**Министерство науки и высшего образования Российской Федерации**

федеральное государственное автономное образовательное учреждение высшего образования

**«НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ ИТМО»**

**Отчет**

по лабораторной работе №3.2 «Создание таблиц базы данных PostgreSQL. Заполнение таблиц рабочими данными»

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

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# Цель работы

# Овладеть практическими навыками создания таблиц базы данных PostgreSQL 1Х, заполнения их рабочими данными, резервного копирования и восстановления БД.

# Практическое задание

# Создать базу данных с использованием pgAdmin 4 (согласно индивидуальному заданию).

# Создать схему в составе базы данных.

# Создать таблицы базы данных.

# Установить ограничения на данные: Primary Key, Unique, Check, Foreign Key.

# Заполнить таблицы БД рабочими данными.

# 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.

# Восстановить БД.

# Вариант 12. БД «Прокат автомобилей»

**Описание предметной области:**

Схема логической модели базы данных, сгенерированная в Generate ERD указана на рисунке 1.

# 

# Рисунок 1 – Схема логической модели базы данных.

# Листинг дампа:

--

-- PostgreSQL database dump

--

-- Dumped from database version 16.0

-- Dumped by pg\_dump version 16.0

-- Started on 2023-10-26 00:56:25 MSK

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 3663 (class 1262 OID 16398)

-- Name: pashahurs; Type: DATABASE; Schema: -; Owner: postgres

--

CREATE DATABASE pashahurs WITH TEMPLATE = template0 ENCODING = 'UTF8' LOCALE\_PROVIDER = libc LOCALE = 'C';

ALTER DATABASE pashahurs OWNER TO postgres;

\connect pashahurs

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;

SET default\_tablespace = '';

SET default\_table\_access\_method = heap;

--

-- TOC entry 221 (class 1259 OID 16464)

-- Name: carriage; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.carriage (

carriage\_id integer NOT NULL,

train\_id integer NOT NULL,

carriage\_type character varying(50) NOT NULL

);

ALTER TABLE public.carriage OWNER TO postgres;

--

-- TOC entry 215 (class 1259 OID 16418)

-- Name: passenger; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.passenger (

passenger\_id integer NOT NULL,

passport\_date\_of\_birth date NOT NULL,

passport\_identification\_number character varying(20),

passport\_number character varying(20),

patronymic character varying(100),

first\_name character varying(100),

last\_name character varying(100),

CONSTRAINT passenger\_id CHECK ((passenger\_id > 0))

);

ALTER TABLE public.passenger OWNER TO postgres;

--

-- TOC entry 220 (class 1259 OID 16456)

-- Name: schedule; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.schedule (

schedule\_id integer NOT NULL,

departure\_time date NOT NULL,

added\_train\_id integer,

train\_type character varying(20) NOT NULL,

train\_status character varying(50) NOT NULL,

station\_name\_to character varying(100) NOT NULL,

station\_name\_from character varying(100) NOT NULL,

train\_name character varying(100) NOT NULL,

CONSTRAINT schedule\_id CHECK ((schedule\_id > 0))

);

ALTER TABLE public.schedule OWNER TO postgres;

--

-- TOC entry 218 (class 1259 OID 16442)

-- Name: seat; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.seat (

seat\_id integer NOT NULL,

carriage\_id integer NOT NULL,

locked\_status boolean NOT NULL,

CONSTRAINT seat\_id CHECK ((seat\_id > 0))

);

ALTER TABLE public.seat OWNER TO postgres;

--

-- TOC entry 222 (class 1259 OID 16474)

-- Name: stop; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.stop (

stop\_id integer NOT NULL,

stop\_type character varying(100) NOT NULL,

location character varying(100) NOT NULL,

stop\_name character varying(100) NOT NULL

);

ALTER TABLE public.stop OWNER TO postgres;

--

-- TOC entry 223 (class 1259 OID 16481)

-- Name: stop\_point; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.stop\_point (

stop\_point\_id integer NOT NULL,

train\_id integer NOT NULL,

arrival\_time timestamp with time zone NOT NULL,

parking\_time time with time zone NOT NULL,

departure\_time time with time zone NOT NULL,

stop\_name character varying(100),

stop\_id integer NOT NULL

);

ALTER TABLE public.stop\_point OWNER TO postgres;

--

-- TOC entry 217 (class 1259 OID 16434)

-- Name: ticket; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.ticket (

ticket\_id integer NOT NULL,

passenger\_id integer NOT NULL,

ticket\_office\_id integer NOT NULL,

price integer NOT NULL,

seat\_id integer NOT NULL,

station\_name\_to character varying(100) NOT NULL,

station\_name\_from character varying(100) NOT NULL,

ticket\_status character varying(100) NOT NULL,

CONSTRAINT price CHECK ((price > 0))

);

ALTER TABLE public.ticket OWNER TO postgres;

--

-- TOC entry 216 (class 1259 OID 16426)

-- Name: ticket\_office; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.ticket\_office (

ticket\_office\_id integer NOT NULL,

stop\_name character varying(100),

address character varying(100),

CONSTRAINT ticket\_office\_id CHECK ((ticket\_office\_id > 0))

);

ALTER TABLE public.ticket\_office OWNER TO postgres;

--

-- TOC entry 219 (class 1259 OID 16448)

-- Name: train; Type: TABLE; Schema: public; Owner: postgres

--

CREATE TABLE public.train (

train\_id integer NOT NULL,

shedule\_id integer NOT NULL,

departure\_date date NOT NULL,

arrival\_date date NOT NULL,

train\_status character varying(100),

CONSTRAINT train\_id CHECK ((train\_id > 0))

);

ALTER TABLE public.train OWNER TO postgres;

--

-- TOC entry 3655 (class 0 OID 16464)

-- Dependencies: 221

-- Data for Name: carriage; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.carriage VALUES (1, 1, 'Economy') ON CONFLICT DO NOTHING;

INSERT INTO public.carriage VALUES (2, 1, 'Business') ON CONFLICT DO NOTHING;

INSERT INTO public.carriage VALUES (3, 2, 'Economy') ON CONFLICT DO NOTHING;

--

-- TOC entry 3649 (class 0 OID 16418)

-- Dependencies: 215

-- Data for Name: passenger; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.passenger VALUES (1, '1990-01-01', 'ID123456', 'P123456', 'Ivanovich', 'Ivan', 'Ivanov') ON CONFLICT DO NOTHING;

INSERT INTO public.passenger VALUES (2, '1985-05-05', 'ID654321', 'P654321', 'Petrovich', 'Petr', 'Petrov') ON CONFLICT DO NOTHING;

--

-- TOC entry 3654 (class 0 OID 16456)

-- Dependencies: 220

-- Data for Name: schedule; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.schedule VALUES (1, '2023-11-01', NULL, 'Express', 'On Time', 'StationB', 'StationA', 'TrainX') ON CONFLICT DO NOTHING;

INSERT INTO public.schedule VALUES (2, '2023-11-02', NULL, 'Normal', 'On Time', 'StationC', 'StationA', 'TrainY') ON CONFLICT DO NOTHING;

--

-- TOC entry 3652 (class 0 OID 16442)

-- Dependencies: 218

-- Data for Name: seat; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.seat VALUES (1, 1, false) ON CONFLICT DO NOTHING;

INSERT INTO public.seat VALUES (2, 1, true) ON CONFLICT DO NOTHING;

INSERT INTO public.seat VALUES (3, 2, false) ON CONFLICT DO NOTHING;

INSERT INTO public.seat VALUES (4, 3, false) ON CONFLICT DO NOTHING;

--

-- TOC entry 3656 (class 0 OID 16474)

-- Dependencies: 222

-- Data for Name: stop; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.stop VALUES (1, 'Major', 'CityA', 'StopA') ON CONFLICT DO NOTHING;

INSERT INTO public.stop VALUES (2, 'Minor', 'CityB', 'StopB') ON CONFLICT DO NOTHING;

--

-- TOC entry 3657 (class 0 OID 16481)

-- Dependencies: 223

-- Data for Name: stop\_point; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.stop\_point VALUES (1, 1, '2023-11-01 08:00:00+03', '00:30:00+03', '08:30:00+03', 'StopA', 1) ON CONFLICT DO NOTHING;

INSERT INTO public.stop\_point VALUES (2, 1, '2023-11-01 10:00:00+03', '00:20:00+03', '10:20:00+03', 'StopB', 2) ON CONFLICT DO NOTHING;

--

-- TOC entry 3651 (class 0 OID 16434)

-- Dependencies: 217

-- Data for Name: ticket; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.ticket VALUES (1, 1, 1, 100, 1, 'StationB', 'StationA', 'Booked') ON CONFLICT DO NOTHING;

INSERT INTO public.ticket VALUES (2, 2, 1, 150, 3, 'StationC', 'StationA', 'Booked') ON CONFLICT DO NOTHING;

--

-- TOC entry 3650 (class 0 OID 16426)

-- Dependencies: 216

-- Data for Name: ticket\_office; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.ticket\_office VALUES (1, 'StopA', 'StreetA, CityA') ON CONFLICT DO NOTHING;

INSERT INTO public.ticket\_office VALUES (2, 'StopB', 'StreetB, CityB') ON CONFLICT DO NOTHING;

--

-- TOC entry 3653 (class 0 OID 16448)

-- Dependencies: 219

-- Data for Name: train; Type: TABLE DATA; Schema: public; Owner: postgres

--

INSERT INTO public.train VALUES (1, 1, '2023-11-01', '2023-11-01', 'On Time') ON CONFLICT DO NOTHING;

INSERT INTO public.train VALUES (2, 2, '2023-11-02', '2023-11-02', 'On Time') ON CONFLICT DO NOTHING;

--

-- TOC entry 3493 (class 2606 OID 16470)

-- Name: carriage carriage\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.carriage

ADD CONSTRAINT carriage\_pkey PRIMARY KEY (carriage\_id);

--

-- TOC entry 3481 (class 2606 OID 16425)

-- Name: passenger passenger\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.passenger

ADD CONSTRAINT passenger\_pkey PRIMARY KEY (passenger\_id);

--

-- TOC entry 3491 (class 2606 OID 16463)

-- Name: schedule schedule\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.schedule

ADD CONSTRAINT schedule\_pkey PRIMARY KEY (schedule\_id);

--

-- TOC entry 3487 (class 2606 OID 16447)

-- Name: seat seat\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.seat

ADD CONSTRAINT seat\_pkey PRIMARY KEY (seat\_id);

--

-- TOC entry 3495 (class 2606 OID 16480)

-- Name: stop stop\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.stop

ADD CONSTRAINT stop\_pkey PRIMARY KEY (stop\_id);

--

-- TOC entry 3497 (class 2606 OID 16487)

-- Name: stop\_point stop\_point\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.stop\_point

ADD CONSTRAINT stop\_point\_pkey PRIMARY KEY (stop\_point\_id);

--

-- TOC entry 3483 (class 2606 OID 16433)

-- Name: ticket\_office ticket\_office\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.ticket\_office

ADD CONSTRAINT ticket\_office\_pkey PRIMARY KEY (ticket\_office\_id);

--

-- TOC entry 3485 (class 2606 OID 16441)

-- Name: ticket ticket\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.ticket

ADD CONSTRAINT ticket\_pkey PRIMARY KEY (ticket\_id);

--

-- TOC entry 3489 (class 2606 OID 16455)

-- Name: train train\_pkey; Type: CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.train

ADD CONSTRAINT train\_pkey PRIMARY KEY (train\_id);

--

-- TOC entry 3503 (class 2606 OID 16508)

-- Name: carriage carriage\_train\_id\_fkey; Type: FK CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.carriage

ADD CONSTRAINT carriage\_train\_id\_fkey FOREIGN KEY (train\_id) REFERENCES public.train(train\_id) NOT VALID;

--

-- TOC entry 3501 (class 2606 OID 16503)

-- Name: seat seat\_carriage\_id\_fkey; Type: FK CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.seat

ADD CONSTRAINT seat\_carriage\_id\_fkey FOREIGN KEY (carriage\_id) REFERENCES public.carriage(carriage\_id) NOT VALID;

--

-- TOC entry 3504 (class 2606 OID 16523)

-- Name: stop\_point stop\_point\_stop\_id\_fkey; Type: FK CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.stop\_point

ADD CONSTRAINT stop\_point\_stop\_id\_fkey FOREIGN KEY (stop\_id) REFERENCES public.stop(stop\_id) NOT VALID;

--

-- TOC entry 3505 (class 2606 OID 16518)

-- Name: stop\_point stop\_point\_train\_id\_fkey; Type: FK CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.stop\_point

ADD CONSTRAINT stop\_point\_train\_id\_fkey FOREIGN KEY (train\_id) REFERENCES public.train(train\_id) NOT VALID;

--

-- TOC entry 3498 (class 2606 OID 16488)

-- Name: ticket ticket\_passenger\_id\_fkey; Type: FK CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.ticket

ADD CONSTRAINT ticket\_passenger\_id\_fkey FOREIGN KEY (passenger\_id) REFERENCES public.passenger(passenger\_id) NOT VALID;

--

-- TOC entry 3499 (class 2606 OID 16498)

-- Name: ticket ticket\_seat\_id\_fkey; Type: FK CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.ticket

ADD CONSTRAINT ticket\_seat\_id\_fkey FOREIGN KEY (seat\_id) REFERENCES public.seat(seat\_id) NOT VALID;

--

-- TOC entry 3500 (class 2606 OID 16493)

-- Name: ticket ticket\_ticket\_office\_id\_fkey; Type: FK CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.ticket

ADD CONSTRAINT ticket\_ticket\_office\_id\_fkey FOREIGN KEY (ticket\_office\_id) REFERENCES public.ticket\_office(ticket\_office\_id) NOT VALID;

--

-- TOC entry 3502 (class 2606 OID 16513)

-- Name: train train\_shedule\_id\_fkey; Type: FK CONSTRAINT; Schema: public; Owner: postgres

--

ALTER TABLE ONLY public.train

ADD CONSTRAINT train\_shedule\_id\_fkey FOREIGN KEY (shedule\_id) REFERENCES public.schedule(schedule\_id) NOT VALID;

-- Completed on 2023-10-26 00:56:25 MSK

--

-- PostgreSQL database dump complete

--

# Вывод

В рамках лабораторного задания я изучил взаимодействие с базами данных в PostgreSQL используя инструмент pgAdmin 4. Я разработал схему базы данных, включая таблицы и их ограничения, заполнил их информацией, создал бэкапы и успешно провёл процедуру восстановления, подтвердив правильность выполненных действий.