Группа DE_622, Студент: Виталий Зайцев

Домашнее задание по уроку 5

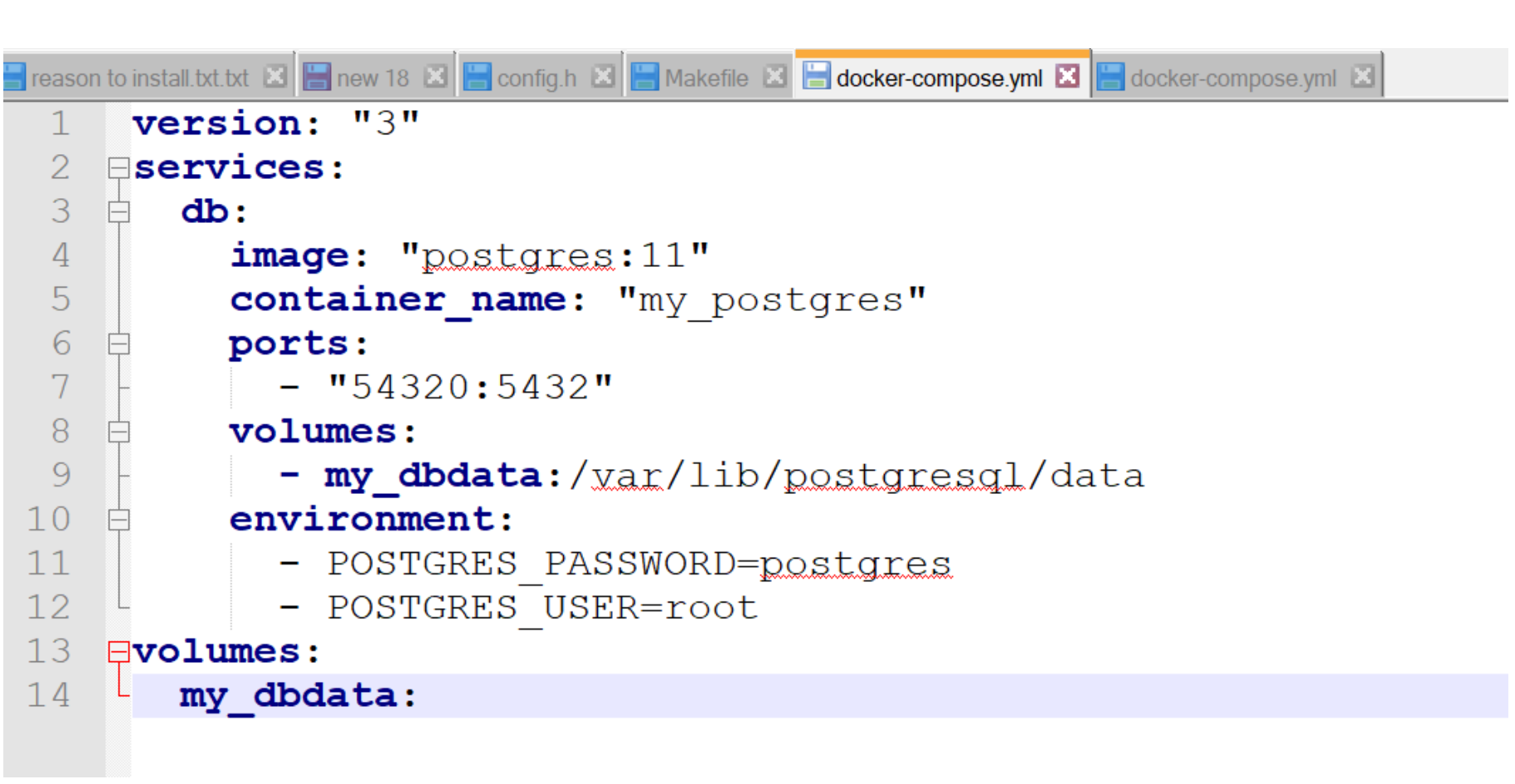
1) Развернуть всю архитектуру у себя
2) Написать ETL процесс для загрузки ВСЕХ таблиц из postgres-источника в postgres-приемник

Выполнение домашнего задания

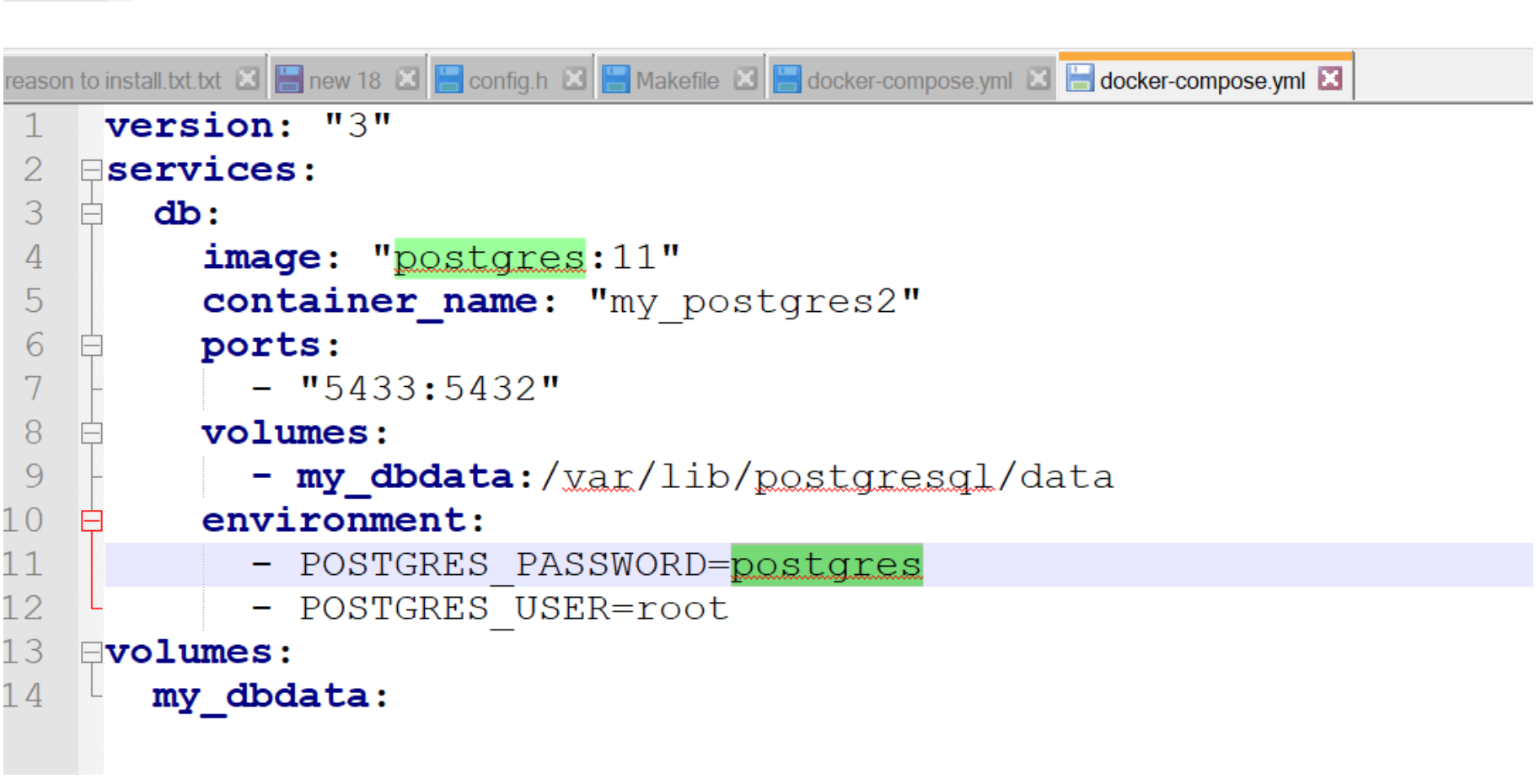
0. Подготовительная часть

Подготовка докер образов

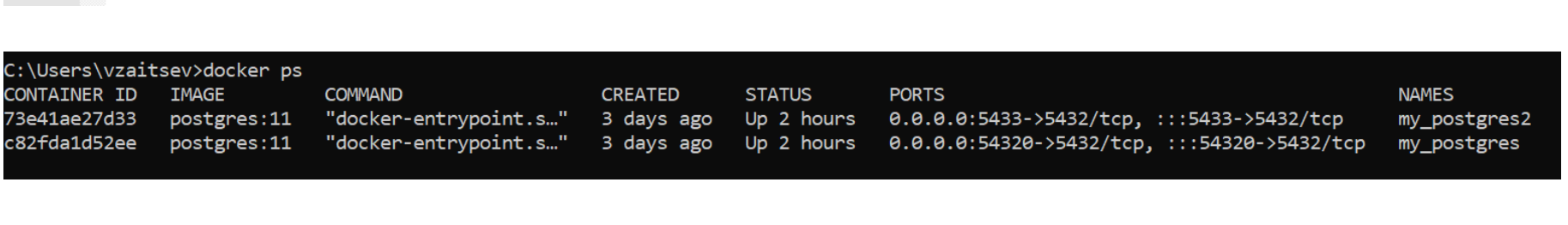
docker ps



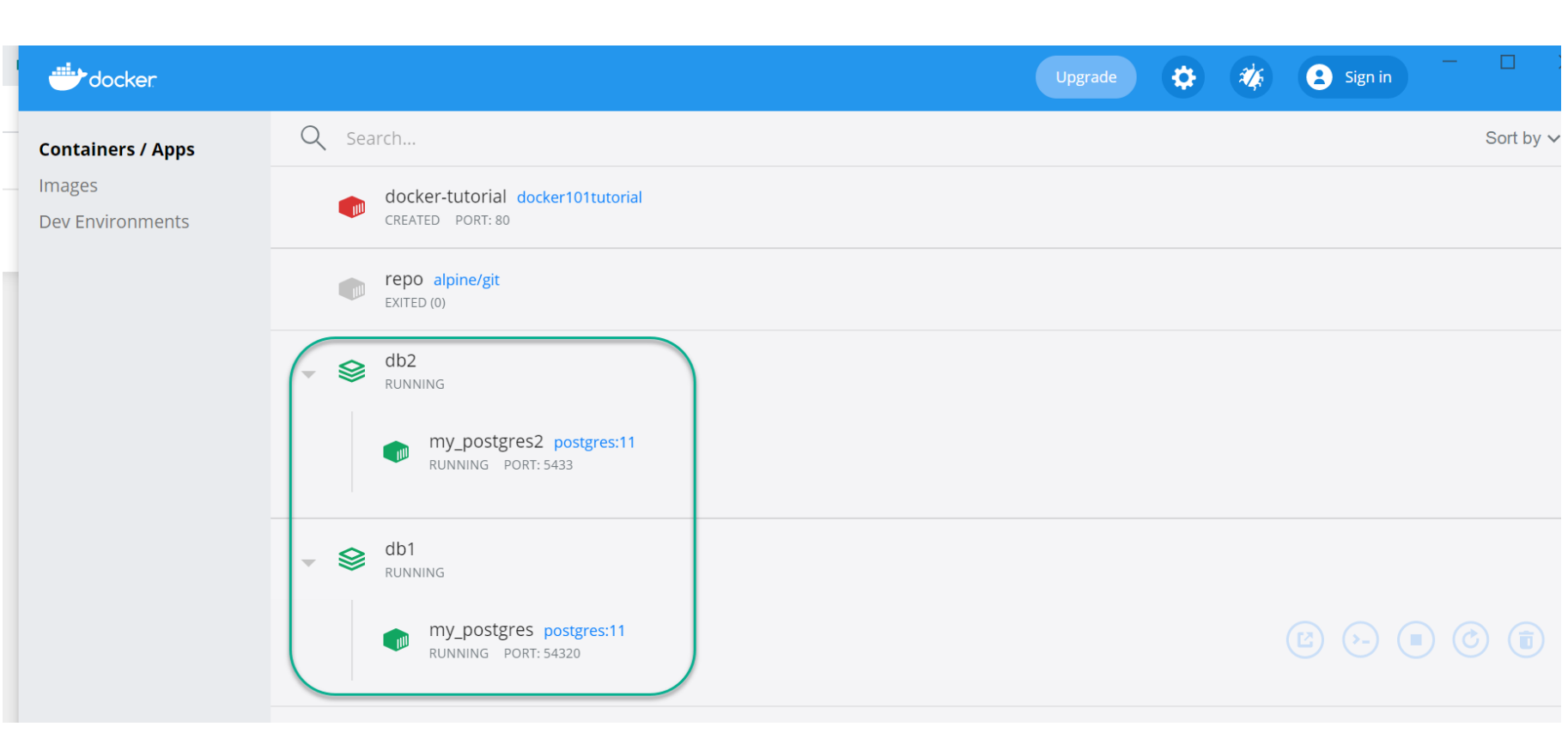
```
version: "3"
services:
  db:
    image: "postgres:11"
    container_name: "my_postgres"
    ports:
      - "54320:5432"
    volumes:
      - my_dbdata:/var/lib/postgresql/data
    environment:
      - POSTGRES_PASSWORD=postgres
      - POSTGRES_USER=root
volumes:
  my_dbdata:
```



```
version: "3"
services:
  db:
    image: "postgres:11"
    container_name: "my_postgres2"
    ports:
      - "5433:5432"
    volumes:
      - my_dbdata:/var/lib/postgresql/data
    environment:
      - POSTGRES_PASSWORD=postgres
      - POSTGRES_USER=root
volumes:
  my_dbdata:
```



```
C:\Users\vzaitsev>docker ps
CONTAINER ID   IMAGE         COMMAND                  CREATED      STATUS        PORTS                                         NAMES
73e41ae27d33   postgres:11   "docker-entrypoint.s…"   3 days ago   Up 2 hours    0.0.0.0:5433->5432/tcp, :::5433->5432/tcp     my_postgres2
c82fda1d52ee   postgres:11   "docker-entrypoint.s…"   3 days ago   Up 2 hours    0.0.0.0:54320->5432/tcp, :::54320->5432/tcp   my_postgres
```

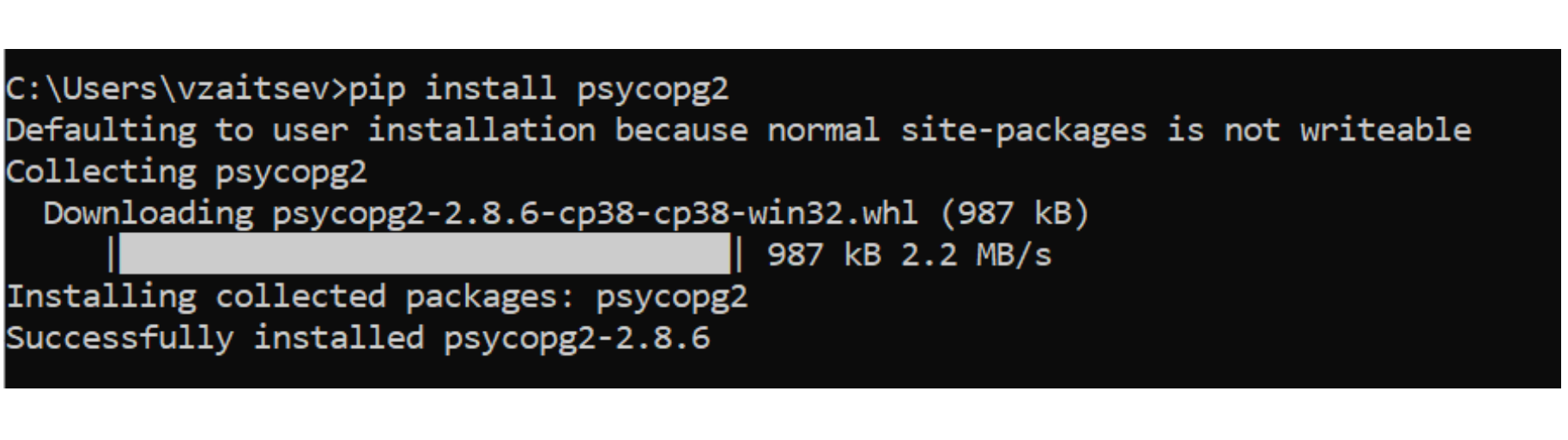


Создание баз для работы

docker exec -it my_postgres psql -U root -c "create database my_database"
Done
docker exec -it my_postgres2 psql -U root -c "create database my_database2"
Done

Установка необходимых python пакетов

psycopg2



```
C:\Users\vzaitsev>pip install psycopg2
Defaulting to user installation because normal site-packages is not writeable
Collecting psycopg2
  Downloading psycopg2-2.8.6-cp38-cp38-win32.whl (987 kB)
     |████████████████████████████████| 987 kB 2.2 MB/s
Installing collected packages: psycopg2
Successfully installed psycopg2-2.8.6
```

Проверка соединений к созданным базам

'my_database' (port 54320)

In [6]:

```python
import psycopg2

# Параметры соединения
conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
# dbname='tpch'
# conn_string= "host='localhost' port=54320 dbname='tpch' user='root' password='postgres'"


# Создаем соединение (оно поддерживает контекстный менеджер, рекомендую пользоваться им)
# Создаем курсор - это специальный объект который делает запросы и получает их результаты
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    #query = 'select * from customer limit 1' # запрос к БД
    query = 'SELECT datname FROM pg_database;' # запрос к БД
    cursor.execute(query) # выполнение запроса
    result = cursor.fetchone() # получение результата
    print(result)
```

```
('postgres',)
```

'my_database2' (port 5433)

In [5]:

```python
import psycopg2

# Параметры соединения
conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"

# Создаем соединение (оно поддерживает контекстный менеджер, рекомендую пользоваться им)
# Создаем курсор - это специальный объект который делает запросы и получает их результаты
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    #query = 'select * from customer limit 1' # запрос к БД
    query = 'SELECT datname FROM pg_database;' # запрос к БД
    cursor.execute(query) # выполнение запроса
    result = cursor.fetchone() # получение результата
    print(result)
```

```
('postgres',)
```

Создание таблиц

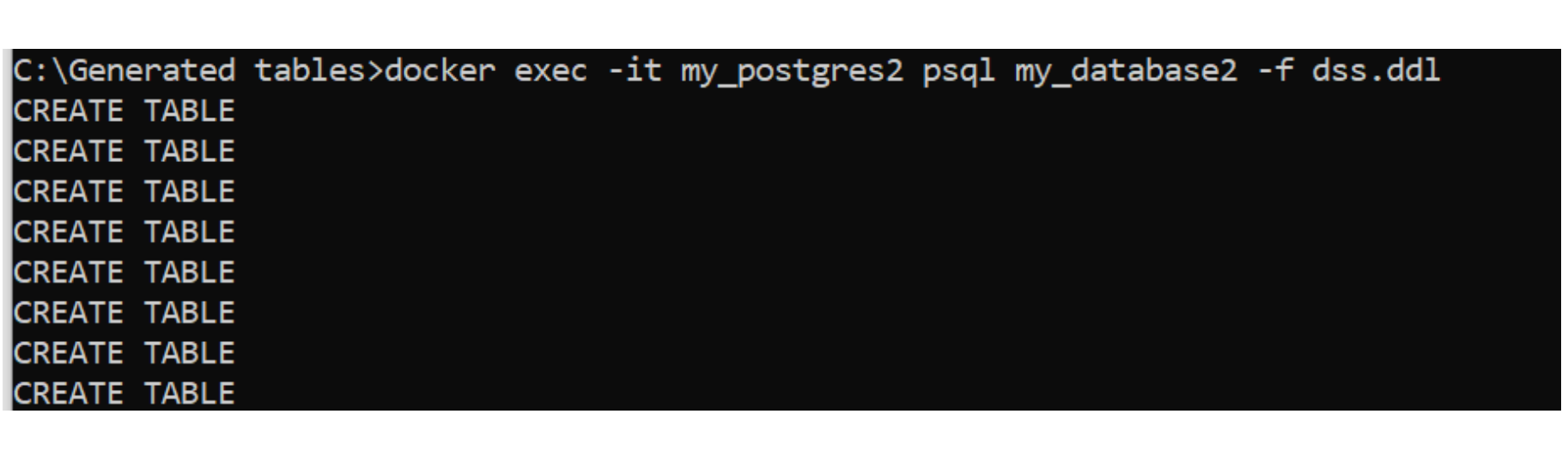
cd C:\Users\vzaitsev\!Git-REPO\tpch-kit\dbgen\

docker cp ./dss.ddl my_postgres:/

docker cp ./dss.ddl my_postgres2:/

docker exec -it my_postgres psql my_database -f dss.ddl

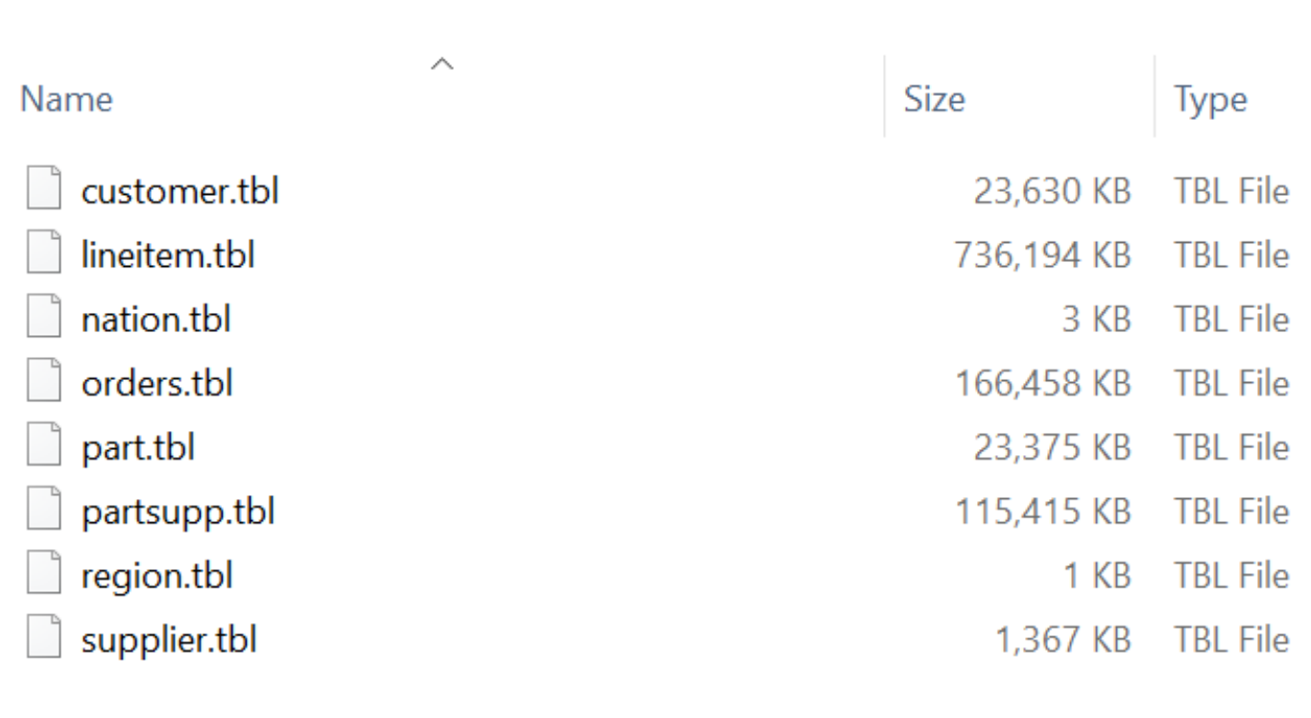
docker exec -it my_postgres2 psql my_database -f dss.ddl



```
C:\Generated tables>docker exec -it my_postgres2 psql my_database2 -f dss.ddl
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
```

Синтез данных

Неуспешно, проблема при компиляции makefile под Win10.
Данные таблиц получены у предподавателя



Name	Size	Type
customer.tbl	23,630 KB	TBL File
lineitem.tbl	736,194 KB	TBL File
nation.tbl	3 KB	TBL File
orders.tbl	166,458 KB	TBL File
part.tbl	23,375 KB	TBL File
partsupp.tbl	115,415 KB	TBL File
region.tbl	1 KB	TBL File
supplier.tbl	1,367 KB	TBL File

my_database

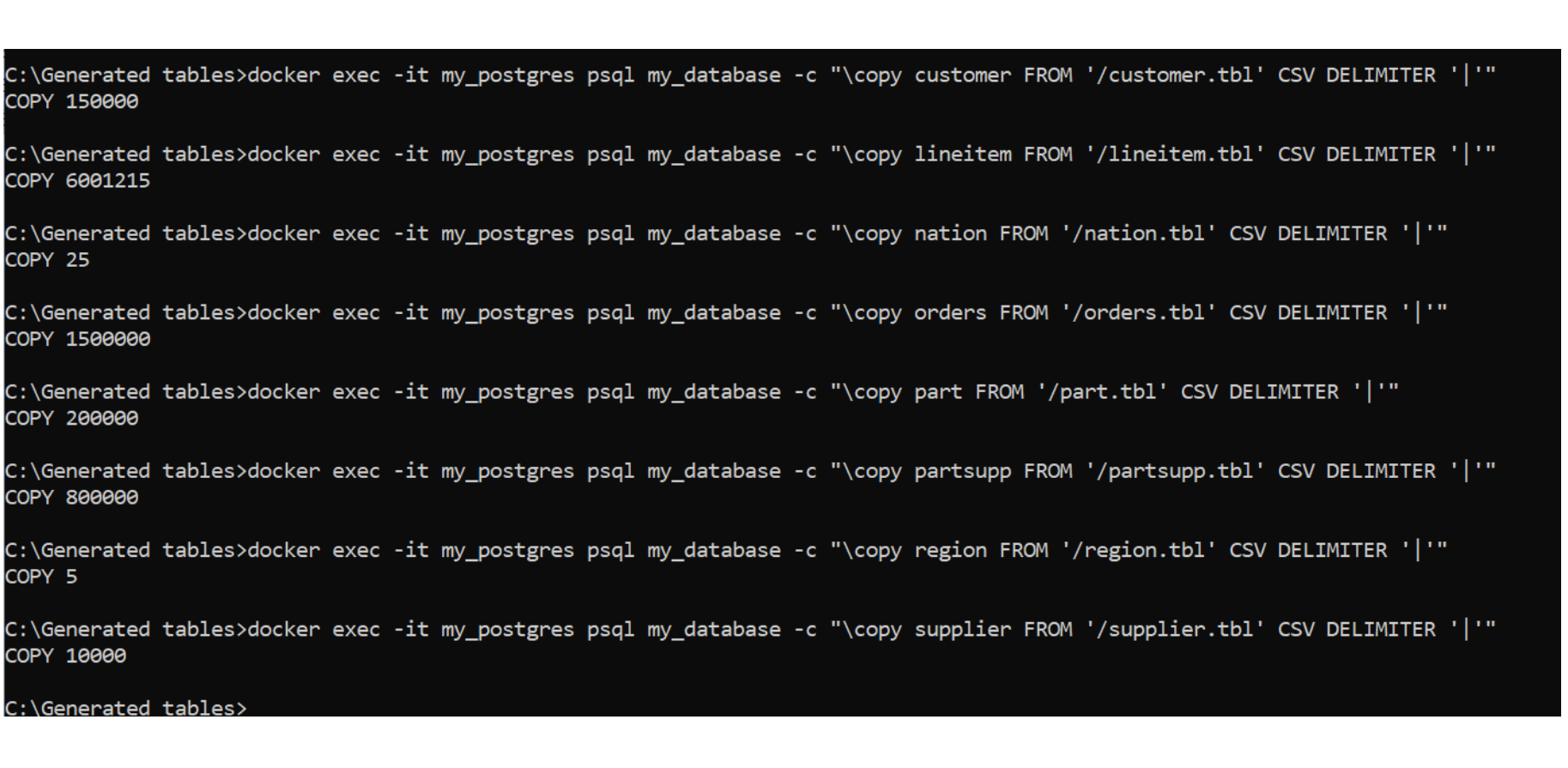
Копирование данных в контейнер

cd C:\Generated tables
docker cp ./customer.tbl my_postgres:/
docker cp ./lineitem.tbl my_postgres:/
docker cp ./nation.tbl my_postgres:/
docker cp ./orders.tbl my_postgres:/
docker cp ./part.tbl my_postgres:/
docker cp ./partsupp.tbl my_postgres:/
docker cp ./region.tbl my_postgres:/
docker cp ./supplier.tbl my_postgres:/

```
C:\Users\vzaitsev\!Git-REPO\tpch-kit\dbgen>cd C:\Generated tables

C:\Generated tables>docker cp ./customer.tbl my_postgres:/

C:\Generated tables>docker cp ./lineitem.tbl my_postgres:/

C:\Generated tables>docker cp ./nation.tbl my_postgres:/

C:\Generated tables>docker cp ./orders.tbl my_postgres:/

C:\Generated tables>docker cp ./part.tbl my_postgres:/

C:\Generated tables>docker cp ./partsupp.tbl my_postgres:/

C:\Generated tables>docker cp ./region.tbl my_postgres:/

C:\Generated tables>docker cp ./supplier.tbl my_postgres:/

C:\Generated tables>
```

Загрузка данных в базу

docker exec -it my_postgres psql my_database -c "\copy customer FROM '/customer.tbl' CSV DELIMITER '|'"
docker exec -it my_postgres psql my_database -c "\copy lineitem FROM '/lineitem.tbl' CSV DELIMITER '|'"
docker exec -it my_postgres psql my_database -c "\copy nation FROM '/nation.tbl' CSV DELIMITER '|'"
docker exec -it my_postgres psql my_database -c "\copy orders FROM '/orders.tbl' CSV DELIMITER '|'"
docker exec -it my_postgres psql my_database -c "\copy part FROM '/part.tbl' CSV DELIMITER '|'"
docker exec -it my_postgres psql my_database -c "\copy partsupp FROM '/partsupp.tbl' CSV DELIMITER '|'"
docker exec -it my_postgres psql my_database -c "\copy region FROM '/region.tbl' CSV DELIMITER '|'"
docker exec -it my_postgres psql my_database -c "\copy supplier FROM '/supplier.tbl' CSV DELIMITER '|'"



```
C:\Generated tables>docker exec -it my_postgres psql my_database -c "\copy customer FROM '/customer.tbl' CSV DELIMITER '|'"
COPY 150000

C:\Generated tables>docker exec -it my_postgres psql my_database -c "\copy lineitem FROM '/lineitem.tbl' CSV DELIMITER '|'"
COPY 6001215

C:\Generated tables>docker exec -it my_postgres psql my_database -c "\copy nation FROM '/nation.tbl' CSV DELIMITER '|'"
COPY 25

C:\Generated tables>docker exec -it my_postgres psql my_database -c "\copy orders FROM '/orders.tbl' CSV DELIMITER '|'"
COPY 1500000

C:\Generated tables>docker exec -it my_postgres psql my_database -c "\copy part FROM '/part.tbl' CSV DELIMITER '|'"
COPY 200000

C:\Generated tables>docker exec -it my_postgres psql my_database -c "\copy partsupp FROM '/partsupp.tbl' CSV DELIMITER '|'"
COPY 800000

C:\Generated tables>docker exec -it my_postgres psql my_database -c "\copy region FROM '/region.tbl' CSV DELIMITER '|'"
COPY 5

C:\Generated tables>docker exec -it my_postgres psql my_database -c "\copy supplier FROM '/supplier.tbl' CSV DELIMITER '|'"
COPY 10000

C:\Generated tables>
```

Проверка наличия данных (my_database, customer)

In [21]:

```python
import psycopg2

# Параметры соединения
conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
# dbname='tpch'
# conn_string= "host='localhost' port=54320 dbname='tpch' user='root' password='postgres'"


# Создаем соединение (оно поддерживает контекстный менеджер, рекомендую пользоваться им)
# Создаем курсор - это специальный объект который делает запросы и получает их результаты
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    query = 'select * from customer limit 2' # запрос к БД
    cursor.execute(query) # выполнение запроса
    result = cursor.fetchall() # получение результата
    print(result)
```

```
[(1, 'Customer#000000001', 'IVhzIApeRb ot,c,E', 15, '25-989-741-2988', Decimal('711.56'), 'BUILDING
', 'to the even, regular platelets. regular, ironic epitaphs nag e'), (2, 'Customer#000000002', 'XSTf
4,NCwDVaWNe6tEgvwfmRchLXak', 13, '23-768-687-3665', Decimal('121.65'), 'AUTOMOBILE', 'l accounts. bli
thely ironic theodolites integrate boldly: caref')]
```

---

1. ETL процедура для таблицы customer

Для каждой таблицы:

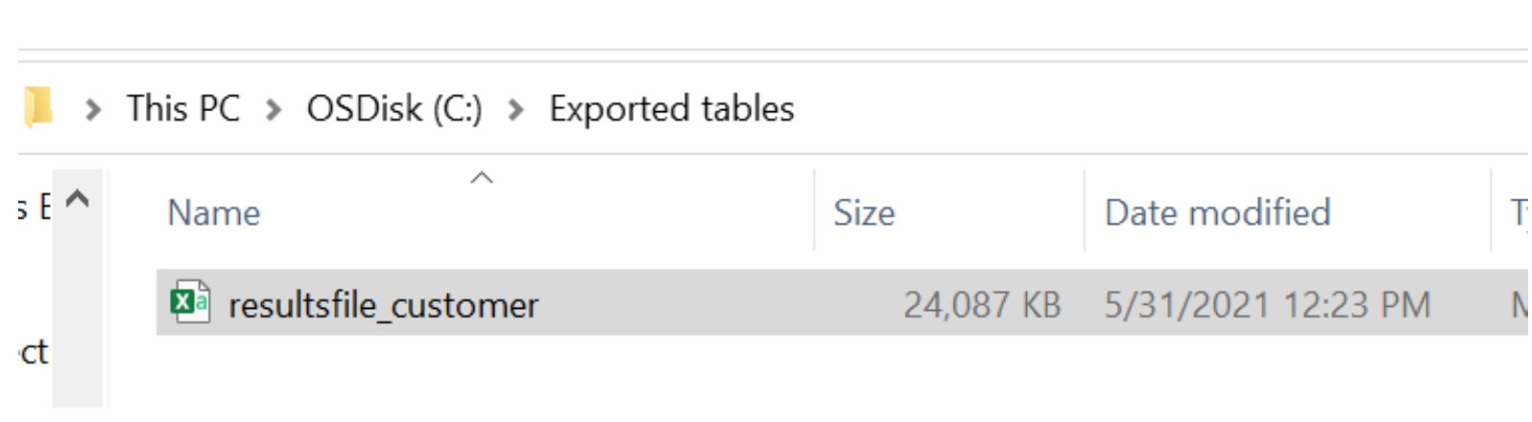
- дамп в файл из исхоной таблицы
- проверка выгруженого дампа в pandas
- загрузка из дампа в целевую таблицу
- select count(*) по целевой таблице

Перечень таблиц:

1. customer
2. lineitem
3. nation
4. orders
5. part
6. partsupp
7. region
8. supplier

In [30]:

```python
import psycopg2

conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY customer TO STDOUT WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_customer.csv", 'w') as f:
        cursor.copy_expert(q, f)
```



Name	Size	Date modified
resultsfile_customer	24,087 KB	5/31/2021 12:23 PM

In [31]:

```python
import pandas as pd

pd.read_csv("C:\\Exported tables\\resultsfile_customer.csv")
```

Out[31]:

	c_custkey	c_name	c_address	c_nationkey	c_phone	c_acctbal	c_mktsegment
0	1	Customer#000000001	IVhzIApeRb ot,c,E	15	25-989-741-2988	711.56	BUILDING
1	2	Customer#000000002	XSTf4,NCwDVaWNe6tEgvwfmRchLXak	13	23-768-687-3665	121.65	AUTOMOBILE
2	3	Customer#000000003	MG9kdTD2WBHm	1	11-719-748-3364	7498.12	AUTOMOBILE
3	4	Customer#000000004	XxVSJsLAGtn	4	14-128-190-5944	2866.83	MACHINERY
4	5	Customer#000000005	KvpyuHCplrB84WgAiGV6sYpZq7Tj	3	13-750-942-6364	794.47	HOUSEHOLD
...	...	...	...	...	...	...	...
149995	149996	Customer#000149996	syg3m0h2HMEUY6zJ2GEVMKkBl	10	20-149-234-3062	8524.71	AUTOMOBILE
149996	149997	Customer#000149997	ufK xSg6NRC8QaunPB7J	21	31-694-123-5061	8936.21	MACHINERY
149997	149998	Customer#000149998	NaDi,1fCNPDTntnVUjGyUJ8TrlleYNK7v	2	12-860-414-6024	5952.41	BUILDING
149998	149999	Customer#000149999	nBpZoYhCPFKZqSunxdeHtRN08x3RE8hqh	1	11-401-828-7411	6104.03	AUTOMOBILE
149999	150000	Customer#000150000	DD7m6OBUJqlbTpiYmzK9SYuJBG266UKoAsKH	10	20-354-401-2016	2530.68	AUTOMOBILE

150000 rows × 8 columns

In [36]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY customer from STDIN WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_customer.csv", 'r') as f:
        cursor.copy_expert(q, f)
```

In [38]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    cursor.execute('select count(*) from customer')
    print(cursor.fetchall())
```

```
[(150000,)]
```

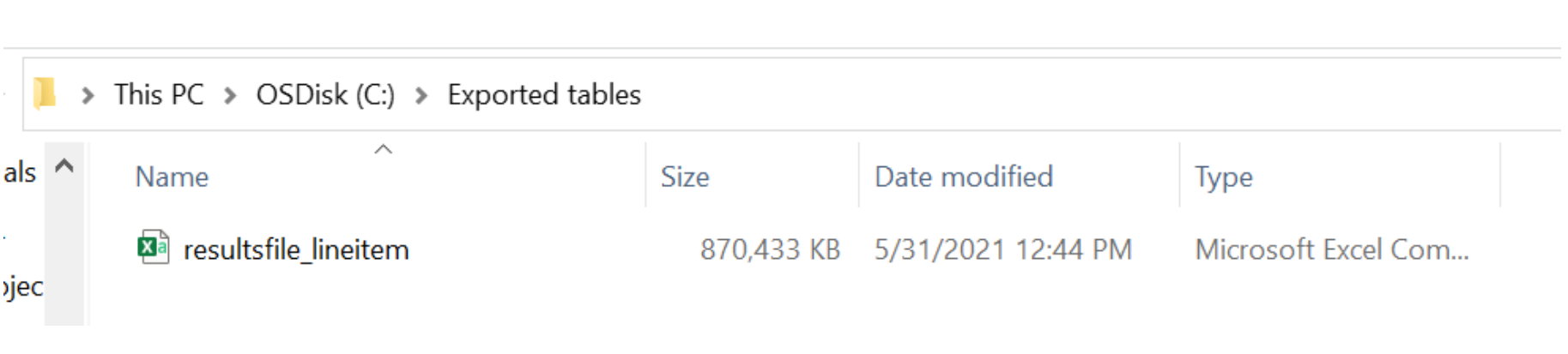
Вывод: Количество экспортированных записей в дампе (150 000) равно количеству записей в целевой таблице (150 000). Успех.

---

2. ETL процедура для таблицы lineitem

In [ ]:

```python
import psycopg2

conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY lineitem TO STDOUT WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_lineitem.csv", 'w') as f:
        cursor.copy_expert(q, f)
```



Name	Size	Date modified	Type
resultsfile_lineitem	870,433 KB	5/31/2021 12:44 PM	Microsoft Excel Com...

Внимание Таблица содержит около 870 тыс записей, этот код "подвисает", НЕ смог дождаться завершения import pandas as pd pd.read_csv("C:\Exported tables\resultsfile_lineitem.csv")

Взамен просто подсчитал количество строк в файле (предполагая, что каждая строка = отдельная запись)

In [36]:

```python
lines = 0
with open("C:\\Exported tables\\resultsfile_lineitem.csv") as f:
    for line in f:
        lines = lines + 1
print(lines)
```

```
6001216
```

In [3]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY lineitem from STDIN WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_lineitem.csv", 'r') as f:
        cursor.copy_expert(q, f)
```

In [37]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    cursor.execute('select count(*) from lineitem')
    print(cursor.fetchall())
```

```
[(6001215,)]
```

Вывод: Количество экспортированных записей в дампе lineitem 6 001 216 (помним, что одна строка - это заголовки столбцов), итого 6 001 215 записей равно равно количеству записей в целевой таблице 6 001 215. Успех.

---

3. ETL процедура для таблицы nation

In [4]:

```python
import psycopg2

conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY nation TO STDOUT WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_nation.csv", 'w') as f:
        cursor.copy_expert(q, f)
```

In [5]:

```python
import pandas as pd
pd.read_csv("C:\\Exported tables\\resultsfile_nation.csv")
```

Out[5]:

	n_nationkey	n_name	n_regionkey	n_comment
0	0	ALGERIA	0	haggle. carefully final deposits detect slyly...
1	1	ARGENTINA	1	al foxes promise slyly according to the regula...
2	2	BRAZIL	1	y alongside of the pending deposits. carefully...
3	3	CANADA	1	eas hang ironic, silent packages. slyly regula...
4	4	EGYPT	4	y above the carefully unusual theodolites. fin...
5	5	ETHIOPIA	0	ven packages wake quickly. regu
6	6	FRANCE	3	refully final requests. regular, ironi
7	7	GERMANY	3	l platelets. regular accounts x-ray: unusual, ...
8	8	INDIA	2	ss excuses cajole slyly across the packages. d...
9	9	INDONESIA	2	slyly express asymptotes. regular deposits ha...
10	10	IRAN	4	efully alongside of the slyly final dependenci...
11	11	IRAQ	4	nic deposits boost atop the quickly final requ...
12	12	JAPAN	2	ously. final, express gifts cajole a
13	13	JORDAN	4	ic deposits are blithely about the carefully r...
14	14	KENYA	0	pending excuses haggle furiously deposits. pe...
15	15	MOROCCO	0	rns. blithely bold courts among the closely re...
16	16	MOZAMBIQUE	0	s. ironic, unusual asymptotes wake blithely r
17	17	PERU	1	platelets. blithely pending dependencies use f...
18	18	CHINA	2	c dependencies. furiously express notornis sle...
19	19	ROMANIA	3	ular asymptotes are about the furious multipli...
20	20	SAUDI ARABIA	4	ts. silent requests haggle. closely express pa...
21	21	VIETNAM	2	hely enticingly express accounts. even, final
22	22	RUSSIA	3	requests against the platelets use never acco...
23	23	UNITED KINGDOM	3	eans boost carefully special requests. account...
24	24	UNITED STATES	1	y final packages. slow foxes cajole quickly. q...

In [6]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY nation from STDIN WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_nation.csv", 'r') as f:
        cursor.copy_expert(q, f)
```

In [7]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    cursor.execute('select count(*) from nation')
    print(cursor.fetchall())
```

```
[(25,)]
```

Вывод: Количество экспортированных записей в дампе nation (0..24=25) равно количеству записей в целевой таблице (25). Успех.

---

4. ETL процедура для таблицы orders

In [8]:

```python
import psycopg2

conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY orders TO STDOUT WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_orders.csv", 'w') as f:
        cursor.copy_expert(q, f)
```

In [9]:

```python
import pandas as pd
pd.read_csv("C:\\Exported tables\\resultsfile_orders.csv")
```

Out[9]:

	o_orderkey	o_custkey	o_orderstatus	o_totalprice	o_orderdate	o_orderpriority	o_clerk	o_shippriority	o_comment
0	1	36901	O	173665.47	1996-01-02	5-LOW	Clerk#000000951	0	nstructions sleep furiously among
1	2	78002	O	46929.18	1996-12-01	1-URGENT	Clerk#000000880	0	foxes. pending accounts at the pending, silen...
2	3	123314	F	193846.25	1993-10-14	5-LOW	Clerk#000000955	0	sly final accounts boost. carefully regular id...
3	4	136777	O	32151.78	1995-10-11	5-LOW	Clerk#000000124	0	sits. slyly regular warthogs cajole. regular, ...
4	5	44485	F	144659.20	1994-07-30	5-LOW	Clerk#000000925	0	quickly. bold deposits sleep slyly. packages u...
...	...	...	...	...	...	...	...	...	...
1499995	5999972	143594	O	114856.68	1996-05-02	3-MEDIUM	Clerk#000000536	0	y express accounts above the blithely bold
1499996	5999973	32071	O	68906.56	1997-07-13	4-NOT SPECIFIED	Clerk#000000130	0	special ideas use pending pinto beans. reques...
1499997	5999974	55448	F	92750.90	1993-07-28	3-MEDIUM	Clerk#000000776	0	fts. requests affix furiously a
1499998	5999975	113398	F	63216.65	1993-07-25	1-URGENT	Clerk#000000813	0	oost! ironic instructions h
1499999	6000000	110063	O	37625.29	1996-08-31	2-HIGH	Clerk#000000411	0	ess pinto beans boost slyly regular accounts! ...

1500000 rows × 9 columns

In [10]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY orders from STDIN WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_orders.csv", 'r') as f:
        cursor.copy_expert(q, f)
```

In [11]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    cursor.execute('select count(*) from orders')
    print(cursor.fetchall())
```

```
[(1500000,)]
```

Вывод: Количество экспортированных записей в дампе orders 1 500 000 равно количеству записей в целевой таблице 1 500 000. Успех.

---

5. ETL процедура для таблицы part

In [12]:

```python
import psycopg2

conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY part TO STDOUT WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_part.csv", 'w') as f:
        cursor.copy_expert(q, f)
```

In [13]:

```python
import pandas as pd
pd.read_csv("C:\\Exported tables\\resultsfile_part.csv")
```

Out[13]:

	p_partkey	p_name	p_mfgr	p_brand	p_type	p_size	p_container	p_retailprice	p_comment
0	1	goldenrod lavender spring chocolate lace	Manufacturer#1	Brand#13	PROMO BURNISHED COPPER	7	JUMBO PKG	901.00	ly. slyly ironi
1	2	blush thistle blue yellow saddle	Manufacturer#1	Brand#13	LARGE BRUSHED BRASS	1	LG CASE	902.00	lar accounts amo
2	3	spring green yellow purple cornsilk	Manufacturer#4	Brand#42	STANDARD POLISHED BRASS	21	WRAP CASE	903.00	egular deposits hag
3	4	cornflower chocolate smoke green pink	Manufacturer#3	Brand#34	SMALL PLATED BRASS	14	MED DRUM	904.00	p furiously r
4	5	forest brown coral puff cream	Manufacturer#3	Brand#32	STANDARD POLISHED TIN	15	SM PKG	905.00	wake carefully
...	...	...	...	...	...	...	...	...	...
199995	199996	cream navajo saddle dodger navy	Manufacturer#4	Brand#43	PROMO PLATED COPPER	11	MED PACK	2095.99	silent dep
199996	199997	peru maroon snow grey chartreuse	Manufacturer#4	Brand#44	PROMO PLATED NICKEL	37	SM DRUM	2096.99	furiously after the
199997	199998	pink wheat powder burlywood snow	Manufacturer#5	Brand#52	MEDIUM BURNISHED BRASS	49	LG BOX	2097.99	. special deposits hag
199998	199999	goldenrod drab brown salmon mint	Manufacturer#5	Brand#55	PROMO PLATED BRASS	24	LG CASE	2098.99	he quickly ironic
199999	200000	peach royal cornsilk sky sandy	Manufacturer#5	Brand#53	MEDIUM ANODIZED TIN	22	LG CAN	1100.00	xes sleep quick

200000 rows × 9 columns

In [14]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY part from STDIN WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_part.csv", 'r') as f:
        cursor.copy_expert(q, f)
```

In [15]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    cursor.execute('select count(*) from part')
    print(cursor.fetchall())
```

```
[(200000,)]
```

Вывод: Количество экспортированных записей в дампе part 200 000 равно количеству записей в целевой таблице 200 000. Успех.

---

6. ETL процедура для таблицы partsupp

In [16]:

```python
import psycopg2

conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY partsupp TO STDOUT WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_partsupp.csv", 'w') as f:
        cursor.copy_expert(q, f)
```

In [17]:

```python
import pandas as pd
pd.read_csv("C:\\Exported tables\\resultsfile_partsupp.csv")
```

Out[17]:

	ps_partkey	ps_suppkey	ps_availqty	ps_supplycost	ps_comment
0	1	2	3325	771.64	, even theodolites. regular, final theodolites...
1	1	2502	8076	993.49	ven ideas. quickly even packages print. pendin...
2	1	5002	3956	337.09	after the fluffily ironic deposits? blithely s...
3	1	7502	4069	357.84	al, regular dependencies serve carefully after...
4	2	3	8895	378.49	nic accounts. final accounts sleep furiously a...
...	...	...	...	...	...
799995	199999	7557	7784	259.56	ts. pending, thin instructions wake furiously ...
799996	200000	1	3372	74.18	egular, pending warthogs along the even pinto ...
799997	200000	2520	8522	192.45	nag slyly carefully bold attainments. special...
799998	200000	5039	605	3.91	theodolites wake carefully about the slyly pe...
799999	200000	7558	2583	996.65	ests affix slyly carefully unusual deposits. p...

800000 rows × 5 columns

In [18]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY partsupp from STDIN WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_partsupp.csv", 'r') as f:
        cursor.copy_expert(q, f)
```

In [19]:

```python
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    cursor.execute('select count(*) from partsupp')
    print(cursor.fetchall())
```

```
[(800000,)]
```

Вывод: Количество экспортированных записей в дампе partsupp 800 000 равно количеству записей в целевой таблице 800 000. Успех.

---

7. ETL процедура для таблицы region

In [20]:

```
import psycopg2

conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY region TO STDOUT WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_region.csv", 'w') as f:
        cursor.copy_expert(q, f)
```

In [21]:

```
import pandas as pd
pd.read_csv("C:\\Exported tables\\resultsfile_region.csv")
```

Out[21]:

	r_regionkey	r_name	r_comment
0	0	AFRICA	lar deposits. blithely final packages cajole. ...
1	1	AMERICA	hs use ironic, even requests. s
2	2	ASIA	ges. thinly even pinto beans ca
3	3	EUROPE	ly final courts cajole furiously final excuse
4	4	MIDDLE EAST	uickly special accounts cajole carefully blith...

In [22]:

```
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY region from STDIN WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_region.csv", 'r') as f:
        cursor.copy_expert(q, f)
```

In [23]:

```
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    cursor.execute('select count(*) from region')
    print(cursor.fetchall())
```

```
[(5,)]
```

Вывод: Количество экспортированных записей в дампе region 5 равно количеству записей в целевой таблице 5. Успех.

---

8. ETL процедура для таблицы supplier

In [24]:

```
import psycopg2

conn_string= "host='localhost' port=54320 dbname='my_database' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY supplier TO STDOUT WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_supplier.csv", 'w') as f:
        cursor.copy_expert(q, f)
```

In [25]:

```
import pandas as pd
pd.read_csv("C:\\Exported tables\\resultsfile_supplier.csv")
```

Out[25]:

	s_suppkey	s_name	s_address	s_nationkey	s_phone	s_acctbal	s_comment
0	1	Supplier#000000001	N kD4on9OM Ipw3,gf0JBoQDd7tgrzrddZ	17	27-918-335-1736	5755.94	each slyly above the careful
1	2	Supplier#000000002	89eJ5ksX3ImxJQBvxObC,	5	15-679-861-2259	4032.68	slyly bold instructions. idle dependen
2	3	Supplier#000000003	q1,G3Pj6OjIuUYfUoH18BFTKP5aU9bEV3	1	11-383-516-1199	4192.40	blithely silent requests after the express dep...
3	4	Supplier#000000004	Bk7ah4CK8SYQTepEmvMkkgMwg	15	25-843-787-7479	4641.08	riously even requests above the exp
4	5	Supplier#000000005	Gcdm2rJRzl5qlTVzc	11	21-151-690-3663	-283.84	. slyly regular pinto bea
...	...	...	...	...	...	...	...
9995	9996	Supplier#000009996	a4eOd7SzN5RnrCwyAh5iey	10	20-898-443-4436	6209.67	s above the blithely even deposits play carefu...
9996	9997	Supplier#000009997	Wc0lgaT,CWQYMS	15	25-177-334-7328	7011.83	ve the furiously ironic platelets. evenly
9997	9998	Supplier#000009998	1RTcQaCJzbx7GAjlc,tajct,8K	1	11-122-533-7674	2801.35	e regular excuses. blithely final pinto beans ...
9998	9999	Supplier#000009999	mX37oAzqsBPhN1LWdzV p	9	19-773-990-5609	231.69	ounts cajole fluffily among the quickly ironic...
9999	10000	Supplier#000010000	aTGLEusCiL4F PDBdv665XBJhPyCOB0i	19	29-578-432-2146	8968.42	ly regular foxes boost slyly. quickly special ...

10000 rows × 7 columns

In [26]:

```
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    q = "COPY supplier from STDIN WITH DELIMITER ',' CSV HEADER;"
    with open("C:\\Exported tables\\resultsfile_supplier.csv", 'r') as f:
        cursor.copy_expert(q, f)
```

In [27]:

```
import psycopg2

conn_string= "host='localhost' port=5433 dbname='my_database2' user='root' password='postgres'"
with psycopg2.connect(conn_string) as conn, conn.cursor() as cursor:
    cursor.execute('select count(*) from supplier')
    print(cursor.fetchall())
```

```
[(10000,)]
```

Вывод: Количество экспортированных записей в дампе supplier 10 000 равно количеству записей в целевой таблице 10 000. Успех.

In [ ]: