

PROJECT 2 PART 1 REPORT: IMPLEMENTATION OF BIGQ CLASS

GROUP MEMBERS:

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INSTRUCTIONS TO COMPILE THE CODE:

1. Unzip "shreyaDasgupta1_yashPattarkine2_p1.zip". Open terminal on the machine and go to the folder where the unzipped files are. Use command -- `cd<pathname/foldername>`
2. Command – `make clean`.
3. Compile test function. Use commands – `make test.out`
4. Run test.out. Use command -- `./test.out`
5. For output1.txt, just run `./runTestCases.sh`
6. For gtests, compile it using -- `make gtest.out`
7. Run gtest using -- `./gtest.out`

BRIEF OVERVIEW OF ALL METHODS OF BigQ Class:

Attributes:

inP – Pointer to inputPipe

opP – Pointer to outputPipe

sortingOrder – object-pointer of type OrderMaker to denote the sorting order

runlength – To denote the number of pages in each run created from inputPipe.

Classes:

1. recordsW – This class has only three attributes – a Record-type object, an indicator of the current position of the run and a pointer to the OrderMaker object – sortedOrder.
2. RecV – This class has three attributes – an integer indicating the result of comparing two records using compareRec method, a Record type object and an object-pointer of type OrderMaker.
3. runmetaData – This class has two integer attributes denoting – start-page number and end-page number, for each of the runs created.
4. pageWrap – This class has a Page type object, and an integer to keep track of the current page number operated on.
5. recordsCompare – This has an operator function which compares two records and returns 0 or 1 depending on whether the first record is greater than or less than the right one respectively. This is used while merging the records together into output pipe.

Methods:

1. **Constructor** – In our constructor – BigQ, we have initialized the inputPipe, the outputPipe, the sorting Order and runlength – attributes. We have also initialized no_of_runs (this denotes the total number of sorted runs generated from the inputPipe) to be 0, and pg_no to be 0. We also create a single worker_thread that calls the method – sortingWorker(), which will invoke our key method – sortRecs().
2. **sortingWorker** – This is the method which calls the sortRecs method. It is mainly used so that we can use all the attributes that we defined in the constructor.
3. **sortRecs** – This is the key method that is used to sort all the records in all the runs, i.e., to execute the first phase of the TPMMS algorithm. In this, we are taking the records from the input pipe and appending them to the page till it gets full. When the page gets full, we are checking if the number of pages in that run is equal to the given runlength. If no, we are simply adding a new page and appending the record to the new page. But if the number of page is equal to the runlength, then we are sorting all the records in that run using a self-defined method called “compareRec” (which is used to compare 2 records, given the sorting order).
We have used a vector of structure (RecV class) for storing the records which would be sorted and we are clearing the vector after each run.
At last, we are sorting all the records of the last run, in case the run is not full and therefore the sorting function is not called.
4. **writeToFile** – This method is called from the sortRecs methods which is essentially writing all the records of a run to a file. This method is called at the end of each run after the records are sorted. In this, we are using iterator pointer of the vector and adding pages to the file. It also uses 2 attributes “startPage” and “endPage”, which we have declared in a new class named “runmetaData”.
5. **mergeRecs**– This method is used in order to execute Phase 2 of the TPMMS algorithm. At first, we store the start-pages of all the runs (from Phase 1). After that, it compares the first records of each of the pages in the page-vector and populates them in the output pipe in a sorted manner (according to given sorting order). It keeps on continuing the same process for all the runs, until the records exhaust, and then it closes the output pipe and returns. The worker thread is closed after that.
6. **compareRec**- This function takes in two parameters of type RecV and returns 0 or 1 after comparing them and checking whether they satisfy the sorting order or not. It returns 1 if the first record is less than the second and 0 if it is greater than the second.

SCREENSHOT OF - Output1.txt

```
n_nationkey: [7], n_name: [GERMANY], n_regionkey: [3], n_comment: [l platelets. regular accounts x-ray: unusual, regular acco]
n_nationkey: [19], n_name: [ROMANIA], n_regionkey: [3], n_comment: [ular asymptotes are about the furious multipliers. express dependencies nag above the ironically ironic account]
n_nationkey: [22], n_name: [RUSSIA], n_regionkey: [3], n_comment: [ requests against the platelets use never according to the quickly regular pint]
n_nationkey: [23], n_name: [UNITED KINGDOM], n_regionkey: [3], n_comment: [gangs boost carefully special requests. accounts are. careful]]
n_nationkey: [4], n_name: [EGYPT], n_regionkey: [4], n_comment: [y above the carefully unusual theodolites. final dugouts are quickly across the furiously regular d]
n_nationkey: [10], n_name: [IRAN], n_regionkey: [4], n_comment: [efully alongside of the slyly final dependencies. ]
n_nationkey: [11], n_name: [IRAQ], n_regionkey: [4], n_comment: [nic deposits boost atop the quickly final requests? quickly regula]
n_nationkey: [13], n_name: [JORDAN], n_regionkey: [4], n_comment: [ic deposits are blithely about the carefully regular pa]
n_nationkey: [20], n_name: [SAUDI ARABIA], n_regionkey: [4], n_comment: [ts. silent requests haggle. closely express packages sleep across the blithely]
consumer: removed 25 rcgs from the pipe
*****
producer: inserted 150000 rcgs into the pipe
Input pipe is shutting down
consumer: removed 150000 rcgs from the pipe
*****
o_orderkey: [4515876], o_custkey: [100685], o_orderstatus: [F], o_totalprice: [510062], o_orderdate: [1993-11-02], o_orderpriority: [4-NOT SPECIFIED], o_clerk: [Clerk#000000105], o_shippriority: [0],
o_comment: [carefully accounts: slyly ironic pinto beans detect. brave somas a]
o_orderkey: [2185667], o_custkey: [51796], o_orderstatus: [F], o_totalprice: [511360], o_orderdate: [1992-10-08], o_orderpriority: [1-URGENT], o_clerk: [Clerk#000000574], o_shippriority: [0], o_comment:
[. deposits wake quickly unusual deposits. express dependencies wake. ]
o_orderkey: [2199712], o_custkey: [66790], o_orderstatus: [0], o_totalprice: [515532], o_orderdate: [1996-09-30], o_orderpriority: [2-HIGH], o_clerk: [Clerk#000000650], o_shippriority: [0], o_comment:
[ the final, ironic deposits inte]
o_orderkey: [3506919], o_custkey: [24049], o_orderstatus: [F], o_totalprice: [522644], o_orderdate: [1992-11-07], o_orderpriority: [1-URGENT], o_clerk: [Clerk#000000924], o_shippriority: [0], o_comment:
[are alongside of the pending deposits. quick]
o_orderkey: [2232932], o_custkey: [13940], o_orderstatus: [0], o_totalprice: [522721], o_orderdate: [1997-04-13], o_orderpriority: [2-HIGH], o_clerk: [Clerk#000000245], o_shippriority: [0], o_comment:
[lithely stealthy accounts are slyly against the pend]
o_orderkey: [4576548], o_custkey: [108931], o_orderstatus: [0], o_totalprice: [525591], o_orderdate: [1997-12-26], o_orderpriority: [1-URGENT], o_clerk: [Clerk#000000336], o_shippriority: [0],
o_comment: [he slyly ironic requests. regular, bold deposits cajol]
o_orderkey: [3043270], o_custkey: [144617], o_orderstatus: [0], o_totalprice: [530604], o_orderdate: [1997-02-12], o_orderpriority: [5-LOW], o_clerk: [Clerk#000000699], o_shippriority: [0], o_comment:
[riously final deposits? ]
o_orderkey: [4722021], o_custkey: [128120], o_orderstatus: [F], o_totalprice: [544089], o_orderdate: [1994-04-07], o_orderpriority: [1-URGENT], o_clerk: [Clerk#000000230], o_shippriority: [0],
o_comment: [al, express pinto beans are after the careful]
o_orderkey: [1750466], o_custkey: [21433], o_orderstatus: [F], o_totalprice: [555205], o_orderdate: [1992-11-30], o_orderpriority: [4-NOT SPECIFIED], o_clerk: [Clerk#000000040], o_shippriority: [0],
o_comment: [ ironic packages. even nptornis integrate. fluffily regular foxes snooze furil]
consumer: removed 150000 rcgs from the pipe
*****
n_nationkey: [7], n_name: [GERMANY], n_regionkey: [3], n_comment: [l platelets. regular accounts x-ray: unusual, regular acco]
n_nationkey: [19], n_name: [ROMANIA], n_regionkey: [3], n_comment: [ular asymptotes are about the furious multipliers. express dependencies nag above the ironically ironic account]
n_nationkey: [22], n_name: [RUSSIA], n_regionkey: [3], n_comment: [ requests against the platelets use never according to the quickly regular pint]
n_nationkey: [23], n_name: [UNITED KINGDOM], n_regionkey: [3], n_comment: [gangs boost carefully special requests. accounts are. careful]]
n_nationkey: [4], n_name: [EGYPT], n_regionkey: [4], n_comment: [y above the carefully unusual theodolites. final dugouts are quickly across the furiously regular d]
n_nationkey: [10], n_name: [IRAN], n_regionkey: [4], n_comment: [efully alongside of the slyly final dependencies. ]
n_nationkey: [11], n_name: [IRAQ], n_regionkey: [4], n_comment: [nic deposits boost atop the quickly final requests? quickly regula]
n_nationkey: [13], n_name: [JORDAN], n_regionkey: [4], n_comment: [ic deposits are blithely about the carefully regular pa]
n_nationkey: [20], n_name: [SAUDI ARABIA], n_regionkey: [4], n_comment: [ts. silent requests haggle. closely express packages sleep across the blithely]
consumer: removed 25 rcgs from the pipe
```

GTEST RESULTS:

```
Yashs-MacBook-Air:shreyaDasgupta_yashPattarkine_p1 yhpatt10$ ./gtest.out
[=====] Running 4 tests from 4 test suites.
[-----] Global test environment set-up.
[-----] 1 test from OpenBinTest
[ RUN      ] OpenBinTest.t1
[          OK ] OpenBinTest.t1 (1 ms)
[-----] 1 test from OpenBinTest (1 ms total)

[-----] 1 test from BinFileNotEmptyTest
[ RUN      ] BinFileNotEmptyTest.t2
[          OK ] BinFileNotEmptyTest.t2 (2 ms)
[-----] 1 test from BinFileNotEmptyTest (2 ms total)

[-----] 1 test from InsertToPipeTest
[ RUN      ] InsertToPipeTest.t3
[          OK ] InsertToPipeTest.t3 (0 ms)
[-----] 1 test from InsertToPipeTest (0 ms total)

[-----] 1 test from WriteToFileTest
[ RUN      ] WriteToFileTest.t4
[          OK ] WriteToFileTest.t4 (8 ms)
[-----] 1 test from WriteToFileTest (8 ms total)

[-----] Global test environment tear-down
[=====] 4 tests from 4 test suites ran. (11 ms total)
[ PASSED  ] 4 tests.
Yashs-MacBook-Air:shreyaDasgupta_yashPattarkine_p1 yhpatt10$ █
```