

Министерство науки и высшего образования Российской Федерации
федеральное государственное автономное образовательное учреждение высшего
образования
«НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ ИТМО»

ОТЧЕТ

по лабораторной работе №1

«Создание таблиц базы данных POSTGRESQL. Заполнение таблиц рабочими
данными»

по дисциплине «**Проектирование и реализация баз данных**»

Автор:

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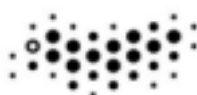
Факультет:

ИКТ

Группа:

К3240

Преподаватель: Говорова Марина Михайловна



УНИВЕРСИТЕТ ИТМО

Санкт-Петербург

2022

Цель работы: овладеть практическими навыками создания таблиц базы данных PostgreSQL 1X, заполнения их рабочими данными, резервного копирования и восстановления БД.

Оборудование: компьютерный класс.

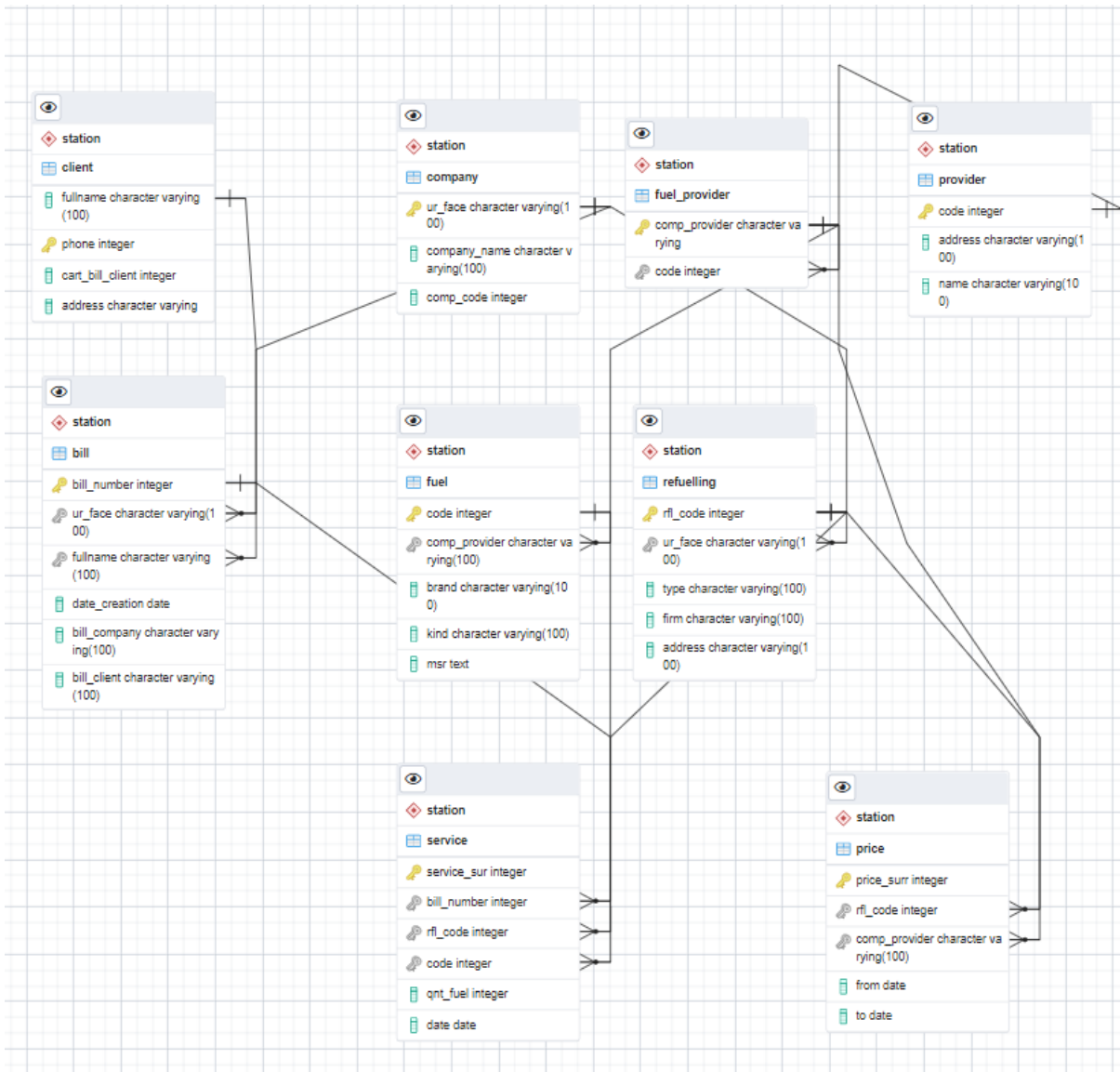
Программное обеспечение: СУБД PostgreSQL 1X, pgAdmin 4.

Практическое задание:

1. Создать базу данных с использованием pgAdmin 4 (согласно индивидуальному заданию).
2. Создать схему в составе базы данных.
3. Создать таблицы базы данных.
4. Установить ограничения на данные: *Primary Key, Unique, Check, Foreign Key*.
5. Заполнить таблицы БД рабочими данными.
6. Создать резервную копию БД.
Указание:
Создать две резервные копии:
 - с расширением *CUSTOM* для восстановления БД;
 - с расширением *PLAIN* для листинга (в отчете);
 - при создании резервных копий БД настроить параметры *Dump options* для *Type of objects* и *Queries*.
7. Восстановить БД.

Выполнение:

- наименование БД - Автозаправка
- схема логической модели базы данных, сгенерированная в Generate ERD:



– dump, содержащий скрипты работы с БД:

Создание и заполнение (представлено по одному запросу на заполнение каждой таблицы)

--

-- PostgreSQL database dump

--

-- Dumped from database version 12.10

-- Dumped by pg_dump version 12.10

-- Started on 2022-05-05 02:35:02

```
SET statement_timeout = 0;
SET lock_timeout = 0;
SET idle_in_transaction_session_timeout = 0;
SET client_encoding = 'UTF8';
SET standard_conforming_strings = on;
SELECT pg_catalog.set_config('search_path', '', false);
SET check_function_bodies = false;
SET xmloption = content;
SET client_min_messages = warning;
SET row_security = off;

--
-- TOC entry 6 (class 2615 OID 41076)
-- Name: station; Type: SCHEMA; Schema: -; Owner: postgres
--

CREATE SCHEMA station;

ALTER SCHEMA station OWNER TO postgres;

SET default_tablespace = '';

SET default_table_access_method = heap;

--
-- TOC entry 204 (class 1259 OID 41090)
-- Name: bill; Type: TABLE; Schema: station; Owner: postgres
--

CREATE TABLE station.bill (
    bill_number integer NOT NULL,
    ur_face character varying(100) NOT NULL,
    fullname character varying(100) NOT NULL,
    date_creation date NOT NULL,
    bill_company character varying(100) NOT NULL,
```

```
    bill_client character varying(100) NOT NULL
);
```

```
ALTER TABLE station.bill OWNER TO postgres;
```

```
--
-- TOC entry 202 (class 1259 OID 41077)
-- Name: client; Type: TABLE; Schema: station; Owner: postgres
--
```

```
CREATE TABLE station.client (
    fullname character varying(100) NOT NULL,
    phone integer NOT NULL,
    cart_bill_client integer NOT NULL,
    address character varying NOT NULL
);
```

```
ALTER TABLE station.client OWNER TO postgres;
```

```
--
-- TOC entry 203 (class 1259 OID 41085)
-- Name: company; Type: TABLE; Schema: station; Owner: postgres
--
```

```
CREATE TABLE station.company (
    ur_face character varying(100) NOT NULL,
    company_name character varying(100) NOT NULL,
    comp_code integer NOT NULL
);
```

```
ALTER TABLE station.company OWNER TO postgres;
```

```
--
```

```
-- TOC entry 208 (class 1259 OID 41133)
-- Name: fuel; Type: TABLE; Schema: station; Owner: postgres
--
```

```
CREATE TABLE station.fuel (
    code integer NOT NULL,
    comp_provider character varying(100) NOT NULL,
    brand character varying(100) NOT NULL,
    kind character varying(100) NOT NULL,
    msr text NOT NULL
);
```

```
ALTER TABLE station.fuel OWNER TO postgres;
```

```
--
-- TOC entry 207 (class 1259 OID 41120)
-- Name: fuel_provider; Type: TABLE; Schema: station; Owner: postgres
--
```

```
CREATE TABLE station.fuel_provider (
    comp_provider character varying NOT NULL,
    code integer NOT NULL
);
```

```
ALTER TABLE station.fuel_provider OWNER TO postgres;
```

```
--
-- TOC entry 210 (class 1259 OID 41166)
-- Name: price; Type: TABLE; Schema: station; Owner: postgres
--
```

```
CREATE TABLE station.price (
    price_surr integer NOT NULL,
    rfl_code integer NOT NULL,
```

```
comp_provider character varying(100) NOT NULL,  
"from" date NOT NULL,  
"to" date NOT NULL,  
CONSTRAINT period CHECK (("from" < "to"))  
);
```

```
ALTER TABLE station.price OWNER TO postgres;
```

```
--  
-- TOC entry 206 (class 1259 OID 41115)  
-- Name: provider; Type: TABLE; Schema: station; Owner: postgres  
--
```

```
CREATE TABLE station.provider (  
    code integer NOT NULL,  
    address character varying(100) NOT NULL,  
    name character varying(100) NOT NULL  
);
```

```
ALTER TABLE station.provider OWNER TO postgres;
```

```
--  
-- TOC entry 205 (class 1259 OID 41105)  
-- Name: refuelling; Type: TABLE; Schema: station; Owner: postgres  
--
```

```
CREATE TABLE station.refuelling (  
    rfl_code integer NOT NULL,  
    ur_face character varying(100) NOT NULL,  
    type character varying(100) NOT NULL,  
    firm character varying(100) NOT NULL,  
    address character varying(100) NOT NULL  
);
```

```
ALTER TABLE station.refuelling OWNER TO postgres;
```

```
--
```

```
-- TOC entry 209 (class 1259 OID 41146)
```

```
-- Name: service; Type: TABLE; Schema: station; Owner: postgres
```

```
--
```

```
CREATE TABLE station.service (  
    service_sur integer NOT NULL,  
    bill_number integer NOT NULL,  
    rfl_code integer NOT NULL,  
    code integer NOT NULL,  
    qnt_fuel integer NOT NULL,  
    date date NOT NULL,  
    CONSTRAINT qnt_fuel CHECK ((qnt_fuel > 0))  
);
```

```
ALTER TABLE station.service OWNER TO postgres;
```

```
--
```

```
-- TOC entry 2904 (class 0 OID 41090)
```

```
-- Dependencies: 204
```

```
-- Data for Name: bill; Type: TABLE DATA; Schema: station; Owner: postgres
```

```
--
```

```
COPY station.bill (bill_number, ur_face, fullname, date_creation, bill_company, bill_client)  
FROM stdin;
```

```
111111 ООО Бензин Иванова Кристина 2010-02-01 Палмолив 111111  
111112 ООО Бензин Петрова Ксения 2011-04-01 Палмолив 111112  
111113 ООО ТопливоЛылова Елена 2014-09-09 Крэйзи 111113  
111114 ООО Бензин Шишкина Дарья 2015-09-04 Палмолив 111114  
111115 ООО ТопливоСкворцова Елизавета 2017-03-15 Крэйзи 111115  
\.
```



```
--
-- TOC entry 2902 (class 0 OID 41077)
-- Dependencies: 202
-- Data for Name: client; Type: TABLE DATA; Schema: station; Owner: postgres
--
```

```
COPY station.client (fullname, phone, cart_bill_client, address) FROM stdin;
```

```
Иванова Кристина    111111 111111 Биржевая линия
Петрова Ксения      111112 111112 Кронверкский проспект
Лылова Елена        111113 111113 Ломоносова улица
Шишкина Дарья       111114 111114 Гривцова переулок
Скворцова Елизавета 111115 111115 Грибоедова канал
```

```
\.
```

```
--
-- TOC entry 2903 (class 0 OID 41085)
-- Dependencies: 203
-- Data for Name: company; Type: TABLE DATA; Schema: station; Owner: postgres
--
```

```
COPY station.company (ur_face, company_name, comp_code) FROM stdin;
```

```
ООО ТопливоПалмолив    1
ООО Бензин Крэйци       2
```

```
\.
```

```
--
-- TOC entry 2908 (class 0 OID 41133)
-- Dependencies: 208
-- Data for Name: fuel; Type: TABLE DATA; Schema: station; Owner: postgres
--
```

```
COPY station.fuel (code, comp_provider, brand, kind, msr) FROM stdin;
```

```
1      Пост1 А-72  Нормаль-АИ80      л/100км
```

2	Пост2	А-92	Регуляр-АИ92	км/л
3	Пост2	А-96	Премиум-АИ95	mpg
4	Пост2	А-93	Нормаль-АИ80	км/л
5	Пост1	А-91	Нормаль-АИ80	л/100км
6	Пост1	А-98	Супер-АИ95+mpg	
7	Пост3	А-72	Экстра-АИ98	mpg
8	Пост3	А-95	ЭКТО-АИ100	км/л
9	Пост1	А-76	Супер-АИ95+л/100км	
10	Пост3	А-80	Экстра-АИ98	л/100км

\.

--

-- TOC entry 2907 (class 0 OID 41120)

-- Dependencies: 207

-- Data for Name: fuel_provider; Type: TABLE DATA; Schema: station; Owner: postgres

--

COPY station.fuel_provider (comp_provider, code) FROM stdin;

Пост1 1

Пост2 2

Пост3 3

\.

--

-- TOC entry 2910 (class 0 OID 41166)

-- Dependencies: 210

-- Data for Name: price; Type: TABLE DATA; Schema: station; Owner: postgres

--

COPY station.price (price_surr, rfl_code, comp_provider, "from", "to") FROM stdin;

1 1 Пост1 2010-01-01 2030-01-01

2 2 Пост2 2009-01-01 2030-01-01

3 2 Пост3 2010-01-01 2030-01-01

\.

```
--
-- TOC entry 2906 (class 0 OID 41115)
-- Dependencies: 206
-- Data for Name: provider; Type: TABLE DATA; Schema: station; Owner: postgres
--
```

```
COPY station.provider (code, address, name) FROM stdin;
```

```
1      Садовая улица      Пост1
2      Думская улица      Пост2
3      Лиговский проспект Пост3
\.
```

```
--
-- TOC entry 2905 (class 0 OID 41105)
-- Dependencies: 205
-- Data for Name: refuelling; Type: TABLE DATA; Schema: station; Owner: postgres
--
```

```
COPY station.refuelling (rfl_code, ur_face, type, firm, address) FROM stdin;
```

```
1      ООО ТопливоАЗС   Палмолив   Малый проспект
2      ООО Бензин   АГЗС   Крэйзи      Средний проспект
\.
```

```
--
-- TOC entry 2909 (class 0 OID 41146)
-- Dependencies: 209
-- Data for Name: service; Type: TABLE DATA; Schema: station; Owner: postgres
--
```

```
COPY station.service (service_sur, bill_number, rfl_code, code, qnt_fuel, date) FROM stdin;
```

```
1      111111 2      6      10      2022-03-15
2      111112 1      9      20      2022-03-16
```

3	111113 1	3	5	2022-04-20
4	111114 1	4	3	2022-04-29
5	111115 2	10	7	2022-02-14
6	111113 2	8	10	2022-04-11
7	111112 1	2	4	2022-04-30
8	111114 2	7	15	2022-04-30
9	111112 1	1	1	2022-02-14
10	111111 1	5	1	2022-05-04
11	111115 2	8	10	2022-04-02
12	111112 1	7	2	2022-05-02
13	111114 1	1	5	2022-01-03
14	111113 1	2	4	2022-02-05
15	111111 1	2	7	2022-05-02
16	111114 1	3	20	2022-01-08
17	111112 2	6	15	2022-04-14
18	111115 2	10	8	2022-01-17
19	111113 2	2	5	2022-03-01
20	111111 1	9	2	2022-03-15

\\.

--

-- TOC entry 2743 (class 2606 OID 41190)

-- Name: refuelling address; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.refuelling

ADD CONSTRAINT address UNIQUE (address) INCLUDE (address);

--

-- TOC entry 2749 (class 2606 OID 41206)

-- Name: provider addressun; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.provider

```
ADD CONSTRAINT addressun UNIQUE (address) INCLUDE (address);
```

```
--
```

```
-- TOC entry 2739 (class 2606 OID 41185)
```

```
-- Name: bill bill_number; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.bill
```

```
ADD CONSTRAINT bill_number UNIQUE (bill_number) INCLUDE (bill_number);
```

```
--
```

```
-- TOC entry 2741 (class 2606 OID 41094)
```

```
-- Name: bill bill_pkey; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.bill
```

```
ADD CONSTRAINT bill_pkey PRIMARY KEY (bill_number);
```

```
--
```

```
-- TOC entry 2723 (class 2606 OID 41187)
```

```
-- Name: client cart_bill_client; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.client
```

```
ADD CONSTRAINT cart_bill_client UNIQUE (cart_bill_client) INCLUDE  
(cart_bill_client);
```

```
--
```

```
-- TOC entry 2759 (class 2606 OID 41200)
```

```
-- Name: fuel code; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.fuel
```

```
    ADD CONSTRAINT code UNIQUE (code) INCLUDE (code);
```

```
--
```

```
-- TOC entry 2751 (class 2606 OID 41204)
```

```
-- Name: provider codeun; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.provider
```

```
    ADD CONSTRAINT codeun UNIQUE (code) INCLUDE (code);
```

```
--
```

```
-- TOC entry 2731 (class 2606 OID 41196)
```

```
-- Name: company comp_code; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.company
```

```
    ADD CONSTRAINT comp_code UNIQUE (comp_code) INCLUDE (comp_code);
```

```
--
```

```
-- TOC entry 2733 (class 2606 OID 41198)
```

```
-- Name: company company_name; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.company
```

```
    ADD CONSTRAINT company_name UNIQUE (company_name) INCLUDE  
(company_name);
```

```
--
```

```
-- TOC entry 2735 (class 2606 OID 41089)
```

```
-- Name: company company_pkey; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.company
```

```
ADD CONSTRAINT company_pkey PRIMARY KEY (ur_face);
```

```
--
```

```
-- TOC entry 2725 (class 2606 OID 49738)
```

```
-- Name: client fn; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.client
```

```
ADD CONSTRAINT fn UNIQUE (fullname) INCLUDE (fullname);
```

```
--
```

```
-- TOC entry 2761 (class 2606 OID 41140)
```

```
-- Name: fuel fuel_pkey; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.fuel
```

```
ADD CONSTRAINT fuel_pkey PRIMARY KEY (code);
```

```
--
```

```
-- TOC entry 2757 (class 2606 OID 41127)
```

```
-- Name: fuel_provider fuel_provider_pkey; Type: CONSTRAINT; Schema: station; Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY station.fuel_provider
```

```
ADD CONSTRAINT fuel_provider_pkey PRIMARY KEY (comp_provider);
```

```
--
```

```
-- TOC entry 2753 (class 2606 OID 41208)
```

```
-- Name: provider nameun; Type: CONSTRAINT; Schema: station; Owner: postgres
```

--

ALTER TABLE ONLY station.provider

ADD CONSTRAINT nameun UNIQUE (name) INCLUDE (name);

--

-- TOC entry 2727 (class 2606 OID 41183)

-- Name: client phone; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.client

ADD CONSTRAINT phone UNIQUE (phone) INCLUDE (phone);

--

-- TOC entry 2729 (class 2606 OID 49736)

-- Name: client pk; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.client

ADD CONSTRAINT pk PRIMARY KEY (phone) INCLUDE (phone);

--

-- TOC entry 2765 (class 2606 OID 41170)

-- Name: price price_pkey; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.price

ADD CONSTRAINT price_pkey PRIMARY KEY (price_surr);

--

-- TOC entry 2755 (class 2606 OID 41119)

-- Name: provider provider_pkey; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.provider

ADD CONSTRAINT provider_pkey PRIMARY KEY (code);

--

-- TOC entry 2745 (class 2606 OID 41109)

-- Name: refuelling refuelling_pkey; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.refuelling

ADD CONSTRAINT refuelling_pkey PRIMARY KEY (rfl_code);

--

-- TOC entry 2747 (class 2606 OID 41192)

-- Name: refuelling rfl_code; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.refuelling

ADD CONSTRAINT rfl_code UNIQUE (rfl_code) INCLUDE (rfl_code);

--

-- TOC entry 2763 (class 2606 OID 41150)

-- Name: service service_pkey; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.service

ADD CONSTRAINT service_pkey PRIMARY KEY (service_sur);

--

-- TOC entry 2737 (class 2606 OID 41194)

-- Name: company ur_face; Type: CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.company

ADD CONSTRAINT ur_face UNIQUE (ur_face) INCLUDE (ur_face);

--

-- TOC entry 2771 (class 2606 OID 41151)

-- Name: service bill_number; Type: FK CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.service

ADD CONSTRAINT bill_number FOREIGN KEY (bill_number) REFERENCES
station.bill(bill_number) NOT VALID;

--

-- TOC entry 2769 (class 2606 OID 41128)

-- Name: fuel_provider code; Type: FK CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.fuel_provider

ADD CONSTRAINT code FOREIGN KEY (code) REFERENCES station.provider(code)
NOT VALID;

--

-- TOC entry 2773 (class 2606 OID 41161)

-- Name: service code; Type: FK CONSTRAINT; Schema: station; Owner: postgres

--

ALTER TABLE ONLY station.service

ADD CONSTRAINT code FOREIGN KEY (code) REFERENCES station.fuel(code) NOT
VALID;

--

-- TOC entry 2770 (class 2606 OID 41141)
-- Name: fuel comp_provider; Type: FK CONSTRAINT; Schema: station; Owner: postgres
--

ALTER TABLE ONLY station.fuel

ADD CONSTRAINT comp_provider FOREIGN KEY (comp_provider) REFERENCES
station.fuel_provider(comp_provider) NOT VALID;

--
-- TOC entry 2775 (class 2606 OID 41176)
-- Name: price comp_provider; Type: FK CONSTRAINT; Schema: station; Owner: postgres
--

ALTER TABLE ONLY station.price

ADD CONSTRAINT comp_provider FOREIGN KEY (comp_provider) REFERENCES
station.fuel_provider(comp_provider);

--
-- TOC entry 2767 (class 2606 OID 49739)
-- Name: bill fn; Type: FK CONSTRAINT; Schema: station; Owner: postgres
--

ALTER TABLE ONLY station.bill

ADD CONSTRAINT fn FOREIGN KEY (fullname) REFERENCES
station.client(fullname) NOT VALID;

--
-- TOC entry 2772 (class 2606 OID 41156)
-- Name: service rfl_code; Type: FK CONSTRAINT; Schema: station; Owner: postgres
--

ALTER TABLE ONLY station.service

ADD CONSTRAINT rfl_code FOREIGN KEY (rfl_code) REFERENCES
station.refuelling(rfl_code) NOT VALID;

```
--
-- TOC entry 2774 (class 2606 OID 41171)
-- Name: price rfl_code; Type: FK CONSTRAINT; Schema: station; Owner: postgres
--

ALTER TABLE ONLY station.price
    ADD CONSTRAINT rfl_code FOREIGN KEY (rfl_code) REFERENCES
station.refuelling(rfl_code);

--
-- TOC entry 2766 (class 2606 OID 41095)
-- Name: bill ur_face; Type: FK CONSTRAINT; Schema: station; Owner: postgres
--

ALTER TABLE ONLY station.bill
    ADD CONSTRAINT ur_face FOREIGN KEY (ur_face) REFERENCES
station.company(ur_face);

--
-- TOC entry 2768 (class 2606 OID 41110)
-- Name: refuelling ur_face; Type: FK CONSTRAINT; Schema: station; Owner: postgres
--

ALTER TABLE ONLY station.refuelling
    ADD CONSTRAINT ur_face FOREIGN KEY (ur_face) REFERENCES
station.company(ur_face);

-- Completed on 2022-05-05 02:35:03

--
-- PostgreSQL database dump complete
--
```

Резервная копия и восстановление:

Резервная копия

Backing up an object on the server

Backing up an object on the server 'PostgreSQL 12 (localhost:5432)' from database 'avto'

Fri Apr 15 2022 21:07:32 GMT+0300 (Москва, стандартное время)

1.04 seconds

More details...

Stop Process

✓ Successfully completed.

Backing up an object on the server

Backing up an object on the server 'PostgreSQL 12 (localhost:5432)' from database 'avto'

Fri Apr 15 2022 21:09:30 GMT+0300 (Москва, стандартное время)

0.29 seconds

More details...

Stop Process

✓ Successfully completed.

Восстановление

Restoring backup on the server

Restoring backup on the server 'PostgreSQL 12 (localhost:5432)'

Fri Apr 15 2022 21:11:13 GMT+0300 (Москва, стандартное время)

1.35 seconds

More details...

Stop Process

✓ Successfully completed.

Выводы: создана с ограничениями (пк, уникальность, проверка), заполнена и восстановлена база данных, построена схема, добавлен листинг кода. и заполнила её, установила