPipe and sortedRightPipe) have the sorted tuple and the join operation will thus be joined in order by removing tuples from pipes.

Other operators have similar path.

**\*\* IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT \*\***

catalog location: catalog  
tpch files dir: ../tpch-dbgcn/1G/  
heap files dir: bin/

```
ps_partkey: [6333], ps_suppkey: [6334], ps_availqty: [3711], ps_supplycost: [1.01], ps_comment: [s use slyly. fluffily express requests wake carefully ironic packages]
ps_partkey: [9097], ps_suppkey: [4098], ps_availqty: [3012], ps_supplycost: [1.01], ps_comment: [s the bold pinto beans cajole carefully after the slyly unusual instructions. slyly special packages above the unusual, bold packages cajole blithely even Tiresias. theodolites among the foxes are]
ps_partkey: [20468], ps_suppkey: [469], ps_availqty: [6884], ps_supplycost: [1], ps_comment: [furiously among the slyly ironic instructions. final, unusual packages wake slyly. final accounts cajole. deposits above the i]
ps_partkey: [27115], ps_suppkey: [9618], ps_availqty: [7966], ps_supplycost: [1.02], ps_comment: [e regular, ironic dugouts. slyly special requests cajole quickly across the blithely express requests. deposits unwind carefully pending theodolites. pinto beans about the even, regular theodolite]
ps_partkey: [34494], ps_suppkey: [9581], ps_availqty: [7438], ps_supplycost: [1.02], ps_comment: [egular excuses. final, regular deposits wake. pinto beans according to th]
ps_partkey: [43172], ps_suppkey: [685], ps_availqty: [6600], ps_supplycost: [1.01], ps_comment: [ites integrate blithely above the slyly regular instructions. asymptotes besides the regular, even accounts haggle carefully slyly bold requests. even pinto beans ]
ps_partkey: [43764], ps_suppkey: [1277], ps_availqty: [2344], ps_supplycost: [1.02], ps_comment: [; furious, ironic requests nag furiously against the silent packages— furiously pending pinto beans use blithely careful]
ps_partkey: [51671], ps_suppkey: [4177], ps_availqty: [3399], ps_supplycost: [1.02], ps_comment: [iously. blithely bold requests haggle furiously. slyly final requests sleep. final, final theodolites cajole. accounts play about the slyly unusual requests. bold courts haggle. bol]
ps_partkey: [60953], ps_suppkey: [954], ps_availqty: [8611], ps_supplycost: [1.01], ps_comment: [ully even dolphins wake carefully about the slyly final pinto beans]
ps_partkey: [61707], ps_suppkey: [1708], ps_availqty: [3178], ps_supplycost: [1.02], ps_comment: [ide of the unusual, regular excuses. unusual, special packages are carefully across the even theodolites: furi]
ps_partkey: [71984], ps_suppkey: [6999], ps_availqty: [6816], ps_supplycost: [1.01], ps_comment: [eodolites are blithely across the special requests. quickly regular excuses are furiously against the slyly final accou]
ps_partkey: [74375], ps_suppkey: [6883], ps_availqty: [864], ps_supplycost: [1.02], ps_comment: [lithely express asymptotes nag regular packages. special, ruthless instructions against the furiously ruthless packages boost around the packages. slyly bold accounts use. furiously ironic pa]
ps_partkey: [76994], ps_suppkey: [9502], ps_availqty: [9712], ps_supplycost: [1], ps_comment: [i. carefully ironic platelets cajole furiously among the furiously regular asymptotes. furiously express asymptotes wake caref]
ps_partkey: [93653], ps_suppkey: [3654], ps_availqty: [4473], ps_supplycost: [1.02], ps_comment: [ of the carefully final requests. bold deposits are slyly. instructions nod furiously instructions. careful]
ps_partkey: [102497], ps_suppkey: [2498], ps_availqty: [6491], ps_supplycost: [1], ps_comment: [fully final accounts. even accounts after the carefully final accounts haggle according to the blithely special requests. carefully unusual]
ps_partkey: [122543], ps_suppkey: [5856], ps_availqty: [5753], ps_supplycost: [1], ps_comment: [e the quickly ironic dependencies. slyly ironic accounts]
ps_partkey: [139711], ps_suppkey: [9712], ps_availqty: [4286], ps_supplycost: [1.01], ps_comment: [ully unusual escapades sleep along the special instructions. final, bold ideas across the slyly ironic ideas sleep dependenc]
ps_partkey: [155112], ps_suppkey: [5113], ps_availqty: [7635], ps_supplycost: [1], ps_comment: [refully bold packages. special somas cajole according to the foxes. furiously even accou]
ps_partkey: [158093], ps_suppkey: [5639], ps_availqty: [3751], ps_supplycost: [1], ps_comment: [iously unusual gifts maintain quickly according to the slyly pending deposits. quickly ]
ps_partkey: [193659], ps_suppkey: [6179], ps_availqty: [6606], ps_supplycost: [1.01], ps_comment: [can haggle. quickly express packages are blithely. even requests against the silent accounts sleep special packages. ironic ideas according to the furiously regular dolphins use quickly plate]
ps_partkey: [193981], ps_suppkey: [3982], ps_availqty: [619], ps_supplycost: [1.01], ps_comment: [ic accounts after the unusual, regular instructions grow carefully around the blithely unusual dependencies. pending accounts along the bl]
```

query1 returned 21 records |

**\*\* IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT \*\***

catalog location: catalog  
tpch files dir: ../tpch-dbgcn/1G/  
heap files dir: bin/

```
int: [31], string: [slate seashell steel medium moccasin], double: [931.03]
int: [1030], string: [orange floral olive ivory lace], double: [931.03]
int: [2029], string: [midnight brown dim violet almond], double: [931.02]
int: [3028], string: [puff slate tomato moccasin azure], double: [931.02]
int: [4027], string: [white ivory moccasin coral puff], double: [931.02]
int: [5026], string: [blanched blush pink light wheat], double: [931.02]
int: [6025], string: [purple medium light aquamarine dark], double: [931.02]
int: [7024], string: [forest rosy peach antique midnight], double: [931.02]
int: [8023], string: [mint salmon moccasin blanched beige], double: [931.02]
int: [9022], string: [peru misty sandy dark drab], double: [931.02]
int: [10021], string: [blush steel green sienna snow], double: [931.02]
int: [11020], string: [plum khaki powder beige peru], double: [931.02]
```

query2 returned 12 records

\*\* IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT \*\*

catalog location: catalog  
tpch files dir: ../tpch-dbggen/1G/  
heap files dir: bin/

double: [9.24623e+07]

query3 returned 1 records

\*\*\*\*\*

\*\* IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT \*\*

catalog location: catalog  
tpch files dir: ../tpch-dbggen/1G/  
heap files dir: bin/

query4

double: [4.00421e+08]

query4 returned 1 recs

\*\*\*\*\*

\*\* IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT \*\*

catalog location: catalog  
tpch files dir: ../tpch-dbggen/1G/  
heap files dir: bin/

query5 finished..output written to file query5.txt

**\*\* IMPORTANT: MAKE SURE THE INFORMATION BELOW IS CORRECT \*\***

catalog location: catalog  
tpch files dir: ../tpch-dbggen/1G/  
heap files dir: bin/

query6

double: [259204], s\_nationkey: [0]  
double: [622711], s\_nationkey: [1]  
double: [1.05512e+06], s\_nationkey: [2]  
double: [1.34958e+06], s\_nationkey: [3]  
double: [1.93341e+06], s\_nationkey: [4]  
double: [2.31075e+06], s\_nationkey: [5]  
double: [2.77305e+06], s\_nationkey: [6]  
double: [3.31518e+06], s\_nationkey: [7]  
double: [3.8054e+06], s\_nationkey: [8]  
double: [4.35583e+06], s\_nationkey: [9]  
double: [4.72726e+06], s\_nationkey: [10]  
double: [5.03559e+06], s\_nationkey: [11]  
double: [5.49353e+06], s\_nationkey: [12]  
double: [5.7115e+06], s\_nationkey: [13]  
double: [6.28344e+06], s\_nationkey: [14]  
double: [6.66139e+06], s\_nationkey: [15]  
double: [7.15223e+06], s\_nationkey: [16]  
double: [7.37374e+06], s\_nationkey: [17]  
double: [8.03379e+06], s\_nationkey: [18]  
double: [8.44267e+06], s\_nationkey: [19]  
double: [8.67352e+06], s\_nationkey: [20]  
double: [9.01937e+06], s\_nationkey: [21]  
double: [9.53912e+06], s\_nationkey: [22]  
double: [1.00022e+07], s\_nationkey: [23]  
double: [1.04605e+07], s\_nationkey: [24]

query6 returned sum for 25 groups (expected 25 groups)