

## **Лабораторная работа № 3**

**«Создание таблиц базы данных PostgreSQL. Заполнение  
таблиц рабочими данными»**

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**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.
7. Восстановить БД.

### Ход работы:

#### 1. Наименование БД

a) **Program** (program\_id Идентификатор программы, start\_date дата начала, end\_date дата конца, program\_name название программы, program\_type\_id идентификатор типа программы)

b) **Program type** (program\_type\_id Идентификатор типа программы, program\_type\_name название, qualification квалификация, document\_type тип документа)

c) **Discipline** (discipline\_id Идентификатор дисциплины, discipline\_name название дисциплины, lec\_hours лекционные часы, lab\_hours лабораторные часы, prac\_hours практические часы)

d) **Group** (group\_id Идентификатор группы, program\_id идентификатор программы, group\_number номер группы, volume вместимость)

e) **Listener** (passport Номер паспорта, phone\_number контакты, listener\_name имя слушателя, listener\_surname фамилия слушателя)

f) **Education** (passport Номер паспорта, group\_id идентификатор группы, status статус, diploma\_number номер документа об обучении)

g) **Class** (class\_id Идентификатор занятия, room\_id идентификатор аудитории, discipline\_id идентификатор дисциплины, group\_id идентификатор группы, teacher\_number табельный номер, date дата занятия, class\_status статус занятия, class\_num номер пары, class\_type тип занятия)

h) **Classroom** (room\_id Идентификатор аудитории, address адрес, type тип аудитории, room\_number номер аудитории)

и) Преподаватель (*teacher\_number* Табельный номер, *teacher\_name* имя, *teacher\_surname* фамилия, *teacher\_middlename* отчество, *occupation\_id* идентификатор должности)

ж) Должность (*occupation\_id* Идентификатор должности, *occupation\_name* название)

## 2. Схема логической модели базы данных, сгенерированная в Generate ERD

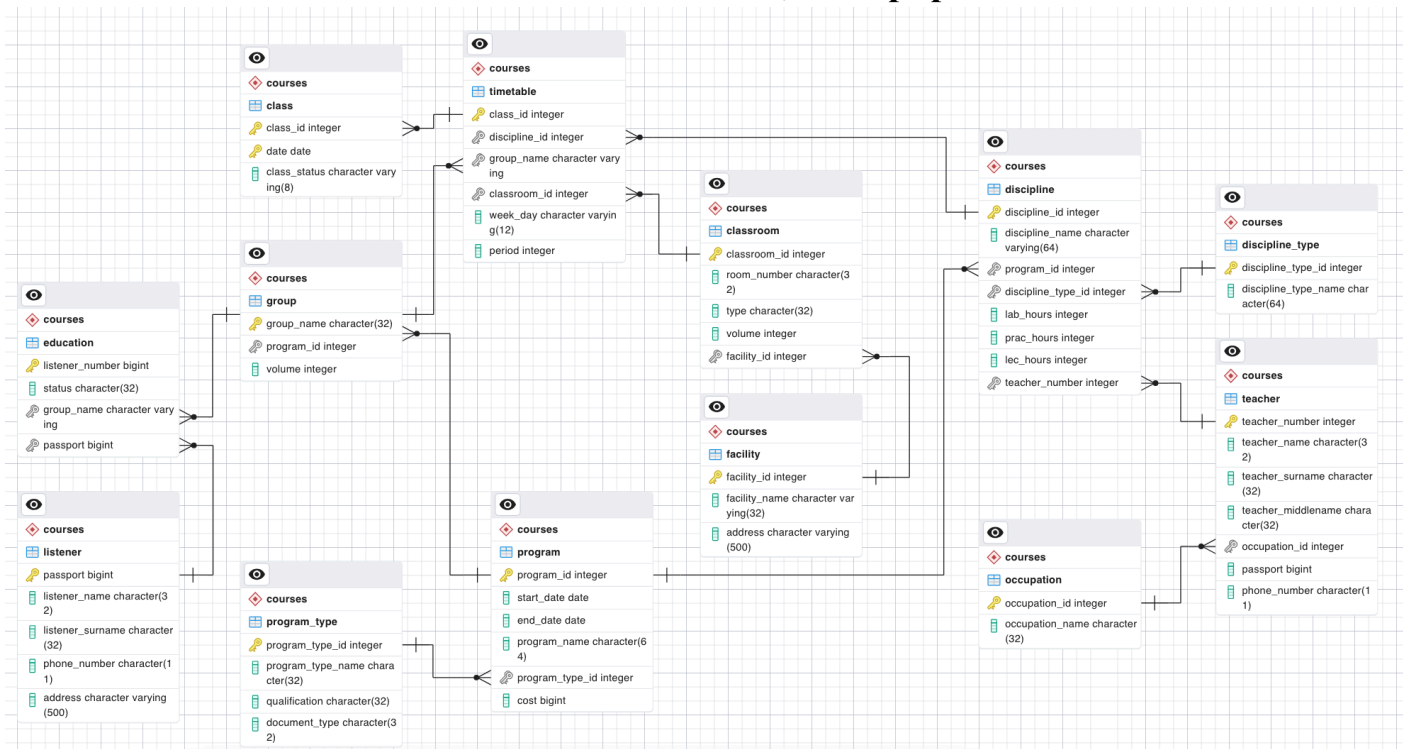


Рисунок 1

## 3. Dump, скомпилированный pg\_Backup, содержащий скрипты работы с БД:

```
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;
```

```
CREATE DATABASE "COURSES" WITH TEMPLATE = template0 ENCODING = 'UTF8' LOCALE_PROVIDER = icu LOCALE = 'en_US.UTF-8' ICU_LOCALE = 'en-US';
```

```
ALTER DATABASE "COURSES" OWNER TO postgres;
```

```
\connect "COURSES"
```

```
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;

CREATE SCHEMA courses;

ALTER SCHEMA courses OWNER TO postgres;

SET default_tablespace = '';

SET default_table_access_method = heap;

CREATE TABLE courses.class (
    class_id integer NOT NULL,
    date date NOT NULL,
    class_status character varying(8) DEFAULT 'Проведен'::character varying NOT NULL,
    CONSTRAINT class_class_status_check CHECK (((class_status)::text = 'Проведен'::text) OR
((class_status)::text = 'Отменен'::text)))
);

ALTER TABLE courses.class OWNER TO postgres;

CREATE TABLE courses.classroom (
    classroom_id integer NOT NULL,
    room_number character varying(7) NOT NULL,
    type character varying(32) NOT NULL,
    volume integer,
    facility_id integer
);

ALTER TABLE courses.classroom OWNER TO postgres;

CREATE TABLE courses.discipline (
    discipline_id integer NOT NULL,
    program_id integer NOT NULL,
    discipline_type_id integer NOT NULL,
    lab_hours integer NOT NULL,
    prac_hours integer NOT NULL,
    lec_hours integer NOT NULL,
    teacher_number integer NOT NULL,
    discipline_name character varying(64) NOT NULL
);

ALTER TABLE courses.discipline OWNER TO postgres;

CREATE TABLE courses.discipline_type (
    discipline_type_id integer NOT NULL,
    discipline_type_name character(64) NOT NULL
);

ALTER TABLE courses.discipline_type OWNER TO postgres;

CREATE TABLE courses.education (
    listener_number bigint NOT NULL,
    status character(32),
    passport bigint,
    group_name character varying
);

ALTER TABLE courses.education OWNER TO postgres;

CREATE TABLE courses.facility (
    facility_id integer NOT NULL,
    facility_name character varying(32) NOT NULL,
    address character varying(500) NOT NULL
);

```

```
ALTER TABLE courses.facility OWNER TO postgres;
```

```
CREATE TABLE courses."group" (  
    group_name character varying NOT NULL,  
    program_id integer NOT NULL,  
    volume integer DEFAULT 20 NOT NULL  
);
```

```
ALTER TABLE courses."group" OWNER TO postgres;
```

```
CREATE TABLE courses.listener (  
    passport bigint NOT NULL,  
    listener_name character(32) NOT NULL,  
    listener_surname character(32) NOT NULL,  
    phone_number character(11) NOT NULL,  
    address character varying(500) NOT NULL  
);
```

```
ALTER TABLE courses.listener OWNER TO postgres;
```

```
CREATE TABLE courses.occupation (  
    occupation_id integer NOT NULL,  
    occupation_name character varying(32) NOT NULL  
);
```

```
ALTER TABLE courses.occupation OWNER TO postgres;
```

```
CREATE TABLE courses.program (  
    program_id integer NOT NULL,  
    start_date date NOT NULL,  
    end_date date NOT NULL,  
    program_name character(64) NOT NULL,  
    program_type_id integer NOT NULL,  
    cost bigint DEFAULT 100000  
);
```

```
ALTER TABLE courses.program OWNER TO postgres;
```

```
CREATE TABLE courses.program_type (  
    program_type_id integer NOT NULL,  
    program_type_name character(32) NOT NULL,  
    qualification character(32) NOT NULL,  
    document_type character(32) NOT NULL  
);
```

```
ALTER TABLE courses.program_type OWNER TO postgres;
```

```
CREATE TABLE courses.teacher (  
    teacher_number integer NOT NULL,  
    teacher_name character varying(32) NOT NULL,  
    occupation_id integer NOT NULL,  
    passport bigint,  
    phone_number character(11)  
);
```

```
ALTER TABLE courses.teacher OWNER TO postgres;
```

```
CREATE TABLE courses.timetable (  
    class_id integer NOT NULL,  
    discipline_id integer,  
    classroom_id integer,  
    week_day character varying(2),  
    period integer,
```

```

        class_type character varying(12),
        group_name character varying,
        CONSTRAINT timetable_period_check CHECK (((period > 0) AND (period < 10)))
    );

```

```

ALTER TABLE courses.timetable OWNER TO postgres;

```

```

INSERT INTO courses.class (class_id, date, class_status) VALUES (1, '2023-06-05', 'Проведен');
INSERT INTO courses.class (class_id, date, class_status) VALUES (2, '2023-06-05', 'Проведен');
INSERT INTO courses.class (class_id, date, class_status) VALUES (3, '2023-06-05', 'Отменен');
INSERT INTO courses.class (class_id, date, class_status) VALUES (4, '2023-06-05', 'Проведен');
INSERT INTO courses.class (class_id, date, class_status) VALUES (1, '2023-06-13', 'Проведен');
INSERT INTO courses.class (class_id, date, class_status) VALUES (2, '2023-06-13', 'Проведен');
INSERT INTO courses.class (class_id, date, class_status) VALUES (3, '2023-06-13', 'Проведен');
INSERT INTO courses.class (class_id, date, class_status) VALUES (4, '2023-06-13', 'Отменен');

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (1, 'j11',
'аудитория', 20, 1);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (2, 'j12',
'аудитория', 25, 1);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (4, 'j14',
'компьютерный класс', 11, 1);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (6, 'j12',
'аудитория', 70, 2);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (7, 'j16',
'лекционная аудитория', 100, 1);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (9, 'k54',
'компьютерный класс', 15, 2);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (10, 'k55',
'лекционная аудитория', 80, 2);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (5, 'j11',
'компьютерный класс', 40, 2);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (8, 'j15',
'аудитория', 29, 1);

```

```

INSERT INTO courses.classroom (classroom_id, room_number, type, volume, facility_id) VALUES (3, 'j13',
'компьютерный класс', 40, 1);

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (2, 116, 14, 32, 32, 32, 222240, 'Алгебра. Начальный уровень');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (3, 116, 14, 32, 32, 32, 222240, 'Линейная алгебра');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (5, 116, 14, 16, 16, 16, 222240, 'Алгебра. Продвинутый уровень');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (6, 116, 14, 16, 16, 16, 222240, 'Математический анализ');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (9, 116, 15, 32, 32, 32, 222223, 'Геометрия. Начальный уровень');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (10, 116, 15, 32, 32, 32, 222223, 'Геометрия');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (11, 116, 15, 16, 16, 16, 222228, 'Геометрия. Продвинутый уровень');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (1, 117, 14, 16, 16, 21, 222240, 'Алгебра. Начальный уровень');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (4, 117, 14, 16, 16, 21, 222240, 'Линейная алгебра');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (7, 117, 15, 16, 16, 21, 222222, 'Геометрия. Начальный уровень');

```

```

INSERT INTO courses.discipline (discipline_id, program_id, discipline_type_id, lab_hours, prac_hours,
lec_hours, teacher_number, discipline_name) VALUES (8, 117, 15, 16, 16, 21, 222222, 'Геометрия');

```

```

INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (1, 'ООП
');

```

```

INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (2, 'Анализ данных
');

```

```

INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (10, 'Прикладная
математика
');

```

```

INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (11, 'История
математических концептов
');

```

```

INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (12, 'Физическая
культура
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (13, 'Физика и
прикладные применения алгебры
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (14, 'Алгебра
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (15, 'Геометрия
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (16, 'Счёт
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (18, 'Статистический
анализ
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (19, 'Основы теории
вероятностей
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (4, 'Математический
анализ.
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (5, 'Дополнительные
главы математического анализа
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (8, 'Линейная алгебра
');
INSERT INTO courses.discipline_type (discipline_type_id, discipline_type_name) VALUES (17, 'Музыка
');

INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888881, 'обучается
', 222222222, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888882, 'обучается
', 222222223, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888883, 'обучается
', 223155399, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888884, 'обучается
', 223114439, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888885, 'обучается
', 222114439, 'M23');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888886, 'обучается
', 222112339, 'M23');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888887, 'обучается
', 222112229, 'M23');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888888, 'обучается
', 222222229, 'K33');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888810, 'обучается
', 222222277, 'K33');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888812, 'обучается
', 222222255, 'M21');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888813, 'обучается
', 222222244, 'M12');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888889, 'отчислен
', 222222288, 'K33');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888814, 'обучается
', 555112339, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888827, 'обучается
', 555112337, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888826, 'обучается
', 555112336, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888825, 'обучается
', 555112335, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888824, 'обучается
', 555112334, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888823, 'обучается
', 555112333, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888822, 'обучается
', 555112332, 'M11');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888816, 'обучается
', 555112334, 'M21');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888815, 'обучается
', 555112333, 'M21');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888821, 'отчислен
', 555112331, 'M22');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888820, 'отчислен
', 555112338, 'M22');

```

```

INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888819, 'отчислен', 5551123379, 'M22');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888818, 'отчислен', 5551123369, 'M22');
INSERT INTO courses.education (listener_number, status, passport, group_name) VALUES (888817, 'обучается', 5551123359, 'K32');

INSERT INTO courses.facility (facility_id, facility_name, address) VALUES (4, 'Корпус им. Достоевского', 'Россия, г. Санкт-Петербург, Достоевского ул., д. 9');
INSERT INTO courses.facility (facility_id, facility_name, address) VALUES (3, 'Корпус им. Котова', 'Россия, г. Санкт-Петербург, Советская ул., д. 11');
INSERT INTO courses.facility (facility_id, facility_name, address) VALUES (2, 'Корпус им. Солженицына', 'Россия, г. Воронеж, Юбилейная ул., д. 11');
INSERT INTO courses.facility (facility_id, facility_name, address) VALUES (1, 'Корпус им. Голыгина', 'Россия, г. Санкт-Петербург, Юбилейная ул., д. 11');

INSERT INTO courses."group" (group_name, program_id, volume) VALUES ('M11', 116, 20);
INSERT INTO courses."group" (group_name, program_id, volume) VALUES ('M21', 117, 20);
INSERT INTO courses."group" (group_name, program_id, volume) VALUES ('M23', 117, 10);
INSERT INTO courses."group" (group_name, program_id, volume) VALUES ('K33', 118, 32);
INSERT INTO courses."group" (group_name, program_id, volume) VALUES ('M22', 112, 30);
INSERT INTO courses."group" (group_name, program_id, volume) VALUES ('M12', 113, 20);
INSERT INTO courses."group" (group_name, program_id, volume) VALUES ('K32', 111, 33);

INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2222222233, 'Петунья', 'Петрова', '89999999997', 'Россия, г. Волгоград, Строителей ул., д. 3 кв.22');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2222222244, 'Ваня', 'Пупыркин', '89898989898', 'Россия, г. Нижневартовск, Колхозная ул., д. 11 кв.144');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2222222255, 'Ванька', 'Пупыркина', '89898987778', 'Россия, г. Ростов-на-Дону, Хуторская ул., д. 5 кв.93');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2222222266, 'Вениамин', 'Пловов', '89898666778', 'Россия, г. Рыбинск, Шоссейная ул., д. 23 кв.122');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2222222277, 'Екатерина', 'Пловова', '89898666778', 'Россия, г. Санкт-Петербург, Молодежная ул., д. 1 кв.44');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2222222288, 'Екатерина', 'Петровна', '89898655578', 'Россия, г. Казань, Почтовая ул., д. 20 кв.184');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2222222299, 'Марина', 'Петровна', '89498655578', 'Россия, г. Краснодар, Восточная ул., д. 19 кв.145');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2221122299, 'Марина', 'Савельева', '89498555578', 'Россия, г. Шахты, Луговая ул., д. 14 кв.134');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2221123399, 'Ксения', 'Савельева', '89398555578', 'Россия, г. Элиста, 17 Сентября ул., д. 6 кв.23');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2221144399, 'Ксения', 'Соколова', '89198555578', 'Россия, г. Элиста, 17 Сентября ул., д. 6 кв.23');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2231144399, 'Евгения', 'Соколова', '89198525578', 'Россия, г. Ярославль, Новоселов ул., д. 4 кв.175');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2231555399, 'Алина', 'Сосискина', '89198625578', 'Россия, г. Коломна, Молодежный пер., д. 19 кв.155');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (2222222222, 'Петя', 'Петров', '89999999999', 'Россия, г. Владивосток, Пушкина ул., д. 19 кв.170');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (3333333333, 'Лолита', 'Кожевникова', '83333333333', 'Россия, г. Санкт-Петербург, Молодежная ул., д. 5 кв.2');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES (5551123399, 'Софья', 'Сидорова', '89999999911', 'Россия, г. Одиноково, Пролетарская ул., д. 15 кв.22');

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INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123319, 'Елена', 'Брик', '89999999112', 'Россия, г. Братск, 3 Марта ул., д. 15 кв.87');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123329, 'Елена', 'Маяковская', '89999999113', 'Россия, г. Первоуральск, Заречный пер., д. 18 кв.3');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123339, 'Марьяна', 'Кафка', '89999999114', 'Россия, г. Южно-Сахалинск, Солнечная ул., д. 10 кв.180');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123349, 'Дарья', 'Чехов', '89999999115', 'Россия, г. Кисловодск, Рабочая ул., д. 2 кв.164');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123359, 'Софья', 'Ремарк', '89999999116', 'Россия, г. Камышин, Заслонова ул., д. 25 кв.206');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123369, 'Жорж', 'Сидоров', '89999999117', 'Россия, г. Ростов-на-Дону, Речная ул., д. 1 кв.42');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123379, 'Евгений', 'Гоголь', '89999999118', 'Россия, г. Шахты, Коммунистическая ул., д. 10 кв.144');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123389, 'Степан', 'Булгаков', '89999999211', 'Россия, г. Севастополь, Сельская ул., д. 23 кв.71');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123391, 'Геннадий', 'Сидоров', '89999999212', 'Россия, г. Бердск, Ленина ул., д. 6 кв.198');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123392, 'Елена', 'Иванова', '89999999213', 'Россия, г. Волгоград, Заслонова ул., д. 4 кв.162');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123393, 'Наталья', 'Толстая', '89999999213', 'Россия, г. Ачинск, Интернациональная ул., д. 9 кв.4');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123394, 'Наталья', 'Достоевская', '89999999214', 'Россия, г. Кострома, Первомайский пер., д. 22 кв.166');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123395, 'Понтий', 'Солженицын', '89999999215', 'Россия, г. Бийск, Трудовая ул., д. 1 кв.12');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123396, 'Евгения', 'Иванова', '89999999216', 'Россия, г. Калуга, Чапаева ул., д. 14 кв.84');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123397, 'Степан', 'Сидоров', '89999999217', 'Россия, г. Ковров, Садовый пер., д. 5 кв.50');
INSERT INTO courses.listener (passport, listener_name, listener_surname, phone_number, address) VALUES
(5551123398, 'Елисей', 'Иванов', '89999999218', 'Россия, г. Йошкар-Ола, Молодежный пер., д. 12 кв.207');

INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1112, 'учитель математики');
INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1113, 'учитель музыки');
INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1114, 'учитель физики');
INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1115, 'учитель физ-ры');
INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1116, 'учитель биологии');
INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1111, 'учитель статистики');
INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1120, 'учитель алгебры');
INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1121, 'учитель анализа данных');
INSERT INTO courses.occupation (occupation_id, occupation_name) VALUES (1122, 'учитель теории вероятностей');

INSERT INTO courses.program (program_id, start_date, end_date, program_name, program_type_id, cost) VALUES
(118, '2025-03-02', '2027-03-02', 'Теория вероятностей и статистика', 123, 300000);
INSERT INTO courses.program (program_id, start_date, end_date, program_name, program_type_id, cost) VALUES
(117, '2022-02-02', '2024-02-02', 'Линейная алгебра - 2', 124, 100000);
INSERT INTO courses.program (program_id, start_date, end_date, program_name, program_type_id, cost) VALUES
(114, '2022-02-03', '2024-02-03', 'Дополнительные главы высшей математики - 2', 124, 150000);
INSERT INTO courses.program (program_id, start_date, end_date, program_name, program_type_id, cost) VALUES
(112, '2023-02-02', '2025-02-02', 'Математический анализ', 123, 100000);
INSERT INTO courses.program (program_id, start_date, end_date, program_name, program_type_id, cost) VALUES
(111, '2020-02-02', '2022-02-02', 'Математический анализ', 123, 100000);

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INSERT INTO courses.program (program_id, start_date, end_date, program_name, program_type_id, cost) VALUES
(113, '2020-02-02', '2022-02-02', 'Дополнительные главы высшей математики - 1', 123, 200000);
INSERT INTO courses.program (program_id, start_date, end_date, program_name, program_type_id, cost) VALUES
(116, '2020-02-02', '2022-02-02', 'Линейная алгебра - 1', 123, 200000);

INSERT INTO courses.program_type (program_type_id, program_type_name, qualification, document_type) VALUES
(123, 'сложный тип', 'квалификация', 'ЗЯ_123');
INSERT INTO courses.program_type (program_type_id, program_type_name, qualification, document_type) VALUES
(124, 'не сложный тип', 'квалификация поменьше', 'ЗЯ_124');

INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222223, 'Poco Maria Locovna', 1112, 4444333123, '88881234567');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222222, 'Vergara Sofia Olegovna', 1112, 4444333333, '88881234568');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222224, 'Forge Katya Lolitovna', 1111, 4444333125, '88881234577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222225, 'Forge Ivan Kolynkin', 1111, 4444333666, '88877734577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222226, 'Jorjev Kolyan Kolynkin', 1111, 4443433666, '83477734577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222227, 'Lokin Kolyan Sergeev', 1112, 4443433656, '83557734577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222228, 'Hvosh Svetlana Sergeevna', 1112, 4445553656, '8355554577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222229, 'Horhe Svetlana Golins', 1113, 4445551156, '8351154577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222210, 'Shishkina Marina Gopons', 1114, 4445151156, '8311154577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222240, 'Polya Polina Pavlovna', 1120, 4445401156, '83114054577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(222241, 'Polya Polik Pavlovich', 1121, 4445411156, '83114154577');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(223240, 'Solec Polina', 1122, 4445466156, '83114054667');
INSERT INTO courses.teacher (teacher_number, teacher_name, occupation_id, passport, phone_number) VALUES
(225550, 'Solec Pavel', 1122, 4499401156, '83199054577');

INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (1, 2, 6, 'ПН', 1, 'Лекция', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (2, 2, 6, 'ПН', 2, 'Практика', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (3, 2, 6, 'ПН', 3, 'Лабораторная', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (4, 1, 8, 'ПН', 1, 'Лекция', 'M23');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (19, 3, 7, 'БТ', 1, 'Лекция', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (18, 3, 3, 'БТ', 2, 'Практика', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (17, 3, 3, 'БТ', 3, 'Практика', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (16, 4, 7, 'СР', 1, 'Лекция', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (15, 4, 5, 'СР', 2, 'Практика', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (14, 4, 8, 'СР', 3, 'Лабораторная', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (13, 5, 7, 'ЧТ', 1, 'Лекция', 'M21');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (12, 5, 8, 'ЧТ', 2, 'Практика', 'M21');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (11, 5, 5, 'ЧТ', 3, 'Практика', 'M21');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (10, 6, 7, 'ЧТ', 1, 'Лекция', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (9, 6, 3, 'ЧТ', 2, 'Практика', 'M11');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (8, 6, 3, 'ЧТ', 3, 'Практика', 'M11');

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INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (7, 7, 7, 'ПТ', 1, 'Лекция', 'M21');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (6, 7, 5, 'ПТ', 2, 'Лабораторная', 'M21');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (5, 7, 5, 'ПТ', 3, 'Практика', 'M21');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (26, 8, 7, 'БТ', 1, 'Лекция', 'M23');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (25, 8, 8, 'БТ', 2, 'Практика', 'M23');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (24, 8, 8, 'БТ', 3, 'Лабораторная', 'M23');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (23, 9, 7, 'СР', 1, 'Лекция', 'M23');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (22, 9, 3, 'СР', 2, 'Лабораторная', 'M23');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (21, 9, 5, 'СБ', 3, 'Практика', 'M23');
INSERT INTO courses.timetable (class_id, discipline_id, classroom_id, week_day, period, class_type,
group_name) VALUES (20, 10, 7, 'СБ', 1, 'Лекция', 'M23');

ALTER TABLE ONLY courses.class
    ADD CONSTRAINT class_status_pkey PRIMARY KEY (date, class_id);

ALTER TABLE courses.classroom
    ADD CONSTRAINT classroom_room_id_check CHECK ((classroom_id > 0)) NOT VALID;

ALTER TABLE courses.classroom
    ADD CONSTRAINT classroom_volume_check CHECK (((volume > 0) AND (volume < 500))) NOT VALID;

ALTER TABLE courses.discipline_type
    ADD CONSTRAINT discipline_id_chk CHECK ((discipline_type_id > 0)) NOT VALID;

ALTER TABLE ONLY courses.discipline_type
    ADD CONSTRAINT discipline_pkey PRIMARY KEY (discipline_type_id);

ALTER TABLE ONLY courses.education
    ADD CONSTRAINT education_pkey PRIMARY KEY (listener_number);

ALTER TABLE ONLY courses.facility
    ADD CONSTRAINT facility_pkey PRIMARY KEY (facility_id);

ALTER TABLE ONLY courses."group"
    ADD CONSTRAINT group_pkey PRIMARY KEY (group_name);

ALTER TABLE courses.listener
    ADD CONSTRAINT listener_phone_number_check CHECK (((phone_number !~ '%^[0-9]%'::text) AND (phone_number
~ '8_____ '::text))) NOT VALID;

ALTER TABLE ONLY courses.listener
    ADD CONSTRAINT listener_pkey PRIMARY KEY (passport);

ALTER TABLE courses.occupation
    ADD CONSTRAINT occupation_occupation_id_check CHECK ((occupation_id > 0)) NOT VALID;

ALTER TABLE ONLY courses.occupation
    ADD CONSTRAINT occupation_pkey PRIMARY KEY (occupation_id);

ALTER TABLE courses.program
    ADD CONSTRAINT program_cost_check CHECK ((cost > 0)) NOT VALID;

ALTER TABLE ONLY courses.program
    ADD CONSTRAINT program_pkey PRIMARY KEY (program_id);

ALTER TABLE courses.program
    ADD CONSTRAINT program_program_id_check CHECK ((program_id > 0)) NOT VALID;

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ALTER TABLE ONLY courses.program_type
    ADD CONSTRAINT program_type_pkey PRIMARY KEY (program_type_id);

ALTER TABLE ONLY courses.classroom
    ADD CONSTRAINT room_pkey PRIMARY KEY (classroom_id);

ALTER TABLE ONLY courses.discipline
    ADD CONSTRAINT syllabus_pkey PRIMARY KEY (discipline_id);

ALTER TABLE courses.teacher
    ADD CONSTRAINT teacher_phone_number_check CHECK (((phone_number !~ '%[^0-9]%'::text) AND (phone_number ~
'8_____':::text))) NOT VALID;

ALTER TABLE ONLY courses.teacher
    ADD CONSTRAINT teacher_pkey PRIMARY KEY (teacher_number);

ALTER TABLE courses.teacher
    ADD CONSTRAINT teacher_teacher_number_check CHECK ((teacher_number > 0)) NOT VALID;

ALTER TABLE courses.timetable
    ADD CONSTRAINT timetable_class_type_check CHECK (((class_type)::text = 'Лабораторная'::text) OR
((class_type)::text = 'Практика'::text) OR ((class_type)::text = 'Лекция'::text))) NOT VALID;

ALTER TABLE ONLY courses.timetable
    ADD CONSTRAINT timetable_pkey PRIMARY KEY (class_id);

ALTER TABLE courses.timetable
    ADD CONSTRAINT week_day_check CHECK (((week_day)::text ~ 'ПН'::text) OR ((week_day)::text ~ 'БТ'::text)
OR ((week_day)::text ~ 'СР'::text) OR ((week_day)::text ~ 'ЧТ'::text) OR ((week_day)::text ~ 'ПТ'::text) OR
((week_day)::text ~ 'СБ'::text) OR ((week_day)::text ~ 'ВС'::text))) NOT VALID;

ALTER TABLE ONLY courses.class
    ADD CONSTRAINT class_class_id_fkey FOREIGN KEY (class_id) REFERENCES courses.timetable(class_id);

ALTER TABLE ONLY courses.classroom
    ADD CONSTRAINT classroom_facility_id_fkey FOREIGN KEY (facility_id) REFERENCES
courses.facility(facility_id) NOT VALID;

ALTER TABLE ONLY courses.discipline
    ADD CONSTRAINT discipline_discipline_type_id_fkey FOREIGN KEY (discipline_type_id) REFERENCES
courses.discipline_type(discipline_type_id) NOT VALID;

ALTER TABLE ONLY courses.discipline
    ADD CONSTRAINT discipline_program_id_fkey FOREIGN KEY (program_id) REFERENCES courses.program(program_id)
NOT VALID;

ALTER TABLE ONLY courses.discipline
    ADD CONSTRAINT discipline_teacher_number_fkey FOREIGN KEY (teacher_number) REFERENCES
courses.teacher(teacher_number) NOT VALID;

ALTER TABLE ONLY courses.education
    ADD CONSTRAINT education_group_name_fkey FOREIGN KEY (group_name) REFERENCES courses."group"(group_name)
NOT VALID;

ALTER TABLE ONLY courses.education
    ADD CONSTRAINT education_passport_fkey FOREIGN KEY (passport) REFERENCES courses.listener(passport) NOT
VALID;

ALTER TABLE ONLY courses."group"
    ADD CONSTRAINT group_program_id_fkey FOREIGN KEY (program_id) REFERENCES courses.program(program_id);

ALTER TABLE ONLY courses.program
    ADD CONSTRAINT program_program_type_id_fkey FOREIGN KEY (program_type_id) REFERENCES
courses.program_type(program_type_id) NOT VALID;

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ALTER TABLE ONLY courses.teacher
    ADD CONSTRAINT teacher_occupation_id_fkey FOREIGN KEY (occupation_id) REFERENCES
courses.occupation(occupation_id);

ALTER TABLE ONLY courses.timetable
    ADD CONSTRAINT timetable_classroom_id_fkey FOREIGN KEY (classroom_id) REFERENCES
courses.classroom(classroom_id);

ALTER TABLE ONLY courses.timetable
    ADD CONSTRAINT timetable_discipline_id_fkey FOREIGN KEY (discipline_id) REFERENCES
courses.discipline(discipline_id);

ALTER TABLE ONLY courses.timetable
    ADD CONSTRAINT timetable_group_name_fkey FOREIGN KEY (group_name) REFERENCES courses."group"(group_name)
NOT VALID;
```

## **Вывод:**

В ходе выполнения лабораторной работы была создана база данных с использованием pgAdmin 4. Внутри БД были созданы схема, таблицы. Были заданы ограничения Check, Foreign Key. С помощью Query Tool таблицы были заполнены данными, а с помощью утилит pg\_Dump и pg\_Restore у БД была создана резервная копия и проведено восстановление данных.