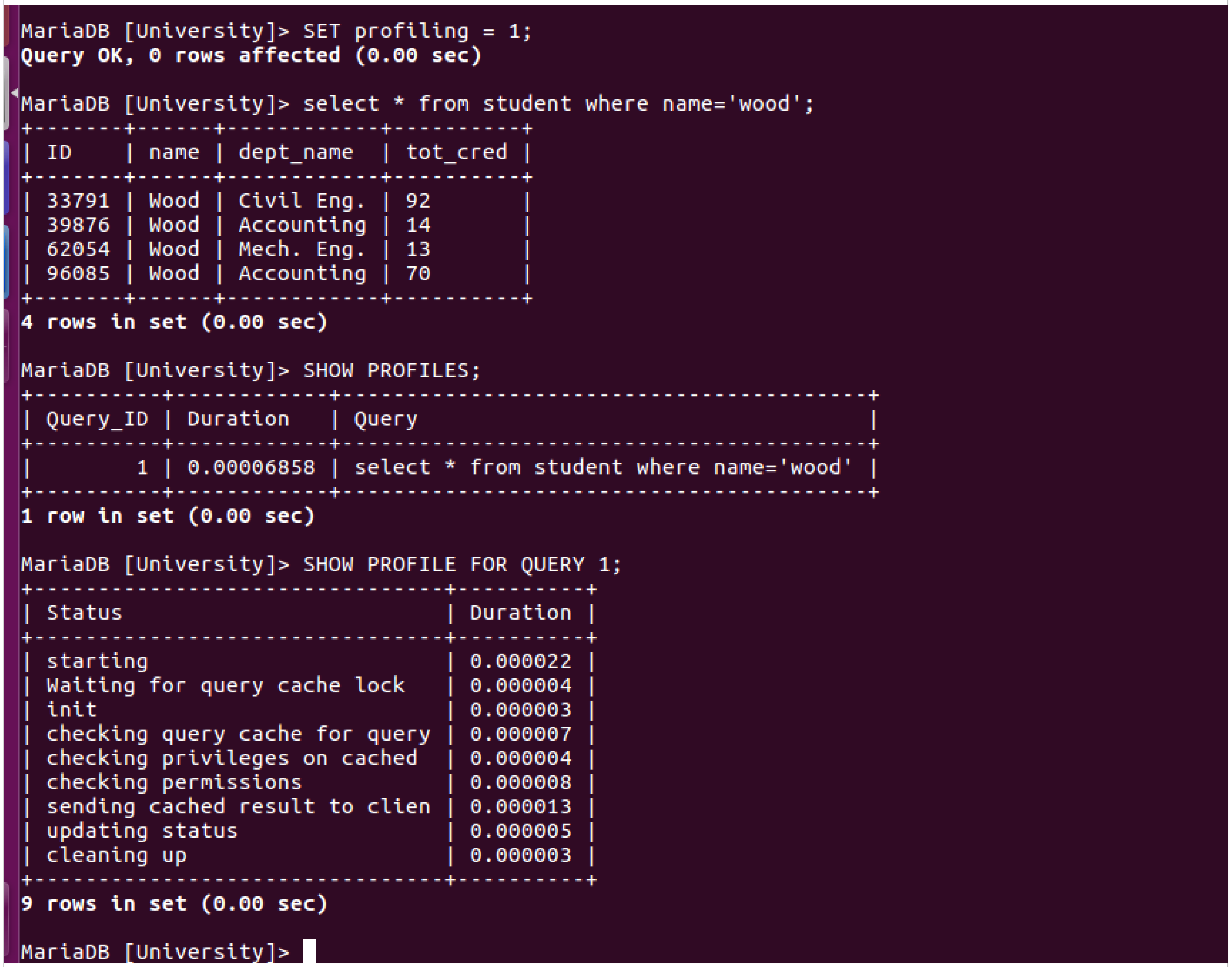
LAB 7

LIBIN N GEORGE
111501015

PART A

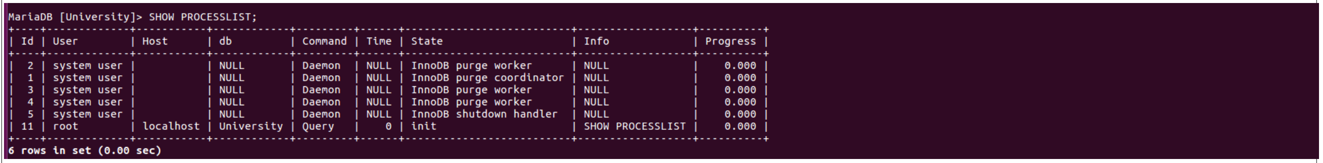
1) Imported database "largeRelationsInsertFile.sql"

2)

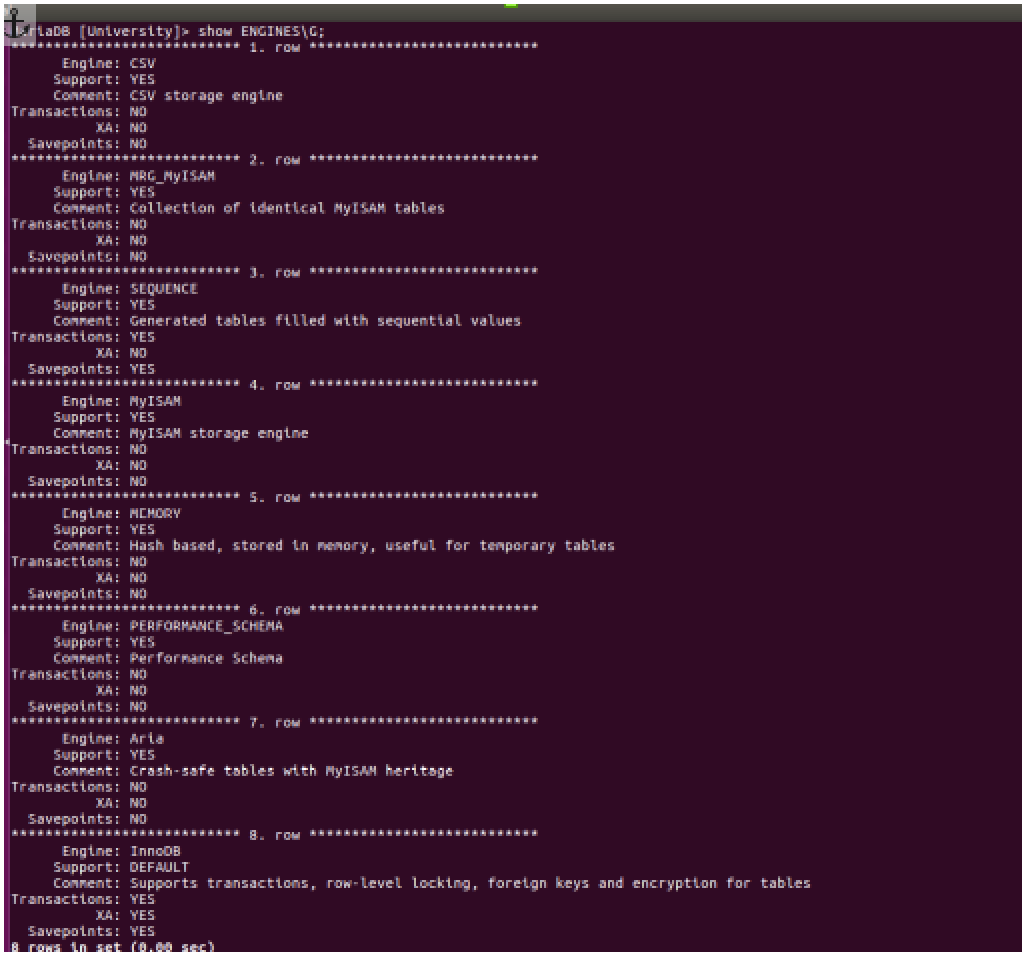


```
MariaDB [University]> SET profiling = 1;
Query OK, 0 rows affected (0.00 sec)

MariaDB [University]> select * from student where name='wood';
+-------+------+------------+----------+
| ID    | name | dept_name  | tot_cred |
+-------+------+------------+----------+
| 33791 | Wood | Civil Eng. | 92       |
| 39876 | Wood | Accounting | 14       |
| 62054 | Wood | Mech. Eng. | 13       |
| 96085 | Wood | Accounting | 70       |
+-------+------+------------+----------+
4 rows in set (0.00 sec)

MariaDB [University]> SHOW PROFILES;
+----------+------------+---------------------------------------+
| Query_ID | Duration   | Query                                 |
+----------+------------+---------------------------------------+
|        1 | 0.00006858 | select * from student where name='wood' |
+----------+------------+---------------------------------------+
1 row in set (0.00 sec)

MariaDB [University]> SHOW PROFILE FOR QUERY 1;
+--------------------------------+----------+
| Status                         | Duration |
+--------------------------------+----------+
| starting                       | 0.000022 |
| Waiting for query cache lock   | 0.000004 |
| init                           | 0.000003 |
| checking query cache for query | 0.000007 |
| checking privileges on cached  | 0.000004 |
| checking permissions           | 0.000008 |
| sending cached result to clien | 0.000013 |
| updating status                | 0.000005 |
| cleaning up                    | 0.000003 |
+--------------------------------+----------+
9 rows in set (0.00 sec)

MariaDB [University]>
```

Thus the bottleneck is for starting and then comes the sending cached results

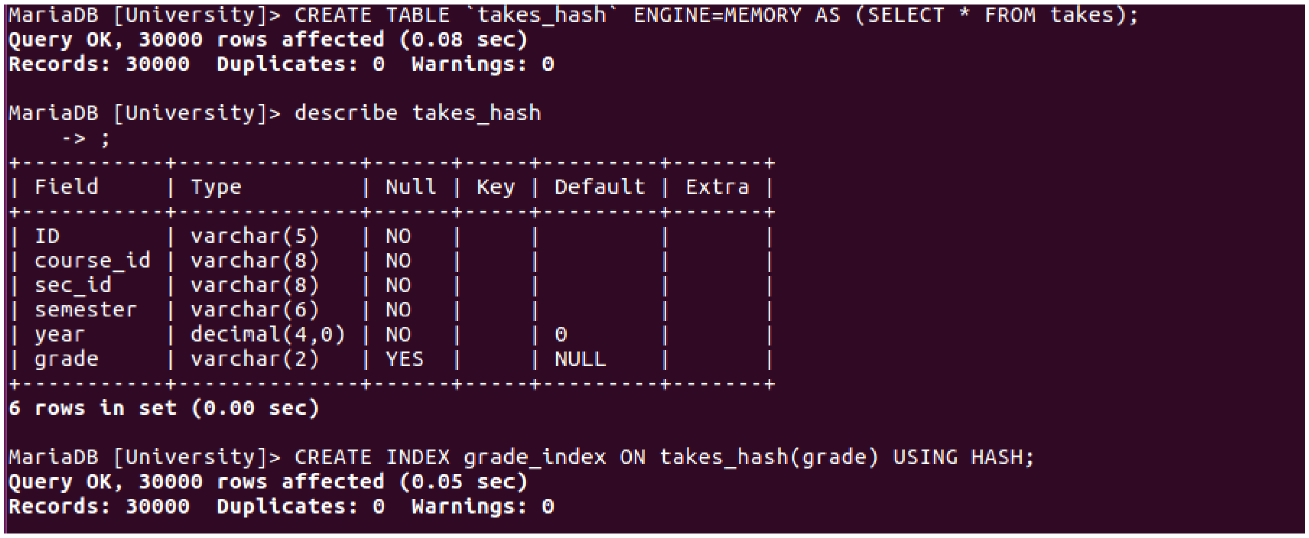


```
MariaDB [University]> SHOW PROCESSLIST;
+----+-------------+-----------+------------+---------+------+--------------------------+------------------+----------+
| Id | User        | Host      | db         | Command | Time | State                    | Info             | Progress |
+----+-------------+-----------+------------+---------+------+--------------------------+------------------+----------+
|  2 | system user |           | NULL       | Daemon  | NULL | InnoDB purge worker      | NULL             |    0.000 |
|  1 | system user |           | NULL       | Daemon  | NULL | InnoDB purge coordinator | NULL             |    0.000 |
|  3 | system user |           | NULL       | Daemon  | NULL | InnoDB purge worker      | NULL             |    0.000 |
|  4 | system user |           | NULL       | Daemon  | NULL | InnoDB purge worker      | NULL             |    0.000 |
|  5 | system user |           | NULL       | Daemon  | NULL | InnoDB shutdown handler  | NULL             |    0.000 |
| 11 | root        | localhost | University | Query   |    0 | init                     | SHOW PROCESSLIST |    0.000 |
+----+-------------+-----------+------------+---------+------+--------------------------+------------------+----------+
6 rows in set (0.00 sec)
```

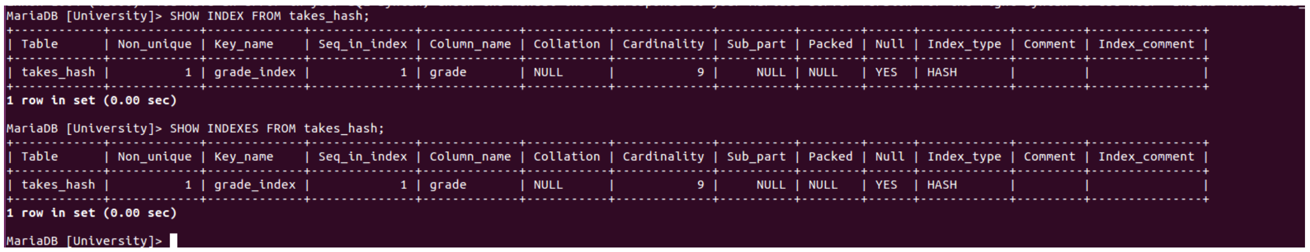


```
MariaDB [University]> show ENGINES\G;
*************************** 1. row ***************************
      Engine: CSV
     Support: YES
     Comment: CSV storage engine
Transactions: NO
          XA: NO
  Savepoints: NO
*************************** 2. row ***************************
      Engine: MRG_MyISAM
     Support: YES
     Comment: Collection of identical MyISAM tables
Transactions: NO
          XA: NO
  Savepoints: NO
*************************** 3. row ***************************
      Engine: SEQUENCE
     Support: YES
     Comment: Generated tables filled with sequential values
Transactions: YES
          XA: NO
  Savepoints: YES
*************************** 4. row ***************************
      Engine: MyISAM
     Support: YES
     Comment: MyISAM storage engine
Transactions: NO
          XA: NO
  Savepoints: NO
*************************** 5. row ***************************
      Engine: MEMORY
     Support: YES
     Comment: Hash based, stored in memory, useful for temporary tables
Transactions: NO
          XA: NO
  Savepoints: NO
*************************** 6. row ***************************
      Engine: PERFORMANCE_SCHEMA
     Support: YES
     Comment: Performance Schema
Transactions: NO
          XA: NO
  Savepoints: NO
*************************** 7. row ***************************
      Engine: Aria
     Support: YES
     Comment: Crash-safe tables with MyISAM heritage
Transactions: NO
          XA: NO
  Savepoints: NO
*************************** 8. row ***************************
      Engine: InnoDB
     Support: DEFAULT
     Comment: Supports transactions, row-level locking, foreign keys and encryption for tables
Transactions: YES
          XA: YES
  Savepoints: YES
8 rows in set (0.00 sec)
```

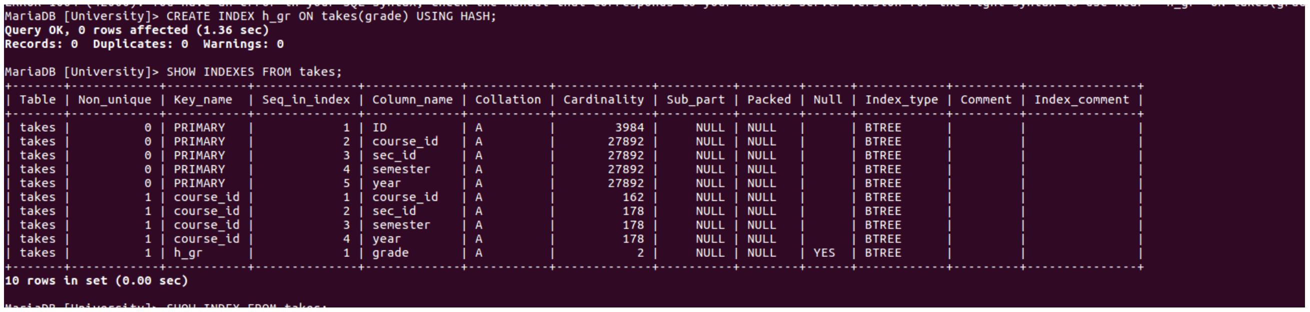
Default storage machine is InnoDB
Engine MEMORY is Hash based hence support Hash Index



```
MariaDB [University]> CREATE TABLE `takes_hash` ENGINE=MEMORY AS (SELECT * FROM takes);
Query OK, 30000 rows affected (0.08 sec)
Records: 30000  Duplicates: 0  Warnings: 0

MariaDB [University]> describe takes_hash
    -> ;
+-----------+--------------+------+-----+---------+-------+
| Field     | Type         | Null | Key | Default | Extra |
+-----------+--------------+------+-----+---------+-------+
| ID        | varchar(5)   | NO   |     |         |       |
| course_id | varchar(8)   | NO   |     |         |       |
| sec_id    | varchar(8)   | NO   |     |         |       |
| semester  | varchar(6)   | NO   |     |         |       |
| year      | decimal(4,0) | NO   |     | 0       |       |
| grade     | varchar(2)   | YES  |     | NULL    |       |
+-----------+--------------+------+-----+---------+-------+
6 rows in set (0.00 sec)

MariaDB [University]> CREATE INDEX grade_index ON takes_hash(grade) USING HASH;
Query OK, 30000 rows affected (0.05 sec)
Records: 30000  Duplicates: 0  Warnings: 0
```

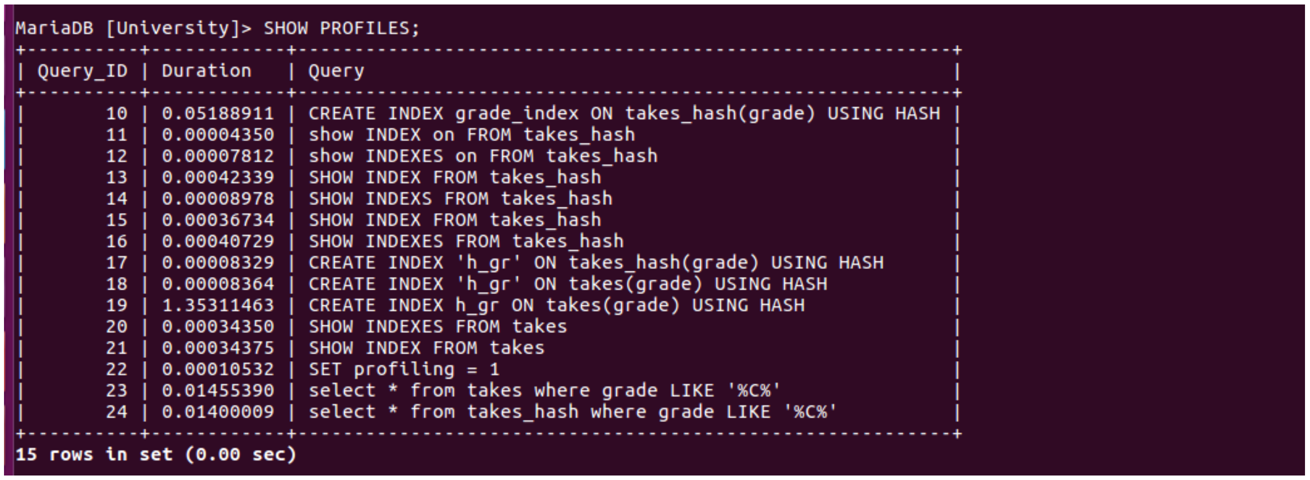


```
MariaDB [University]> SHOW INDEX FROM takes_hash;
+------------+------------+-------------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| Table      | Non_unique | Key_name    | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment |
+------------+------------+-------------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| takes_hash |          1 | grade_index |            1 | grade       | NULL      |           9 |     NULL | NULL   | YES  | HASH       |         |               |
+------------+------------+-------------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
1 row in set (0.00 sec)

MariaDB [University]> SHOW INDEXES FROM takes_hash;
+------------+------------+-------------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| Table      | Non_unique | Key_name    | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment |
+------------+------------+-------------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| takes_hash |          1 | grade_index |            1 | grade       | NULL      |           9 |     NULL | NULL   | YES  | HASH       |         |               |
+------------+------------+-------------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
1 row in set (0.00 sec)

MariaDB [University]>
```



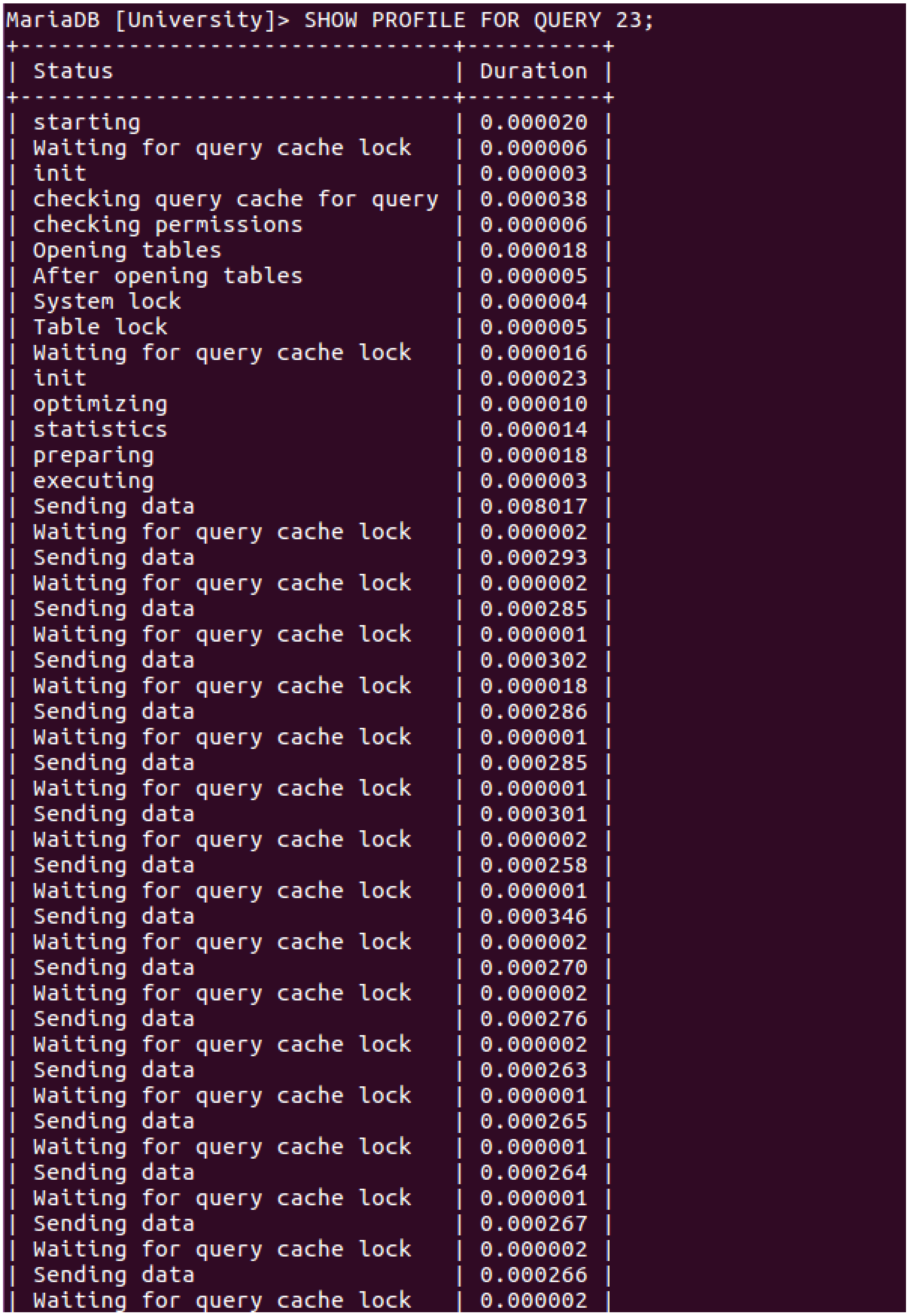
```
MariaDB [University]> CREATE INDEX h_gr ON takes(grade) USING HASH;
Query OK, 0 rows affected (1.36 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [University]> SHOW INDEXES FROM takes;
+-------+------------+-----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| Table | Non_unique | Key_name  | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment |
+-------+------------+-----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| takes |          0 | PRIMARY   |            1 | ID          | A         |        3984 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          0 | PRIMARY   |            2 | course_id   | A         |       27892 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          0 | PRIMARY   |            3 | sec_id      | A         |       27892 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          0 | PRIMARY   |            4 | semester    | A         |       27892 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          0 | PRIMARY   |            5 | year        | A         |       27892 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | course_id |            1 | course_id   | A         |         162 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | course_id |            2 | sec_id      | A         |         178 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | course_id |            3 | semester    | A         |         178 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | course_id |            4 | year        | A         |         178 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | h_gr      |            1 | grade       | A         |           2 |     NULL | NULL   | YES  | BTREE      |         |               |
+-------+------------+-----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
10 rows in set (0.00 sec)
```

Thus hash is not used instead it uses a Btree index type which is nullable

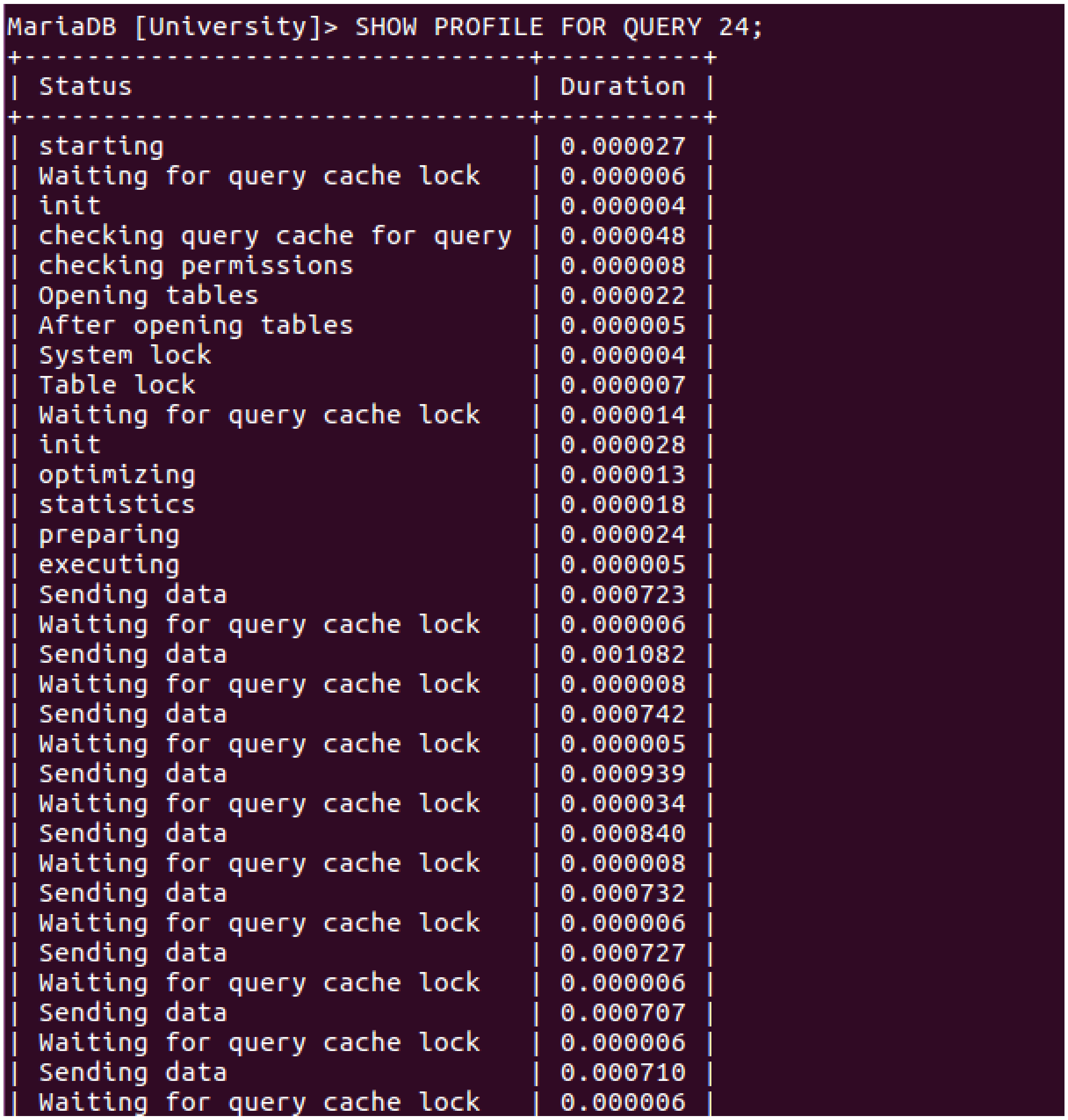


```
MariaDB [University]> SHOW PROFILES;
+----------+------------+------------------------------------------------------------+
| Query_ID | Duration   | Query                                                      |
+----------+------------+------------------------------------------------------------+
|       10 | 0.05188911 | CREATE INDEX grade_index ON takes_hash(grade) USING HASH |
|       11 | 0.00004350 | show INDEX on FROM takes_hash                              |
|       12 | 0.00007812 | show INDEXES on FROM takes_hash                            |
|       13 | 0.00042339 | SHOW INDEX FROM takes_hash                                 |
|       14 | 0.00008978 | SHOW INDEXS FROM takes_hash                                |
|       15 | 0.00036734 | SHOW INDEX FROM takes_hash                                 |
|       16 | 0.00040729 | SHOW INDEXES FROM takes_hash                               |
|       17 | 0.00008329 | CREATE INDEX 'h_gr' ON takes_hash(grade) USING HASH        |
|       18 | 0.00008364 | CREATE INDEX 'h_gr' ON takes(grade) USING HASH             |
|       19 | 1.35311463 | CREATE INDEX h_gr ON takes(grade) USING HASH               |
|       20 | 0.00034350 | SHOW INDEXES FROM takes                                    |
|       21 | 0.00034375 | SHOW INDEX FROM takes                                      |
|       22 | 0.00010532 | SET profiling = 1                                          |
|       23 | 0.01455390 | select * from takes where grade LIKE '%C%'                 |
|       24 | 0.01400009 | select * from takes_hash where grade LIKE '%C%'            |
+----------+------------+------------------------------------------------------------+
15 rows in set (0.00 sec)
```

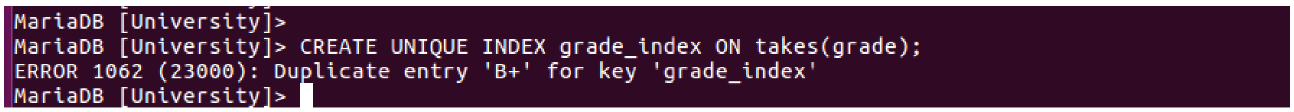
That is hash takes less time than B tree Indexing.



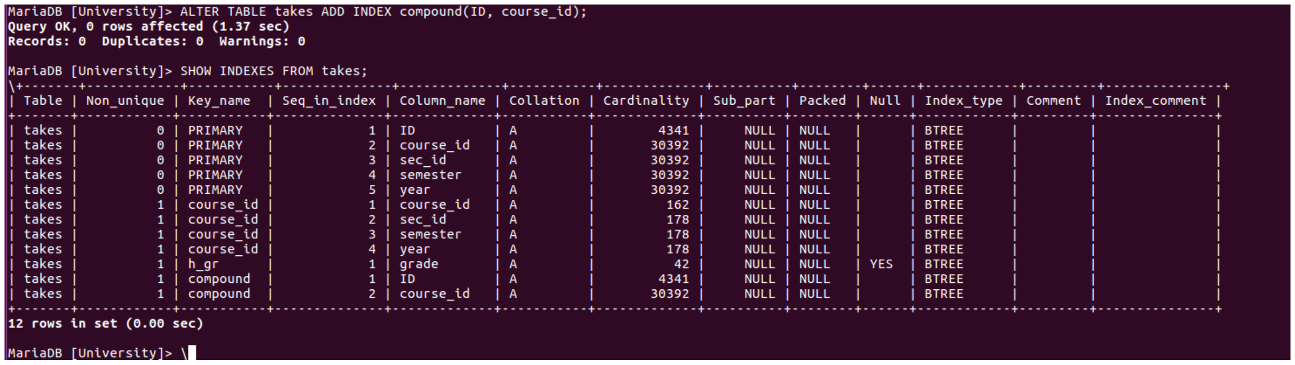
```
MariaDB [University]> SHOW PROFILE FOR QUERY 23;
+--------------------------------+----------+
| Status                         | Duration |
+--------------------------------+----------+
| starting                       | 0.000020 |
| Waiting for query cache lock   | 0.000006 |
| init                           | 0.000003 |
| checking query cache for query | 0.000038 |
| checking permissions           | 0.000006 |
| Opening tables                 | 0.000018 |
| After opening tables           | 0.000005 |
| System lock                    | 0.000004 |
| Table lock                     | 0.000005 |
| Waiting for query cache lock   | 0.000016 |
| init                           | 0.000023 |
| optimizing                     | 0.000010 |
| statistics                     | 0.000014 |
| preparing                      | 0.000018 |
| executing                      | 0.000003 |
| Sending data                   | 0.008017 |
| Waiting for query cache lock   | 0.000002 |
| Sending data                   | 0.000293 |
| Waiting for query cache lock   | 0.000002 |
| Sending data                   | 0.000285 |
| Waiting for query cache lock   | 0.000001 |
| Sending data                   | 0.000302 |
| Waiting for query cache lock   | 0.000018 |
| Sending data                   | 0.000286 |
| Waiting for query cache lock   | 0.000001 |
| Sending data                   | 0.000285 |
| Waiting for query cache lock   | 0.000001 |
| Sending data                   | 0.000301 |
| Waiting for query cache lock   | 0.000002 |
| Sending data                   | 0.000258 |
| Waiting for query cache lock   | 0.000001 |
| Sending data                   | 0.000346 |
| Waiting for query cache lock   | 0.000002 |
| Sending data                   | 0.000270 |
| Waiting for query cache lock   | 0.000002 |
| Sending data                   | 0.000276 |
| Waiting for query cache lock   | 0.000002 |
| Sending data                   | 0.000263 |
| Waiting for query cache lock   | 0.000001 |
| Sending data                   | 0.000265 |
| Waiting for query cache lock   | 0.000001 |
| Sending data                   | 0.000264 |
| Waiting for query cache lock   | 0.000001 |
| Sending data                   | 0.000267 |
| Waiting for query cache lock   | 0.000002 |
| Sending data                   | 0.000266 |
| Waiting for query cache lock   | 0.000002 |
```



```
MariaDB [University]> SHOW PROFILE FOR QUERY 24;
+--------------------------------+----------+
| Status                         | Duration |
+--------------------------------+----------+
| starting                       | 0.000027 |
| Waiting for query cache lock   | 0.000006 |
| init                           | 0.000004 |
| checking query cache for query | 0.000048 |
| checking permissions           | 0.000008 |
| Opening tables                 | 0.000022 |
| After opening tables           | 0.000005 |
| System lock                    | 0.000004 |
| Table lock                     | 0.000007 |
| Waiting for query cache lock   | 0.000014 |
| init                           | 0.000028 |
| optimizing                     | 0.000013 |
| statistics                     | 0.000018 |
| preparing                      | 0.000024 |
| executing                      | 0.000005 |
| Sending data                   | 0.000723 |
| Waiting for query cache lock   | 0.000006 |
| Sending data                   | 0.001082 |
| Waiting for query cache lock   | 0.000008 |
| Sending data                   | 0.000742 |
| Waiting for query cache lock   | 0.000005 |
| Sending data                   | 0.000939 |
| Waiting for query cache lock   | 0.000034 |
| Sending data                   | 0.000840 |
| Waiting for query cache lock   | 0.000008 |
| Sending data                   | 0.000732 |
| Waiting for query cache lock   | 0.000006 |
| Sending data                   | 0.000727 |
| Waiting for query cache lock   | 0.000006 |
| Sending data                   | 0.000707 |
| Waiting for query cache lock   | 0.000006 |
| Sending data                   | 0.000710 |
| Waiting for query cache lock   | 0.000006 |
```

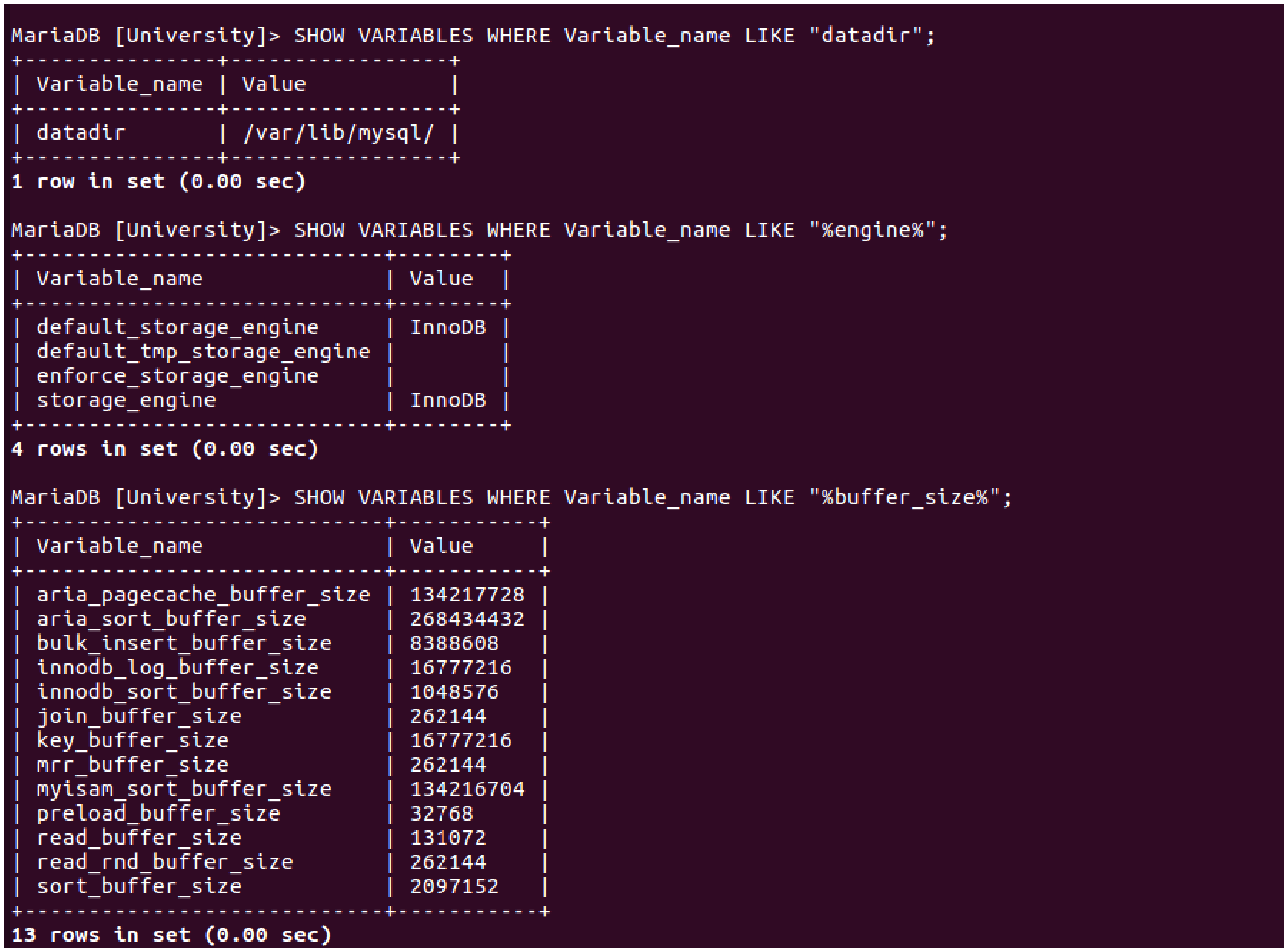


```
MariaDB [University]>
MariaDB [University]> CREATE UNIQUE INDEX grade_index ON takes(grade);
ERROR 1062 (23000): Duplicate entry 'B+' for key 'grade_index'
MariaDB [University]>
```

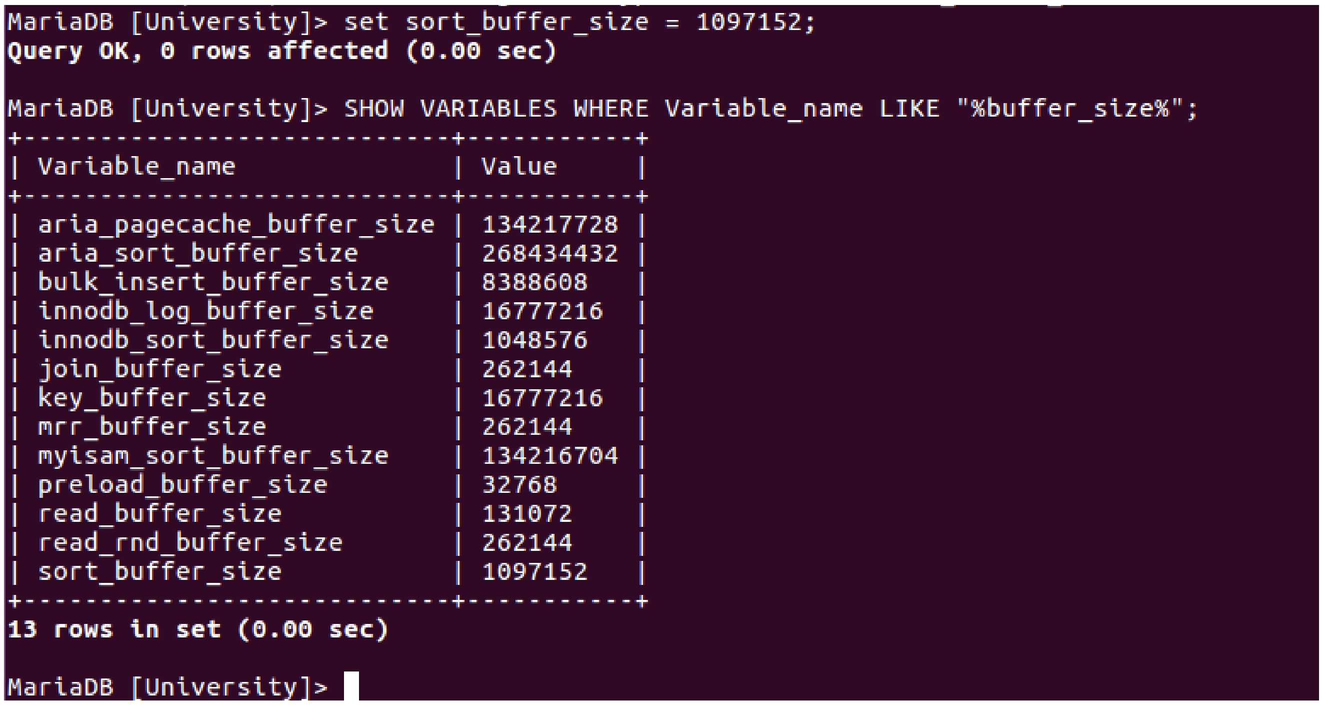


```
MariaDB [University]> ALTER TABLE takes ADD INDEX compound(ID, course_id);
Query OK, 0 rows affected (1.37 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [University]> SHOW INDEXES FROM takes;
\+-------+------------+-----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| Table | Non_unique | Key_name  | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment |
+-------+------------+-----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| takes |          0 | PRIMARY   |            1 | ID          | A         |        4341 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          0 | PRIMARY   |            2 | course_id   | A         |       30392 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          0 | PRIMARY   |            3 | sec_id      | A         |       30392 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          0 | PRIMARY   |            4 | semester    | A         |       30392 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          0 | PRIMARY   |            5 | year        | A         |       30392 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | course_id |            1 | course_id   | A         |         162 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | course_id |            2 | sec_id      | A         |         178 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | course_id |            3 | semester    | A         |         178 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | course_id |            4 | year        | A         |         178 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | h_gr      |            1 | grade       | A         |          42 |     NULL | NULL   | YES  | BTREE      |         |               |
| takes |          1 | compound  |            1 | ID          | A         |        4341 |     NULL | NULL   |      | BTREE      |         |               |
| takes |          1 | compound  |            2 | course_id   | A         |       30392 |     NULL | NULL   |      | BTREE      |         |               |
+-------+------------+-----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
12 rows in set (0.00 sec)

MariaDB [University]> \
```

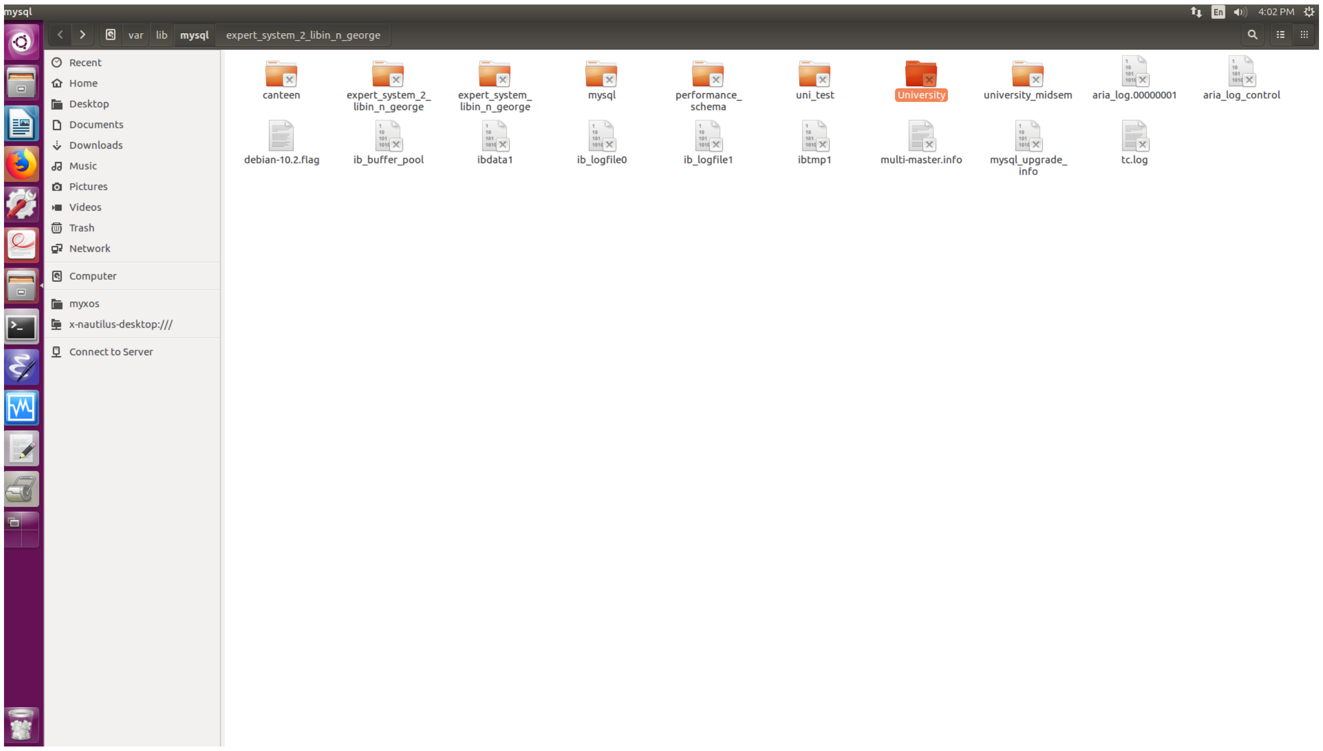
4)



```
MariaDB [University]> SHOW VARIABLES WHERE Variable_name LIKE "datadir";
+---------------+-----------------+
| Variable_name | Value           |
+---------------+-----------------+
| datadir       | /var/lib/mysql/ |
+---------------+-----------------+
1 row in set (0.00 sec)

MariaDB [University]> SHOW VARIABLES WHERE Variable_name LIKE "%engine%";
+----------------------------+--------+
| Variable_name              | Value  |
+----------------------------+--------+
| default_storage_engine     | InnoDB |
| default_tmp_storage_engine |        |
| enforce_storage_engine     |        |
| storage_engine             | InnoDB |
+----------------------------+--------+
4 rows in set (0.00 sec)

MariaDB [University]> SHOW VARIABLES WHERE Variable_name LIKE "%buffer_size%";
+----------------------------+-----------+
| Variable_name              | Value     |
+----------------------------+-----------+
| aria_pagecache_buffer_size | 134217728 |
| aria_sort_buffer_size      | 268434432 |
| bulk_insert_buffer_size    | 8388608   |
| innodb_log_buffer_size     | 16777216  |
| innodb_sort_buffer_size    | 1048576   |
| join_buffer_size           | 262144    |
| key_buffer_size            | 16777216  |
| mrr_buffer_size            | 262144    |
| myisam_sort_buffer_size    | 134216704 |
| preload_buffer_size        | 32768     |
| read_buffer_size           | 131072    |
| read_rnd_buffer_size       | 262144    |
| sort_buffer_size           | 2097152   |
+----------------------------+-----------+
13 rows in set (0.00 sec)
```

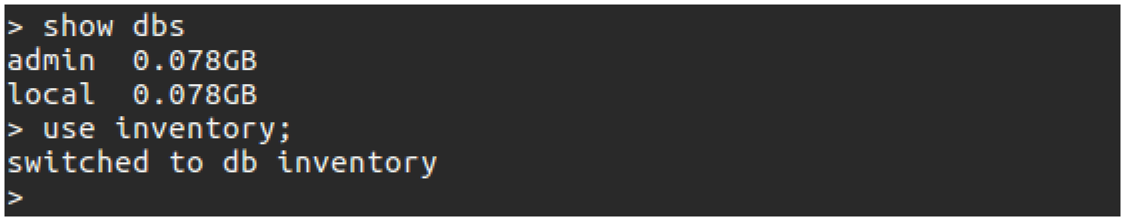


```
MariaDB [University]> set sort_buffer_size = 1097152;
Query OK, 0 rows affected (0.00 sec)

MariaDB [University]> SHOW VARIABLES WHERE Variable_name LIKE "%buffer_size%";
+----------------------------+-----------+
| Variable_name              | Value     |
+----------------------------+-----------+
| aria_pagecache_buffer_size | 134217728 |
| aria_sort_buffer_size      | 268434432 |
| bulk_insert_buffer_size    | 8388608   |
| innodb_log_buffer_size     | 16777216  |
| innodb_sort_buffer_size    | 1048576   |
| join_buffer_size           | 262144    |
| key_buffer_size            | 16777216  |
| mrr_buffer_size            | 262144    |
| myisam_sort_buffer_size    | 134216704 |
| preload_buffer_size        | 32768     |
| read_buffer_size           | 131072    |
| read_rnd_buffer_size       | 262144    |
| sort_buffer_size           | 1097152   |
+----------------------------+-----------+
13 rows in set (0.00 sec)

MariaDB [University]> 
```

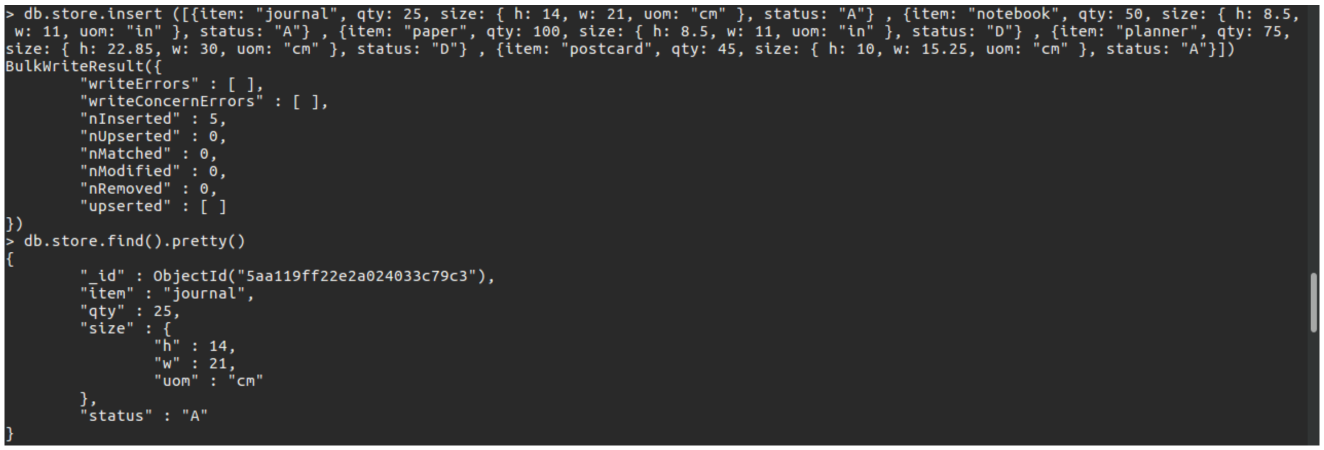


We can see each database as a inode/directory

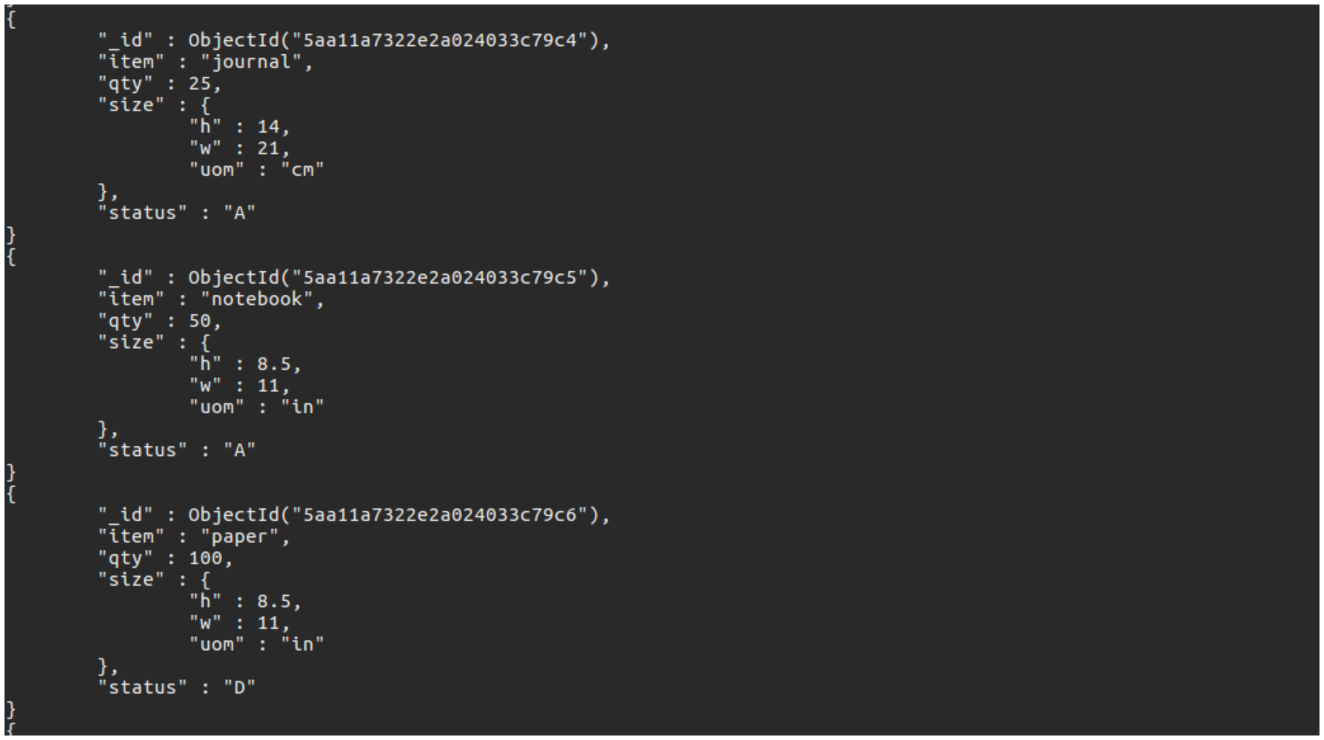
PART B



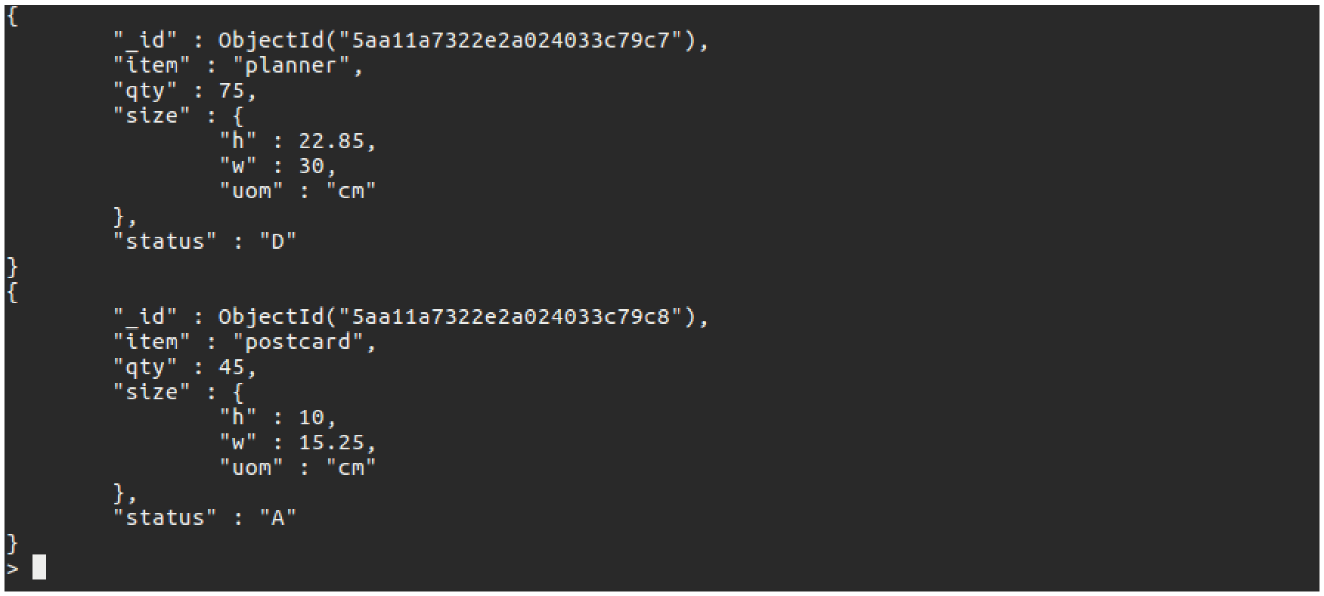
```
> show dbs
admin   0.078GB
local   0.078GB
> use inventory;
switched to db inventory
>
```



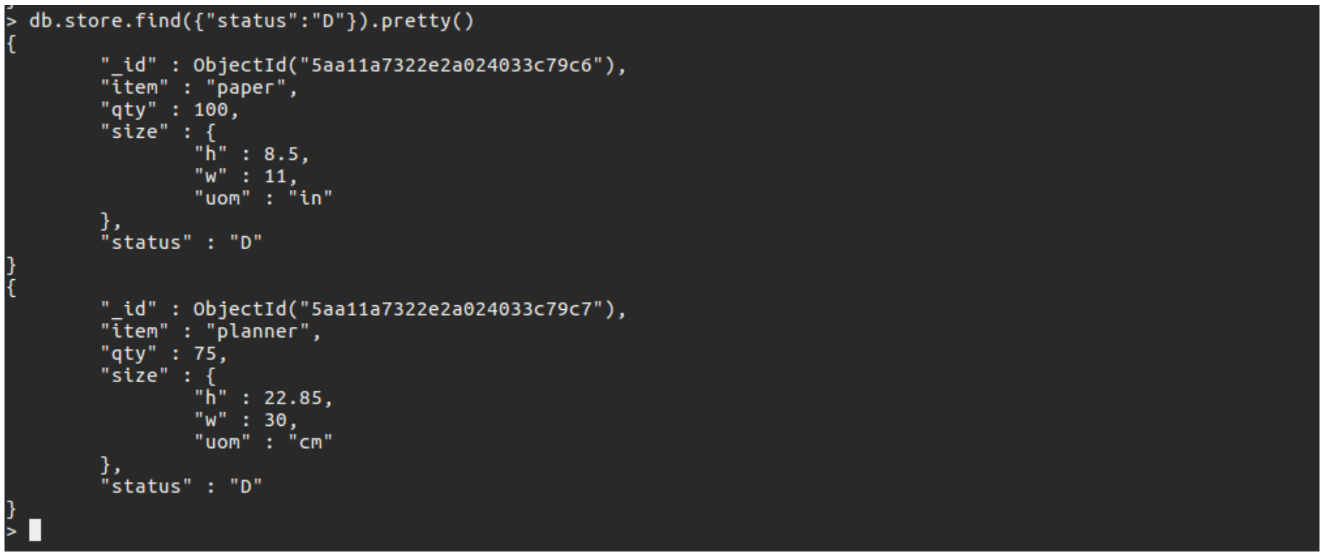
```
> db.store.insert ([{item: "journal", qty: 25, size: { h: 14, w: 21, uom: "cm" }, status: "A"} , {item: "notebook", qty: 50, size: { h: 8.5,
 w: 11, uom: "in" }, status: "A"} , {item: "paper", qty: 100, size: { h: 8.5, w: 11, uom: "in" }, status: "D"} , {item: "planner", qty: 75,
size: { h: 22.85, w: 30, uom: "cm" }, status: "D"} , {item: "postcard", qty: 45, size: { h: 10, w: 15.25, uom: "cm" }, status: "A"}])
BulkWriteResult({
        "writeErrors" : [ ],
        "writeConcernErrors" : [ ],
        "nInserted" : 5,
        "nUpserted" : 0,
        "nMatched" : 0,
        "nModified" : 0,
        "nRemoved" : 0,
        "upserted" : [ ]
})
> db.store.find().pretty()
{
        "_id" : ObjectId("5aa119ff22e2a024033c79c3"),
        "item" : "journal",
        "qty" : 25,
        "size" : {
                "h" : 14,
                "w" : 21,
                "uom" : "cm"
        },
        "status" : "A"
}
```



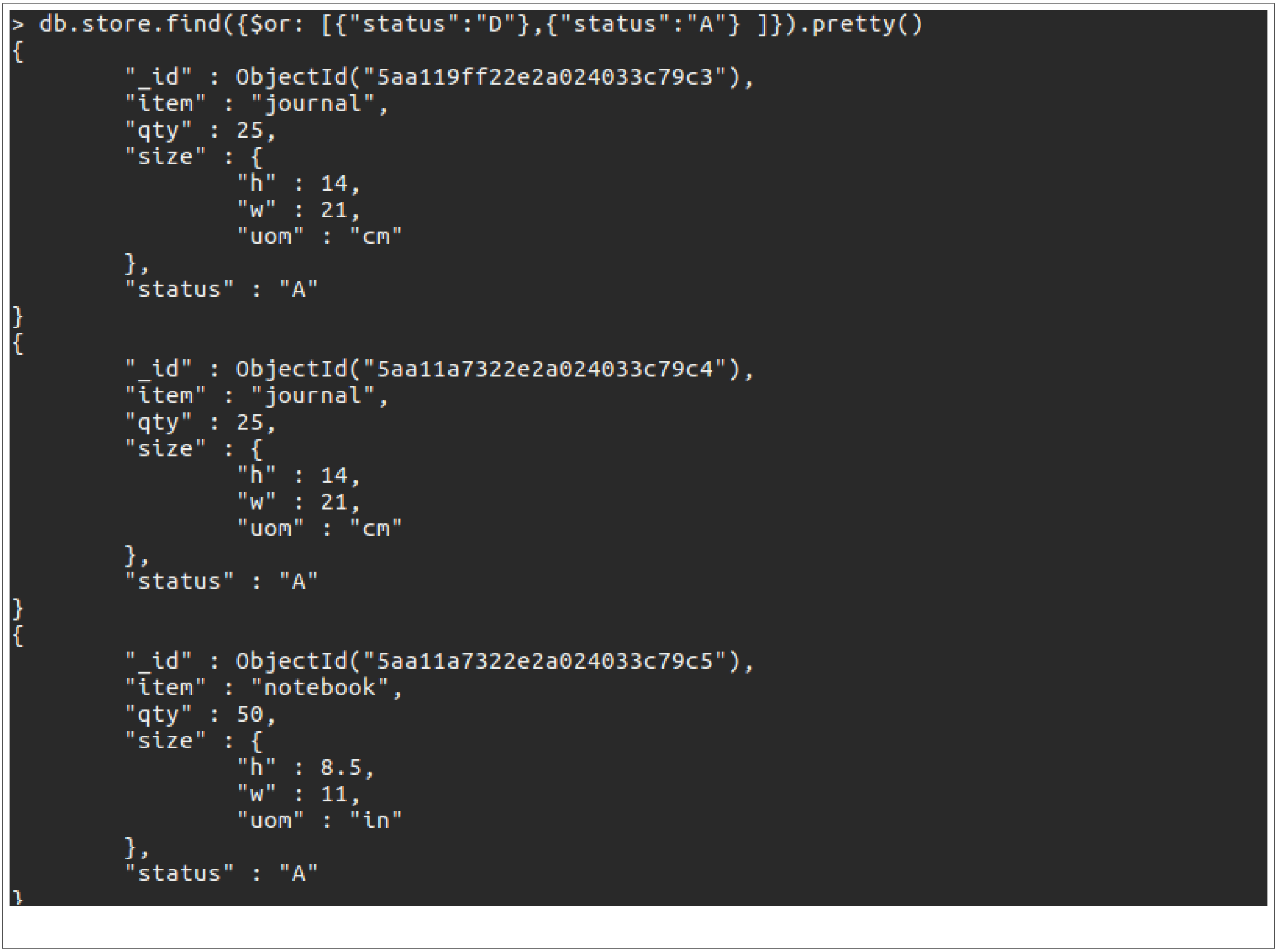
```
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c4"),
        "item" : "journal",
        "qty" : 25,
        "size" : {
                "h" : 14,
                "w" : 21,
                "uom" : "cm"
        },
        "status" : "A"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c5"),
        "item" : "notebook",
        "qty" : 50,
        "size" : {
                "h" : 8.5,
                "w" : 11,
                "uom" : "in"
        },
        "status" : "A"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c6"),
        "item" : "paper",
        "qty" : 100,
        "size" : {
                "h" : 8.5,
                "w" : 11,
                "uom" : "in"
        },
        "status" : "D"
}
{
```



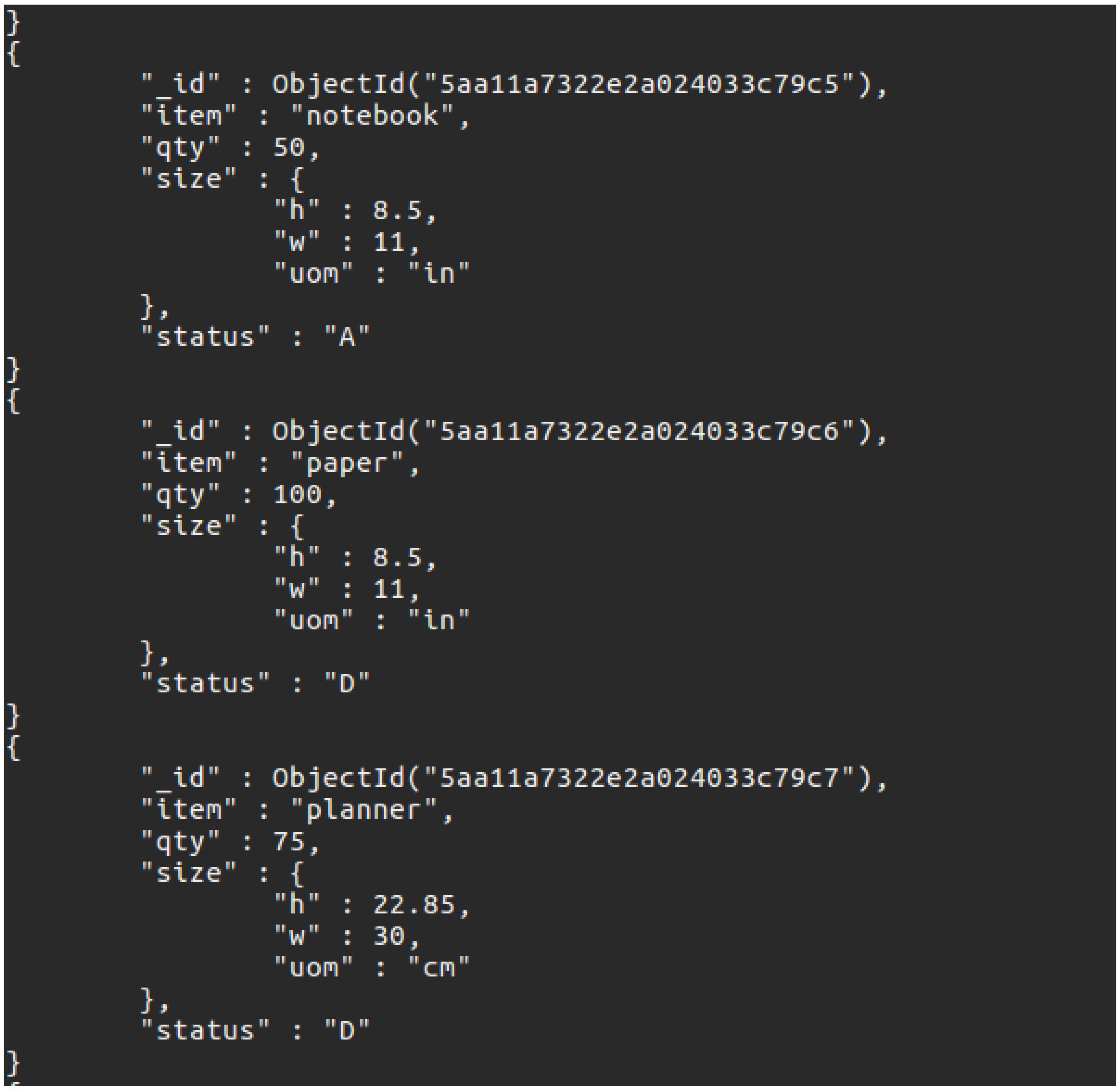
```
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c7"),
        "item" : "planner",
        "qty" : 75,
        "size" : {
                "h" : 22.85,
                "w" : 30,
                "uom" : "cm"
        },
        "status" : "D"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c8"),
        "item" : "postcard",
        "qty" : 45,
        "size" : {
                "h" : 10,
                "w" : 15.25,
                "uom" : "cm"
        },
        "status" : "A"
}
> 
```



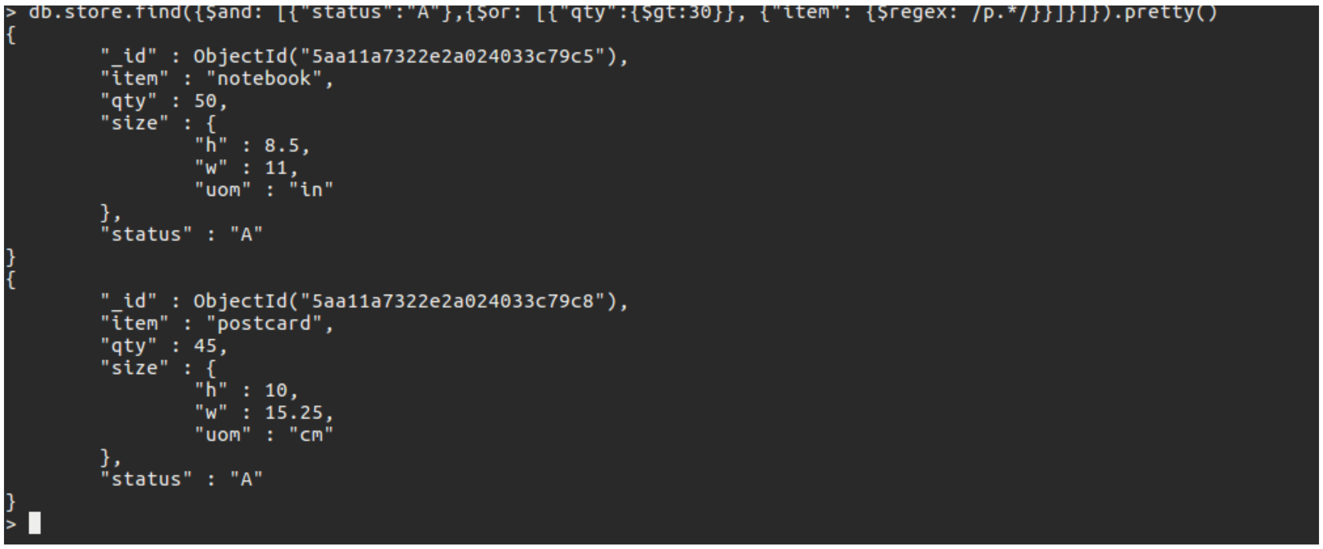
```
> db.store.find({"status":"D"}).pretty()
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c6"),
        "item" : "paper",
        "qty" : 100,
        "size" : {
                "h" : 8.5,
                "w" : 11,
                "uom" : "in"
        },
        "status" : "D"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c7"),
        "item" : "planner",
        "qty" : 75,
        "size" : {
                "h" : 22.85,
                "w" : 30,
                "uom" : "cm"
        },
        "status" : "D"
}
> 
```



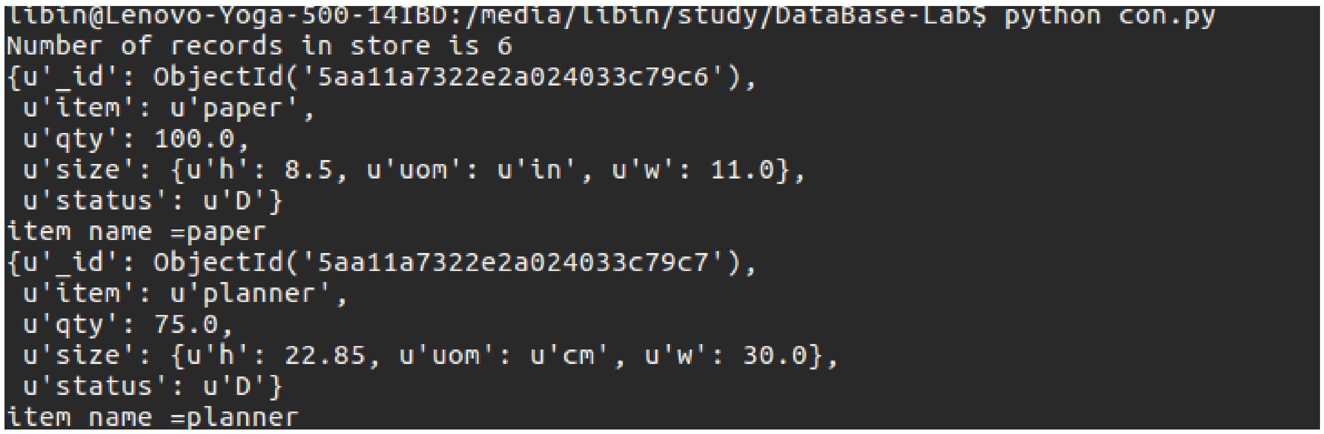
```
> db.store.find({$or: [{"status":"D"},{"status":"A"} ]}).pretty()
{
        "_id" : ObjectId("5aa119ff22e2a024033c79c3"),
        "item" : "journal",
        "qty" : 25,
        "size" : {
                "h" : 14,
                "w" : 21,
                "uom" : "cm"
        },
        "status" : "A"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c4"),
        "item" : "journal",
        "qty" : 25,
        "size" : {
                "h" : 14,
                "w" : 21,
                "uom" : "cm"
        },
        "status" : "A"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c5"),
        "item" : "notebook",
        "qty" : 50,
        "size" : {
                "h" : 8.5,
                "w" : 11,
                "uom" : "in"
        },
        "status" : "A"
}
```



```
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c5"),
        "item" : "notebook",
        "qty" : 50,
        "size" : {
                "h" : 8.5,
                "w" : 11,
                "uom" : "in"
        },
        "status" : "A"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c6"),
        "item" : "paper",
        "qty" : 100,
        "size" : {
                "h" : 8.5,
                "w" : 11,
                "uom" : "in"
        },
        "status" : "D"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c7"),
        "item" : "planner",
        "qty" : 75,
        "size" : {
                "h" : 22.85,
                "w" : 30,
                "uom" : "cm"
        },
        "status" : "D"
}
```



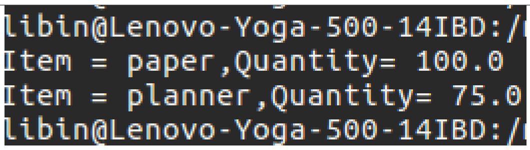
```
> db.store.find({$and: [{"status":"A"},{$or: [{"qty":{$gt:30}}, {"item": {$regex: /p.*/}}]}]}).pretty()
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c5"),
        "item" : "notebook",
        "qty" : 50,
        "size" : {
                "h" : 8.5,
                "w" : 11,
                "uom" : "in"
        },
        "status" : "A"
}
{
        "_id" : ObjectId("5aa11a7322e2a024033c79c8"),
        "item" : "postcard",
        "qty" : 45,
        "size" : {
                "h" : 10,
                "w" : 15.25,
                "uom" : "cm"
        },
        "status" : "A"
}
> 
```



```
libin@Lenovo-Yoga-500-14IBD:/media/libin/study/DataBase-Lab$ python con.py
Number of records in store is 6
{u'_id': ObjectId('5aa11a7322e2a024033c79c6'),
 u'item': u'paper',
 u'qty': 100.0,
 u'size': {u'h': 8.5, u'uom': u'in', u'w': 11.0},
 u'status': u'D'}
item name =paper
{u'_id': ObjectId('5aa11a7322e2a024033c79c7'),
 u'item': u'planner',
 u'qty': 75.0,
 u'size': {u'h': 22.85, u'uom': u'cm', u'w': 30.0},
 u'status': u'D'}
item name =planner
```

```
from pymongo import MongoClient
import pprint
client = MongoClient()
client = MongoClient("mongodb://localhost")
db = client.inventory
coll = db.store
print "Number of records in store is {}".format(coll.count())
for i in coll.find({"status":"D"}):
    pprint.pprint(i)
    print "item name ={} ". format(i["item"])
```

```
from pymongo import MongoClient
import pprint
client = MongoClient()
client = MongoClient("mongodb://localhost")
db = client.inventory
coll = db.store
di = []
for i in coll.find({"status":"D"}):
    di.append({"Item":i["item"],"Quantity": i["qty"]})
for i in di:
    print "Item = {},Quantity= {} ".format( i["Item"], i["Quantity"])
```



```
libin@Lenovo-Yoga-500-14IBD:/
Item = paper,Quantity= 100.0
Item = planner,Quantity= 75.0
libin@Lenovo-Yoga-500-14IBD:/
```