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«Национальный исследовательский университет ИТМО»  
Факультет инфокоммуникационных технологий

**Лабораторная работа №3**

**«Создание БД PostgreSQL в pgAdmin. Резервное копирование и  
восстановление БД»**

**по дисциплине:**

**«Базы данных»**

**Выполнила:**

студентка 2 курса ИКТ

группы К3242

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Санкт-Петербург  
2022

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

**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.

**Ход работы:**

**Создание и наполнение БД.**

Была установлена программа PostgreSQL версии 11, а также платформа администрирования и управления для баз данных Postgres – PGAdmin. В PGAdmin была спроектирована база данных «Аудиторный фонд»

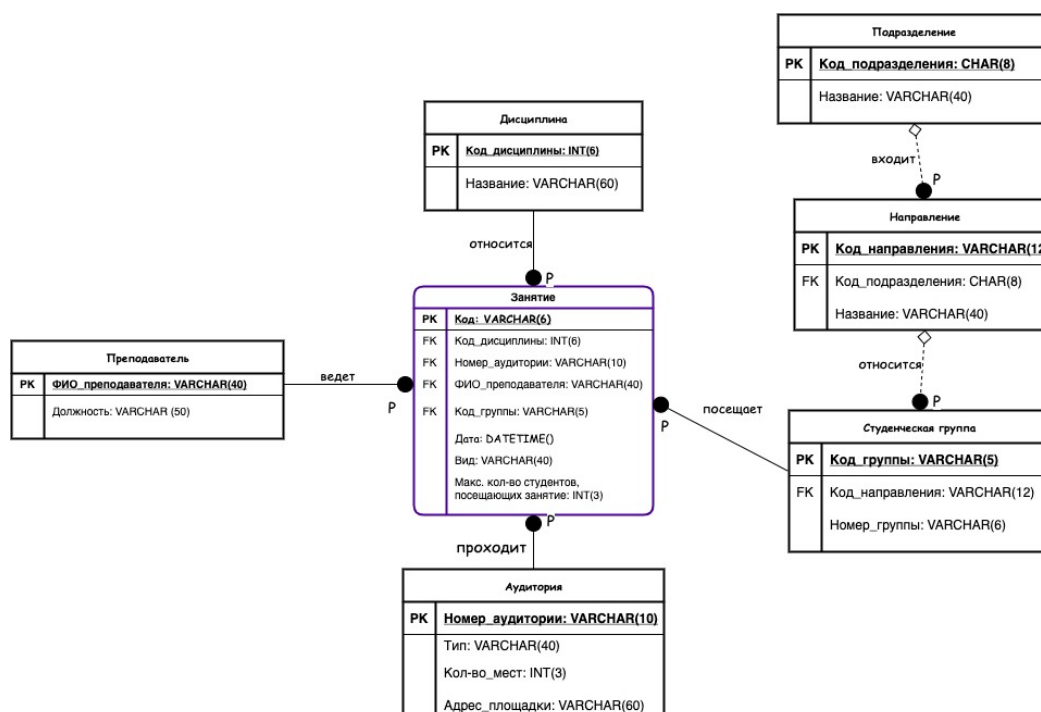


Рисунок 1 – IDEF1X модель базы данных «Аудиторный фонд»



Рисунок 2 – ER модель базы данных «Аудиторный фонд»

Таблицы были заполнены синтетическими данными. Были установлены ограничения на атрибуты и заданы связи между таблицами.

### Листинг резервной копии:

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

--
-- Dumped from database version 11.15
-- Dumped by pg_dump version 12.6
```

-- Started on 2022-03-19 03:39:41 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 6 (class 2615 OID 16394)
-- Name: classroom; Type: SCHEMA; Schema: -; Owner: postgres
--
```

```
CREATE SCHEMA classroom;
```

```
ALTER SCHEMA classroom OWNER TO postgres;
```

```
SET default_tablespace = '';
```

```
--
-- TOC entry 197 (class 1259 OID 16490)
-- Name: classroom; Type: TABLE; Schema: classroom; Owner: postgres
--
```

```
CREATE TABLE classroom.classroom (
    name_classroom character varying(10) NOT NULL,
    type character varying(40) NOT NULL,
    number_seats integer NOT NULL,
    address character varying(60) NOT NULL
);
```

```
ALTER TABLE classroom.classroom OWNER TO postgres;
```

```
--
-- TOC entry 198 (class 1259 OID 16495)
-- Name: direction; Type: TABLE; Schema: classroom; Owner: postgres
--
```

```
CREATE TABLE classroom.direction (
```

```
code_direction character varying(12) NOT NULL,  
code_division "char" NOT NULL,  
name character varying(40) NOT NULL  
);
```

```
ALTER TABLE classroom.direction OWNER TO postgres;
```

```
--  
-- TOC entry 199 (class 1259 OID 16500)  
-- Name: discipline; Type: TABLE; Schema: classroom; Owner: postgres  
--
```

```
CREATE TABLE classroom.discipline (  
code_discipline integer NOT NULL,  
name character varying(60) NOT NULL  
);
```

```
ALTER TABLE classroom.discipline OWNER TO postgres;
```

```
--  
-- TOC entry 200 (class 1259 OID 16505)  
-- Name: division; Type: TABLE; Schema: classroom; Owner: postgres  
--
```

```
CREATE TABLE classroom.division (  
code_division "char" NOT NULL,  
name character varying(40) NOT NULL  
);
```

```
ALTER TABLE classroom.division OWNER TO postgres;
```

```
--  
-- TOC entry 201 (class 1259 OID 16510)  
-- Name: lesson; Type: TABLE; Schema: classroom; Owner: postgres  
--
```

```
CREATE TABLE classroom.lesson (  
code character varying(6) NOT NULL,  
code_discipline integer NOT NULL,  
name_classroom character varying(10) NOT NULL,  
name_teacher character varying(40) NOT NULL,  
code_group character varying(5) NOT NULL,  
date_and_time timestamp without time zone NOT NULL,
```

```
type character varying(40) NOT NULL,  
max_number_students integer NOT NULL  
);
```

```
ALTER TABLE classroom.lesson OWNER TO postgres;
```

```
--  
-- TOC entry 202 (class 1259 OID 16515)  
-- Name: student_group; Type: TABLE; Schema: classroom; Owner: postgres  
--
```

```
CREATE TABLE classroom.student_group (  
code_group character varying(5) NOT NULL,  
code_direction character varying(12) NOT NULL,  
number_group character varying(6) NOT NULL  
);
```

```
ALTER TABLE classroom.student_group OWNER TO postgres;
```

```
--  
-- TOC entry 203 (class 1259 OID 16518)  
-- Name: teacher; Type: TABLE; Schema: classroom; Owner: postgres  
--
```

```
CREATE TABLE classroom.teacher (  
name_teacher character varying(40) NOT NULL,  
"position" character varying(50) NOT NULL  
);
```

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

```
--  
-- TOC entry 3168 (class 0 OID 16490)  
-- Dependencies: 197  
-- Data for Name: classroom; Type: TABLE DATA; Schema: classroom;  
Owner: postgres  
--
```

```
COPY classroom.classroom (name_classroom, type, number_seats, address)  
FROM stdin;
```

|      |              |    |                     |
|------|--------------|----|---------------------|
| 2132 | Лекционная   | 50 | ул. Ломоносова, 9\n |
| 2245 | Практическая | 20 | ул. Ломоносова, 9\n |
| 3222 | Лекционная   | 60 | ул. Ломоносова, 9\n |

|     |              |     |                           |
|-----|--------------|-----|---------------------------|
| 123 | Практическая | 15  | Кронверкский проспект, 49 |
| 321 | Лекционная   | 100 | Кронверкский проспект, 49 |
| 215 | Практическая | 22  | Кронверкский проспект, 49 |

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--  
-- TOC entry 3169 (class 0 OID 16495)  
-- Dependencies: 198  
-- Data for Name: direction; Type: TABLE DATA; Schema: classroom;  
Owner: postgres  
--

COPY classroom.direction (code\_direction, code\_division, name) FROM  
stdin;

|          |   |   |
|----------|---|---|
| 09.03.03 | 1 | Мобильные и сетевые технологии          |
| 19.04.01 | 2 | Биотехнология                           |
| 27.03.05 | 3 | Инноватика                              |
| 16.03.01 | 4 | Техническая физика                      |
| 12.03.01 | 5 | Приборостроение                         |
| 16.04.03 | 6 | Информационные технологии в теплофизике |

\.

--  
-- TOC entry 3170 (class 0 OID 16500)  
-- Dependencies: 199  
-- Data for Name: discipline; Type: TABLE DATA; Schema: classroom;  
Owner: postgres  
--

COPY classroom.discipline (code\_discipline, name) FROM stdin;

|        |                                   |
|--------|-----------------------------------|
| 198726 | Теория вероятностей               |
| 876097 | Экология                          |
| 376028 | Физика                            |
| 782097 | Основы академической коммуникации |
| 263917 | Исследования и анализ в бизнесе   |
| 283098 | Управление R&D проектами          |

\.

--  
-- TOC entry 3171 (class 0 OID 16505)  
-- Dependencies: 200  
-- Data for Name: division; Type: TABLE DATA; Schema: classroom;  
Owner: postgres

--

COPY classroom.division (code\_division, name) FROM stdin;

1 ИКТ  
2 МНЖ  
3 ФТМИ  
4 ФТМ  
5 МКТУ  
6 МБНС  
\.

--

-- TOC entry 3172 (class 0 OID 16510)

-- Dependencies: 201

-- Data for Name: lesson; Type: TABLE DATA; Schema: classroom; Owner:  
postgres

--

COPY classroom.lesson (code, code\_discipline, name\_classroom,  
name\_teacher, code\_group, date\_and\_time, type, max\_number\_students) FROM  
stdin;

|                     |          |      |                             |                |
|---------------------|----------|------|-----------------------------|----------------|
| 1ds7b3              | 198726   | 2132 | Александрова Инна Ильинична | 1218s          |
| 2021-05-21 11:40:00 | Лекция   | 50   |                             |                |
| 3ns76s              | 263917   | 2245 | Андреев Артемий Алексеевич  | 1sj73          |
| 2021-04-22 10:00:00 | Практика | 20   |                             |                |
| qsl29s              | 283098   | 3222 | Гущев Андрей Иванович       | 3ns7a 2020-03- |
| 10 13:30:00         | Лекция   | 60   |                             |                |
| 2ms7qw              | 376028   | 123  | Иванова Мария Петровна      | 5ans7 2020-09- |
| 18 15:20:00         | Практика | 15   |                             |                |
| 1o2ns6              | 782097   | 321  | Петров Иван Алексеевич      | 9sjg6 2021-12- |
| 04 08:20:00         | Лекция   | 100  |                             |                |
| 2nns72              | 876097   | 215  | Харламов Иван Андреевич     | rf7rs 2021-10- |
| 10 10:00:00         | Практика | 22   |                             |                |

\.

--

-- TOC entry 3173 (class 0 OID 16515)

-- Dependencies: 202

-- Data for Name: student\_group; Type: TABLE DATA; Schema: classroom;  
Owner: postgres

--

COPY classroom.student\_group (code\_group, code\_direction,  
number\_group) FROM stdin;



|       |          |        |
|-------|----------|--------|
| 1sj73 | 09.03.03 | K3242  |
| 1218s | 12.03.01 | R3280  |
| 3ns7a | 16.03.01 | L3218  |
| rf7rs | 19.04.01 | T4131  |
| 9sjg6 | 27.03.05 | U4166  |
| 5ans7 | 16.04.03 | W41522 |

\.

```
--
-- TOC entry 3174 (class 0 OID 16518)
-- Dependencies: 203
-- Data for Name: teacher; Type: TABLE DATA; Schema: classroom; Owner:
postgres
```

```
--
COPY classroom.teacher (name_teacher, "position") FROM stdin;
Петров Иван Алексеевич  Преподаватель
Иванова Мария Петровна Преподаватель
Гущев Андрей Иванович  Доцент
Александрова Инна Ильинична Преподаватель
Андреев Артемий Алексеевич Доцент
Харламов Иван Андреевич Преподаватель
\.
```

```
--
-- TOC entry 3028 (class 2606 OID 16494)
-- Name: classroom classroom_pkey; Type: CONSTRAINT; Schema:
classroom; Owner: postgres
```

```
--
ALTER TABLE ONLY classroom.classroom
    ADD CONSTRAINT classroom_pkey PRIMARY KEY
(name_classroom);
```

```
--
-- TOC entry 3030 (class 2606 OID 16499)
-- Name: direction direction_pkey; Type: CONSTRAINT; Schema:
classroom; Owner: postgres
```

```
--
ALTER TABLE ONLY classroom.direction
    ADD CONSTRAINT direction_pkey PRIMARY KEY (code_direction);
```

```
--
-- TOC entry 3032 (class 2606 OID 16504)
-- Name: discipline discipline_pkey; Type: CONSTRAINT; Schema:
classroom; Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.discipline
    ADD CONSTRAINT discipline_pkey PRIMARY KEY (code_discipline);
```

```
--
-- TOC entry 3034 (class 2606 OID 16509)
-- Name: division division_pkey; Type: CONSTRAINT; Schema: classroom;
Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.division
    ADD CONSTRAINT division_pkey PRIMARY KEY (code_division);
```

```
--
-- TOC entry 3036 (class 2606 OID 16514)
-- Name: lesson lesson_pkey; Type: CONSTRAINT; Schema: classroom;
Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.lesson
    ADD CONSTRAINT lesson_pkey PRIMARY KEY (code_discipline);
```

```
--
-- TOC entry 3038 (class 2606 OID 16524)
-- Name: student_group student_group_pkey; Type: CONSTRAINT;
Schema: classroom; Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.student_group
    ADD CONSTRAINT student_group_pkey PRIMARY KEY (code_group);
```

```
--
-- TOC entry 3040 (class 2606 OID 16522)
-- Name: teacher teacher_pkey; Type: CONSTRAINT; Schema: classroom;
Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.teacher
    ADD CONSTRAINT teacher_pkey PRIMARY KEY (name_teacher);
```

```
--
-- TOC entry 3046 (class 2606 OID 16530)
-- Name: student_group code_direction; Type: FK CONSTRAINT; Schema:
classroom; Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.student_group
    ADD CONSTRAINT code_direction FOREIGN KEY (code_direction)
REFERENCES classroom.direction(code_direction) ON UPDATE RESTRICT ON
DELETE RESTRICT DEFERRABLE INITIALLY DEFERRED;
```

```
--
-- TOC entry 3042 (class 2606 OID 16535)
-- Name: lesson code_discipline; Type: FK CONSTRAINT; Schema:
classroom; Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.lesson
    ADD CONSTRAINT code_discipline FOREIGN KEY (code_discipline)
REFERENCES classroom.discipline(code_discipline) ON UPDATE RESTRICT
ON DELETE RESTRICT DEFERRABLE INITIALLY DEFERRED;
```

```
--
-- TOC entry 3041 (class 2606 OID 16525)
-- Name: direction code_division; Type: FK CONSTRAINT; Schema:
classroom; Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.direction
    ADD CONSTRAINT code_division FOREIGN KEY (code_division)
REFERENCES classroom.division(code_division) ON UPDATE RESTRICT ON
DELETE RESTRICT DEFERRABLE;
```

```
--
-- TOC entry 3045 (class 2606 OID 16550)
-- Name: lesson code_group; Type: FK CONSTRAINT; Schema: classroom;
Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.lesson
  ADD CONSTRAINT code_group FOREIGN KEY (code_group)
REFERENCES classroom.student_group(code_group) ON UPDATE RESTRICT
ON DELETE RESTRICT DEFERRABLE INITIALLY DEFERRED;
```

```
--
-- TOC entry 3044 (class 2606 OID 16545)
-- Name: lesson name_teacher; Type: FK CONSTRAINT; Schema:
classroom; Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.lesson
  ADD CONSTRAINT name_teacher FOREIGN KEY (name_teacher)
REFERENCES classroom.teacher(name_teacher) ON UPDATE RESTRICT ON
DELETE RESTRICT DEFERRABLE INITIALLY DEFERRED;
```

```
--
-- TOC entry 3043 (class 2606 OID 16540)
-- Name: lesson number_classroom; Type: FK CONSTRAINT; Schema:
classroom; Owner: postgres
--
```

```
ALTER TABLE ONLY classroom.lesson
  ADD CONSTRAINT number_classroom FOREIGN KEY
(name_classroom) REFERENCES classroom.classroom(name_classroom) ON
UPDATE RESTRICT ON DELETE RESTRICT DEFERRABLE INITIALLY
DEFERRED;
```

```
-- Completed on 2022-03-19 03:39:41 MSK
```

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

### **Вывод:**

С помощью PGAdmin 4 была создана база данных, выстроены связи между таблицами и атрибутами, установлены необходимые ограничения.

