• Задание №1

```
CREATE TABLE tbl1
(
    UserID UInt64,
    PageViews UInt8,
    Duration UInt8,
    Sign Int8,
    Version UInt8
)
ENGINE = <ENGINE>
ORDER BY UserID;

INSERT INTO tbl1 VALUES (4324182021466249494, 5, 146, -1, 1);
INSERT INTO tbl1 VALUES (4324182021466249494, 5, 146, 1, 1), (4324182021466249494, 6, 185, 1, 2);

SELECT * FROM tbl1;
```

UserID	-PageViews-	—Duration—	—Sign—	_Version_
4324182021466249494	5	146	1	1
4324182021466249494	6	185	1	2
UserID	—PageViews—	—Duration—	—Sign—	—Version—
4324182021466249494	5	146	-1	1

SELECT * FROM tbl1 final;

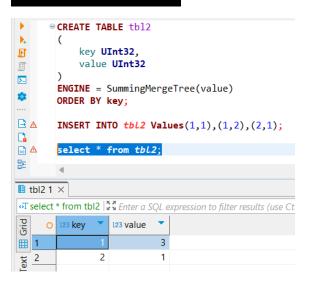
	ion \lnot
4324182021466249494 6 185 1	2

```
○ CREATE TABLE tbl1
)
            UserID UInt64,
Þ
            PageViews UInt8,
I
            Duration UInt8,
>_
            Sign Int8,
            Version UInt8
        ENGINE = VersionedCollapsingMergeTree(Sign, Version)
        ORDER BY UserID;
        INSERT INTO tbl1 VALUES (4324182021466249494, 5, 146, -1, 1);
        INSERT INTO tbl1 VALUES (4324182021466249494, 5, 146, 1, 1),(4324182021466249494, 6, 185, 1, 2);
₿
SELECT * FROM tbl1;
(x)
品
tbl11 ×
oT SELECT * FROM tbl1 | ♣  Enter a SQL expression to filter results (use Ctrl+Space)
        123 UserID
                               123 PageViews
                                             •
                                                123 Duration
                                                            •
                                                               123 Sign
                                                                        •
                                                                           123 Version
                                             5
                                                           146
                                                                                       1
Ⅲ 1
                                                                         1
        4,324,182,021,466,249,494
                                             6
                                                           185
                                                                         1
                                                                                       2
  2
Text
   3
        4,324,182,021,466,249,494
                                              5
                                                           146
                                                                        -1
                                                                                       1
```

```
○ CREATE TABLE tbl1
1
              UserID UInt64,
Þ
              PageViews UInt8,
ⅉ
              Duration UInt8,
>_
              Sign Int8,
              Version UInt8
         ENGINE = VersionedCollapsingMergeTree(Sign, Version)
         ORDER BY UserID;
         INSERT INTO tbl1 VALUES (4324182021466249494, 5, 146, -1, 1);
\blacksquare
         INSERT INTO tbl1 VALUES (4324182021466249494, 5, 146, 1, 1), (4324182021466249494, 6, 185, 1, 2);
SELECT * FROM tbl1 final;
==
■ tbl1 1 ×
\diamondT SELECT * FROM tb11 final \begin{bmatrix} \kappa & \lambda \\ k & \lambda \end{bmatrix} Enter a SQL expression to filter results (use Ctrl+Space)
                                                   ▼ 123 Duration
                                    123 PageViews
          123 UserID
                                                                        123 Sign
                                                                                     123 Version
9
                                                                   185
                                                                                                   2
                                                    6
\blacksquare
```

Выбрана версия движка «VersionedCollapsingMergeTree», поскольку в таблице и в загружаемых данных используются поля «Sign» и «Version»

Задание №2



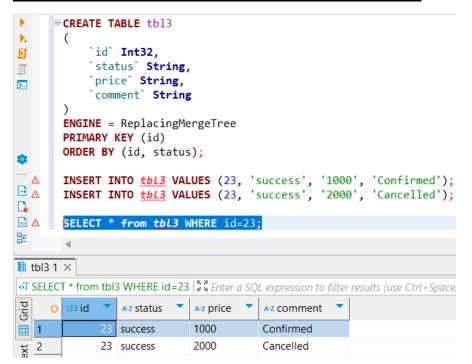
Выбрана версия движка «SummingMergeTree», поскольку структура таблицы, представленный результат и загружаемые данные подходят только для данного типа движка

Задание №3

```
CREATE TABLE tbl3
    `id` Int32,
    `status` String,
    `price` String,
    `comment` String
ENGINE = <ENGINE>
PRIMARY KEY (id)
ORDER BY (id, status);
INSERT INTO tbl3 VALUES (23, 'success', '1000', 'Confirmed');
INSERT INTO tbl3 VALUES (23, 'success', '2000', 'Cancelled');
SELECT * from tbl3 WHERE id=23;
                               price-
                                              comment-
   id-
            -status-
                                             Cancelled
   23
                               2000
            success
   id
                              price
            status
                                             -comment-
                                             Confirmed
   23
                               1000
            success
```

SELECT * from tbl3 FINAL WHERE id=23;





```
•
       ⊖ CREATE TABLE tbl3
1
          (
               `id` Int32,
Ð
               `status` String,
price String,
>_
                'comment' String
          ENGINE = ReplacingMergeTree
          PRIMARY KEY (id)
          ORDER BY (id, status);
         INSERT INTO tbl3 VALUES (23, 'success', '1000', 'Confirmed');
INSERT INTO tbl3 VALUES (23, 'success', '2000', 'Cancelled');
\blacksquare \blacktriangle
SELECT * from tbl3 FINAL WHERE id=23;
   Table tbl3 not found
tbl3 1 ×
oT SELECT * from tbl3 FINAL WHERE id=23 | ™ Enter a SQL expression to filter results (use Ctrl
Grid
           123 id
                       A-z status
                                      A-z price
                                                     A-z comment
                      success
                                      2000
                                                     Cancelled
\blacksquare
```

Выбрана версия движка «ReplacingMergeTree», поскольку структура таблицы, представленный результат и загружаемые данные подходят только для данного типа движка

Задание №4

```
CREATE TABLE tbl4
    CounterID UInt8,
    StartDate Date,
    UserID UInt64
) ENGINE = <ENGINE>
PARTITION BY toYYYYMM(StartDate)
ORDER BY (CounterID, StartDate);
INSERT INTO tbl4 VALUES(0, '2019-11-11', 1);
INSERT INTO tb14 VALUES(1, '2019-11-12', 1);
CREATE TABLE tbl5
    CounterID UInt8,
    StartDate Date,
    UserID AggregateFunction(uniq, UInt64)
) ENGINE = <ENGINE>
PARTITION BY toYYYYMM(StartDate)
ORDER BY (CounterID, StartDate);
INSERT INTO tbl5
select CounterID, StartDate, uniqState(UserID)
from tbl4
group by CounterID, StartDate;
INSERT INTO tbl5 VALUES (1,'2019-11-12',1);
Exception on client:
Code: 53. DB::Exception: Cannot convert UInt64 to AggregateFunction(uniq, UInt64): While executing ValuesBlockInpu
tFormat: data for INSERT was parsed from query. (TYPE_MISMATCH)
SELECT uniqMerge(UserID) AS state
FROM tbl5
GROUP BY CounterID, StartDate;
  state
       1
```

```
○ CREATE TABLE tbl4
)
           CounterID UInt8,
            StartDate Date,
Þ
            UserID UInt64
I
       ) ENGINE = MergeTree
Σ_
       PARTITION BY toYYYYMM(StartDate)
       ORDER BY (CounterID, StartDate);
       INSERT INTO tbl4 VALUES(0, '2019-11-11', 1);
  Δ
       INSERT INTO tbl4 VALUES(1, '2019-11-12', 1);
  Δ
      ○ CREATE TABLE tb15
           CounterID UInt8,
            StartDate Date,
           UserID AggregateFunction(uniq, UInt64)
       ) ENGINE = AggregatingMergeTree
       PARTITION BY toYYYYMM(StartDate)
       ORDER BY (CounterID, StartDate);
     □ INSERT INTO tbl5
       select CounterID, StartDate, uniqState(UserID)
  Δ
       from tbl4
       group by CounterID, StartDate;
       INSERT INTO tbl5 VALUES (1, '2019-11-12',1);
\blacksquare
     SELECT uniqMerge(UserID) AS state
FROM tbl5
(x)
       GROUP BY CounterID, StartDate;
먎

    tbl5 1 ×

•T SELECT uniqMerge(UserID) AS state FROM tbl5 GROUP BY CounterID, 9

Grid
        123 state
Ⅲ 1
                 1
# 2
```

Для таблицы «tbl4» выбрана версия движка «MergeTree» чтобы данные просто добавлялись. Для таблицы «tbl5» выбрана версия «AggregatingMergeTree» чтобы можно было применить агрегатную функцию «uniqState»

Задание №5

```
CREATE TABLE tb16
    `id` Int32,
    `status` String,
    `price` String,
    `comment` String,
    `sign` Int8
ENGINE = <ENGINE>
PRIMARY KEY (id)
ORDER BY (id, status);
INSERT INTO tb16 VALUES (23, 'success', '1000', 'Confirmed', 1);
INSERT INTO tb16 VALUES (23, 'success', '1000', 'Confirmed', -1), (23, 'success', '2000', 'Cancelled',
1);
SELECT * FROM tb16;
                             price-
    id
                                           comment-
                                                                sign
            -status-
                                           Confirmed
    23
                              1000
            success
                                           Cancelled
    23
                              2000
                                                                     1
            success
   -id
            -status-
                             price
                                           comment-
                                                                sign
                                           Confirmed
    23
                             1000
            success
                                                                     1
```

SELECT * FROM tbl6 FINAL;



```
© CREATE TABLE tb16
1
              `id` Int32,
Þ
              `status` String,
I
               `price` String,
>_
              `comment` String,
              `sign` Int8
         ENGINE = CollapsingMergeTree(sign)
         PRIMARY KEY (id)
         ORDER BY (id, status);
         INSERT INTO tbl6 VALUES (23, 'success', '1000', 'Confirmed', 1);
INSERT INTO tbl6 VALUES (23, 'success', '1000', 'Confirmed', -1), (23, 'success', '2000', 'Cancelled', 1);
₿▲
SELECT * FROM tbl6;
==
         4
tbl6 1 ×
«T SELECT * FROM tb16 \binom{\kappa, \pi}{\kappa, \kappa} Enter a SQL expression to filter results (use Ctrl+Space)
                A-z status
                              ▼ A-z price ▼
                                                 A-z comment
Ⅲ 1
                    success
                                   1000
                                                 Confirmed
                                                                             1
                23 success
                                   1000
                                                 Confirmed
                                                                            -1
Text
   2
                23 success
                                                 Cancelled
   3
                                   2000
                                                                             1
```

```
○ CREATE TABLE tbl6
)
Þ
              `id` Int32,
              `status` String,
`price` String,
>_
               comment String,
              `sign` Int8
         ENGINE = CollapsingMergeTree(sign)
         PRIMARY KEY (id)
         ORDER BY (id, status);
         INSERT INTO tbl6 VALUES (23, 'success', '1000', 'Confirmed', 1);
INSERT INTO tbl6 VALUES (23, 'success', '1000', 'Confirmed', -1), (23, 'success', '2000', 'Cancelled', 1);
.... 🛕
∄▲
(x) A
        SELECT * FROM tbl6 FINAL;
8=
tbl6 1 ×
\bulletT SELECT * FROM tbl6 FINAL |_{\epsilon}^{\kappa, n} Enter a SQL expression to filter results (use Ctrl+Space)
                                                                   123 sign
                     A-z status
                                   A-z price
                                                  A-z comment
                                   2000
                                                 Cancelled
Ⅲ 1
                    success
                                                                              1
```

Выбрана версия движка «CollapsingMergeTree», поскольку структура таблицы, представленный результат и загружаемые данные подходят только для данного типа движка