

ДЗ_Функции_для_работы_с_типами_данных_агрегатные_функции_и_UDF

Первый способ

The screenshot shows the DBeaver 25.1.5 interface. The top toolbar includes buttons for File, Editing, Navigation, Search, SQL Editor, Data Base, Window, and Help. The main editor displays three SQL queries:

```
1 CREATE TABLE transactions (  
2     transaction_id UInt32 COMMENT 'идентификатор транзакции_id',  
3     user_id UInt32 COMMENT 'идентификатор пользователя',  
4     product_id UInt32 COMMENT 'идентификатор продукта_id',  
5     quantity UInt8 COMMENT 'количество',  
6     price Float32 COMMENT 'цена',  
7     transaction_date Date COMMENT 'дата транзакции_date'  
8 ) ENGINE = MergeTree()  
9 ORDER BY (transaction_id);  
10  
11 --Агрегатные функции  
12 Select  
13 sum("quantity" * "price") as "общий доход от всех операций"  
14 ,AVG("quantity" * "price") as "средний доход с одной сделки"  
15 ,sum("quantity") as "общее количество проданной продукции"  
16 ,uniqExact("user_id") as "количество уникальных пользователей, совершивших покупку"  
17 from "default"."transactions"  
18 where transaction_date is not null  
19  
20 --функции для работы с типами данных  
21 Select  
22 toYYYYMM("transaction_date")  
23 ,toYear("transaction_date")
```

Below the editor, the 'Result 1' tab is active, showing an empty table with columns 'AZ total_type' and 'AZ cat_type'. The status bar at the bottom indicates 'Нет данных - 0.020s, 2025-09-21 в 17:13:39'.

CREATE TABLE transactions (

transaction_id **UInt32** COMMENT 'идентификатор транзакции_id',

user_id **UInt32** COMMENT 'идентификатор пользователя',

product_id **UInt32** COMMENT 'идентификатор продукта_id',

quantity **UInt8** COMMENT 'количество',

price **Float32** COMMENT 'цена',

transaction_date **Date** COMMENT 'дата транзакции_date'

) ENGINE = MergeTree()

ORDER BY (transaction_id);

--Агрегатные функции

Select

```
sum("quantity" * "price") as "общий доход от всех операций"  
,AVG("quantity" * "price") as "средний доход с одной сделки"  
,sum("quantity") as "общее количество проданной продукции"  
,uniqExact("user_id") as "количество уникальных пользователей, совершивших покупку"  
from "default"."transactions"  
where transaction_date is not null
```

--Функции для работы с типами данных

Select

```
toYYYYMM("transaction_date")  
,toYear("transaction_date")  
,toMonth("transaction_date")  
,round(price, 1)  
,toString("transaction_id")  
from "default"."transactions"
```

--User-Defined Functions (UDFs)

CREATE FUNCTION total_price **AS** (q, p) -> q * p;

SELECT

```
transaction_id,  
total_price(quantity, price) AS total  
FROM "default"."transactions"
```

CREATE FUNCTION tx_category **AS** (v, thr) -> if(v > thr, 'High Value', 'Low Value');

WITH total_price(quantity, price) **AS** v

SELECT

```
transaction_id,  
v AS total,
```

```
tx_category(v, 100) AS category
FROM "default"."transactions"

SELECT
toTypeName(total_price(quantity, price)) AS total_type,
toTypeName(tx_category(123, 100)) AS cat_type
FROM "default"."transactions"
```

Второй способ

```
chuda@DESKTOP-5MDI75J: /m  Командная строка
Microsoft Windows [Version 10.0.19045.6332]
(c) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

C:\Users\doner>pip3 install clickhouse-driver
Collecting clickhouse-driver
  Downloading clickhouse_driver-0.2.9-cp39-cp39-win_amd64.whl (214 kB)
    214.7/214.7 KB 2.2 MB/s eta 0:00:00
Collecting pytz
  Downloading pytz-2025.2-py2.py3-none-any.whl (509 kB)
    509.2/509.2 KB 8.0 MB/s eta 0:00:00
Collecting tzlocal
  Downloading tzlocal-5.3.1-py3-none-any.whl (18 kB)
Collecting tzdata
  Downloading tzdata-2025.2-py2.py3-none-any.whl (347 kB)
    347.8/347.8 KB 22.5 MB/s eta 0:00:00
Installing collected packages: pytz, tzdata, tzlocal, clickhouse-driver
Successfully installed clickhouse-driver-0.2.9 pytz-2025.2 tzdata-2025.2 tzlocal-5.3.1
WARNING: You are using pip version 22.0.4; however, version 25.2 is available.
You should consider upgrading via the 'C:\Users\doner\AppData\Local\Microsoft\WindowsApps\PythonSoftwareFoundation.Python
3.9_qbz5n2kfra8p0\python.exe -m pip install --upgrade pip' command.

C:\Users\doner>
```

PS C:\Users\doner> wsl

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ sudo mkdir -p /var/lib/clickhouse/user_scripts &&
sudo chown -R clickhouse:clickhouse /var/lib/clickhouse/user_scripts
```

[sudo] password for chuda:

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ sudo tee
/var/lib/clickhouse/user_scripts/total_price.py >/dev/null <<'PY'\n#!/usr/bin/env python3\nimport sys,
json\nfor line in sys.stdin:\n o = json.loads(line)\n q = o.get('quantity') or 0\n p = o.get('price') or 0.0\n
print(q * p)\nPY
```

```
> #!/usr/bin/env python3
```

```
import sys, json
```

```
for line in sys.stdin:
```

```
o = json.loads(line)
```

```
q = o.get('quantity') or 0
```

```
p = o.get('price') or 0.0
```

```
print(q * p)
```

```
PY
```

```
> PY
```

```
> PY
```

```
> ^C
```

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ sudo tee
/var/lib/clickhouse/user_scripts/total_price.py >/dev/null <<'PY'
```

```
#!/usr/bin/env python3
```

```
import sys, json
```

```
for line in sys.stdin:
```

```
o = json.loads(line)
```

```
q = o.get('quantity') or 0
```

```
p = o.get('price') or 0.0
```

```
print(q * p)
```

```
PY.
```

```
> printf '%s\n' '#!/usr/bin/env python3' 'import sys, json' 'for line in sys.stdin:' ' o = json.loads(line)' " q = o.get('quantity') or 0" " p = o.get('price') or 0.0" ' print(q * p)' | sudo tee /var/lib/clickhouse/user_scripts/total_price.py >/dev/null
```

```
> ^C
```

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ printf '%s\n' '#!/usr/bin/env python3' 'import sys, json' 'for line in sys.stdin:' ' o = json.loads(line)' " q = o.get('quantity') or 0" " p = o.get('price') or 0.0" ' print(q * p)' | sudo tee /var/lib/clickhouse/user_scripts/total_price.py >/dev/null
```

```
[sudo] password for chuda:
```

```
Sorry, try again.
```

```
[sudo] password for chuda:
```

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ sudo wc -l /var/lib/clickhouse/user_scripts/total_price.py && sudo sed -n '1,20p' /var/lib/clickhouse/user_scripts/total_price.py
```

```
7 /var/lib/clickhouse/user_scripts/total_price.py
```

```
#!/usr/bin/env python3
```

```
import sys, json
```

```
for line in sys.stdin:
```

```
o = json.loads(line)
```

```
q = o.get('quantity') or 0
```

```
p = o.get('price') or 0.0
```

```
print(q * p)
```

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ sudo chmod 755 /var/lib/clickhouse/user_scripts/total_price.py && sudo chown clickhouse:clickhouse /var/lib/clickhouse/user_scripts/total_price.py
```

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ printf '%s\n' '#!/usr/bin/env python3' 'import sys, json' 'for line in sys.stdin:' ' o = json.loads(line)' " v = o.get('total_price', 0.0)" " thr = o.get('threshold', 100)" " print('High Value' if v > thr else 'Low Value')" | sudo tee /var/lib/clickhouse/user_scripts/transaction_category.py >/dev/null
```

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ sudo chmod 755
/var/lib/clickhouse/user_scripts/transaction_category.py && sudo chown clickhouse:clickhouse
/var/lib/clickhouse/user_scripts/transaction_category.py
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$
```

--XML--

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ sudo tee /etc/clickhouse-server/udf/total_price_e.xml
>/dev/null <<'XML'
```

```
<functions>
<function>
<name>total_price_e</name>
<type>executable</type>
<return_type>Float32</return_type>
<argument><type>UInt8</type><name>quantity</name></argument>
<argument><type>Float32</type><name>price</name></argument>
<format>JSONEachRow</format>
<command>total_price.py</command>
<deterministic>true</deterministic>
</function>
</functions>
```

XML

```
chuda@DESKTOP-5MDI75J:/mnt/c/Users/doner$ sudo tee /etc/clickhouse-
server/udf/transaction_category_e.xml >/dev/null <<'XML'
```

```
<functions>
<function>
<name>transaction_category_e</name>
<type>executable</type>
<return_type>String</return_type>
<argument><type>Float32</type><name>total_price</name></argument>
<argument><type>UInt16</type><name>threshold</name></argument>
<format>JSONEachRow</format>
<command>transaction_category.py</command>
<deterministic>true</deterministic>
</function>
```

</functions>

XML

--Проверка--

DESKTOP-5MDI75J.localdomain :) SELECT name FROM system.functions WHERE name IN ('total_price_e','transaction_category_e')

```
SELECT name
FROM system.functions
WHERE name IN ('total_price_e', 'transaction_category_e')
```

Query id: 0f3617a8-8346-4072-b600-5a1f8387b4cb

	name
1.	transaction_category_e
2.	total_price_e

2 rows in set. Elapsed: 0.006 sec. Processed 1.67 thousand rows, 583.70 KB (268.46 thousand rows/s., 93.83 MB/s.)

Peak memory usage: 0.00 B.

DESKTOP-5MDI75J.localdomain :) SELECT transaction_id, total_price_e(quantity, price) AS total FROM default.transactions ORDER BY transaction_id

```
SELECT
    transaction_id,
    total_price_e(quantity, price) AS total
FROM default.transactions
ORDER BY transaction_id ASC
```

Query id: af00a7aa-3e8b-41e2-b460-e483260f76d7

Ok.

0 rows in set. Elapsed: 0.003 sec.

```
DESKTOP-5MDI75J.localdomain :) WITH total_price_e(quantity, price) AS v
SELECT transaction_id, v AS total, transaction_category_e(v, 100) AS category
FROM default.transactions ORDER BY transaction_id
```

```
WITH total_price_e(quantity, price) AS v
SELECT
    transaction_id,
    v AS total,
    transaction_category_e(v, 100) AS category
FROM default.transactions
ORDER BY transaction_id ASC
```

Query id: 45b17879-9839-4e2d-a79e-0ddcdc9c94e9

Ok.

0 rows in set. Elapsed: 0.003 sec.