

Министерство науки и высшего образования Российской Федерации
Федеральное государственное автономное образовательное учреждение
высшего образования
«НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ ИТМО»
Факультет инфокоммуникационных технологий

ОТЧЕТ О ЛАБОРАТОРНОЙ РАБОТЕ № 3

**ПО ТЕМЕ: Создание таблиц базы данных POSTGRESQL. Заполнение таблиц
рабочими данными**

по дисциплине: Проектирование и реализация баз данных

Специальность: 09.03.03 Мобильные и сетевые технологии

Проверил:
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Оценка _____

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Цель работы:

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

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*.

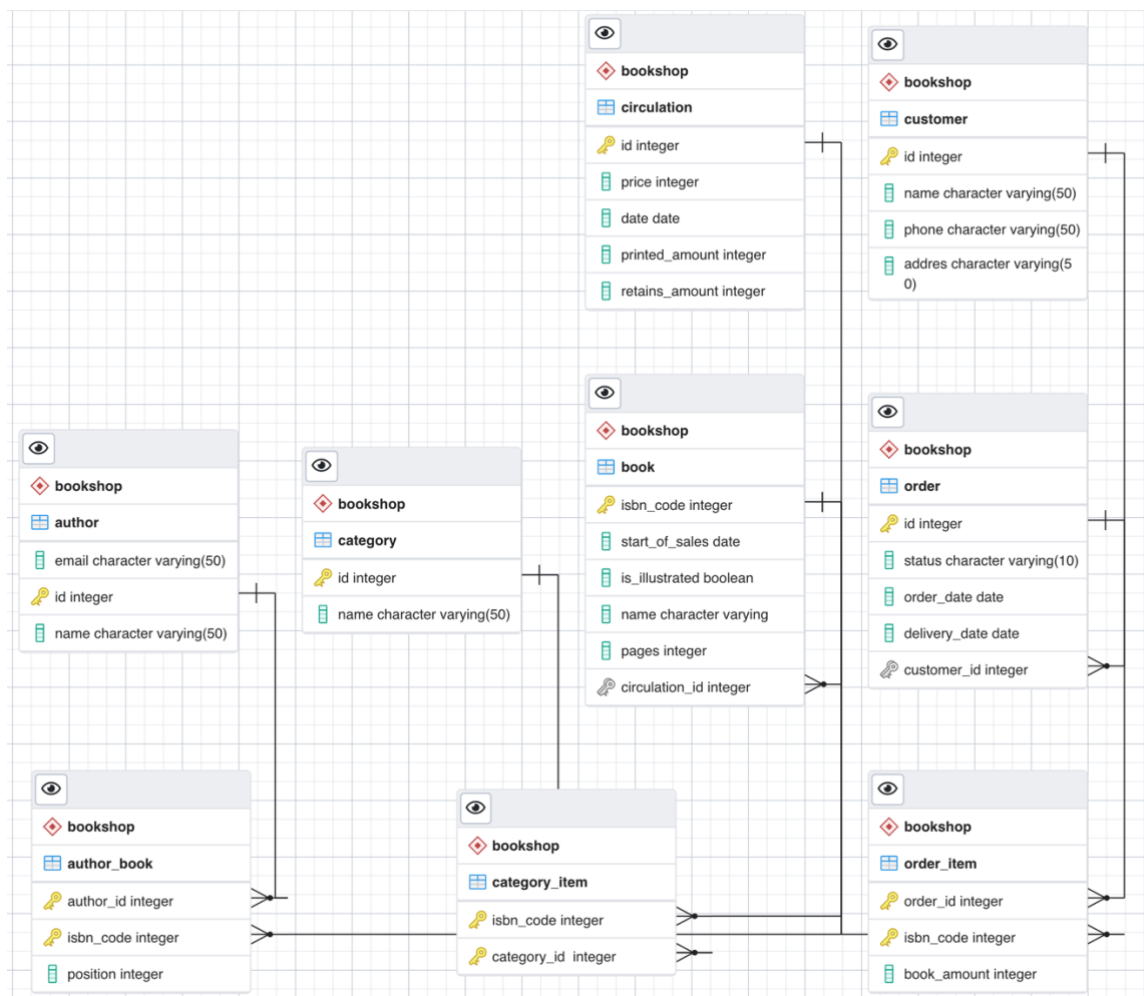
7. Восстановить БД.

Индивидуальное задание:

Вариант 5. БД «Издательство компьютерной литературы»

Выполнение:

Наименование БД: bookshop.



--

-- PostgreSQL database dump

--

-- Dumped from database version 13.2

-- Dumped by pg_dump version 13.2

-- Started on 2021-05-04 13:03:46 MSK

-- Устанавливаем значения по умолчанию

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 5 (class 2615 OID 16535)
-- Name: bookshop; Type: SCHEMA; Schema: -; Owner: postgres
--

-- Создаем БД и назначаем владельца
CREATE SCHEMA bookshop;


ALTER SCHEMA bookshop OWNER TO postgres;


--

-- TOC entry 2 (class 3079 OID 16536)
-- Name: adminpack; Type: EXTENSION; Schema: -; Owner: -
--

CREATE EXTENSION IF NOT EXISTS adminpack WITH SCHEMA pg_catalog;

```

```

--
-- TOC entry 3333 (class 0 OID 0)
-- Dependencies: 2
-- Name: EXTENSION adminpack; Type: COMMENT; Schema: -; Owner:
--

COMMENT ON EXTENSION adminpack IS 'administrative functions for PostgreSQL';

SET default_tablespace = '';

SET default_table_access_method = heap;

--
-- TOC entry 202 (class 1259 OID 16546)
-- Name: author; Type: TABLE; Schema: bookshop; Owner: postgres
--
-- Создаем автора
CREATE TABLE bookshop.author (
    email character varying(50) NOT NULL,
    id integer NOT NULL,
    name character varying(50) NOT NULL
);

ALTER TABLE bookshop.author OWNER TO postgres;

--

```

-- TOC entry 203 (class 1259 OID 16549)

-- Name: Author_id_seq; Type: SEQUENCE; Schema: bookshop; Owner: postgres

--

```
ALTER TABLE bookshop.author ALTER COLUMN id ADD GENERATED ALWAYS  
AS IDENTITY (
```

```
    SEQUENCE NAME bookshop."Author_id_seq"
```

```
    START WITH 1
```

```
    INCREMENT BY 1
```

```
    NO MINVALUE
```

```
    NO MAXVALUE
```

```
    CACHE 1
```

```
);
```

--

-- TOC entry 204 (class 1259 OID 16551)

-- Name: circulation; Type: TABLE; Schema: bookshop; Owner: postgres

--

-- Создаем тираж

```
CREATE TABLE bookshop.circulation (
```

```
    id integer NOT NULL,
```

```
    price integer NOT NULL,
```

```
    date date NOT NULL,
```

```
    printed_amount integer NOT NULL,
```

```
    retains_amount integer NOT NULL
```

```
);
```

```
ALTER TABLE bookshop.circulation OWNER TO postgres;
```

```
--
```

```
-- TOC entry 205 (class 1259 OID 16554)
```

```
-- Name: Circulation_id_seq; Type: SEQUENCE; Schema: bookshop; Owner: postgres
```

```
--
```

```
ALTER TABLE bookshop.circulation ALTER COLUMN id ADD GENERATED  
ALWAYS AS IDENTITY (
```

```
    SEQUENCE NAME bookshop."Circulation_id_seq"
```

```
    START WITH 1
```

```
    INCREMENT BY 1
```

```
    NO MINVALUE
```

```
    NO MAXVALUE
```

```
    CACHE 1
```

```
);
```

```
--
```

```
-- TOC entry 206 (class 1259 OID 16556)
```

```
-- Name: customer; Type: TABLE; Schema: bookshop; Owner: postgres
```

```
--
```

```
-- Создаём покупателя
```

```
CREATE TABLE bookshop.customer (
```

```
    id integer NOT NULL,
```

```
    name character varying(50) NOT NULL,
```

```
    phone character varying(50),
```

```
    addres character varying(50) NOT NULL
);
```

```
ALTER TABLE bookshop.customer OWNER TO postgres;
```

```
--
-- TOC entry 207 (class 1259 OID 16559)
-- Name: Customer_id_seq; Type: SEQUENCE; Schema: bookshop; Owner: postgres
--
```

```
ALTER TABLE bookshop.customer ALTER COLUMN id ADD GENERATED
ALWAYS AS IDENTITY (
    SEQUENCE NAME bookshop."Customer_id_seq"
    START WITH 1
    INCREMENT BY 1
    NO MINVALUE
    NO MAXVALUE
    CACHE 1
);
```

```
--
-- TOC entry 208 (class 1259 OID 16561)
-- Name: author_book; Type: TABLE; Schema: bookshop; Owner: postgres
--
```

```
CREATE TABLE bookshop.author_book (
```



```
author_id integer NOT NULL,  
isbn_code integer NOT NULL,  
"position" integer NOT NULL  
);
```

```
ALTER TABLE bookshop.author_book OWNER TO postgres;
```

```
--
```

```
-- TOC entry 209 (class 1259 OID 16564)
```

```
-- Name: book; Type: TABLE; Schema: bookshop; Owner: postgres
```

```
--
```

```
-- Создаём книгу
```

```
CREATE TABLE bookshop.book (  
    isbn_code integer NOT NULL,  
    start_of_sales date NOT NULL,  
    is_illustrated boolean,  
    name character varying NOT NULL,  
    pages integer,  
    circulation_id integer NOT NULL  
);
```

```
ALTER TABLE bookshop.book OWNER TO postgres;
```

```
--
```

```
-- TOC entry 210 (class 1259 OID 16570)
```

```
-- Name: category; Type: TABLE; Schema: bookshop; Owner: postgres
```

```

--

-- Создаём категорию

CREATE TABLE bookshop.category (
    id integer NOT NULL,
    name character varying(50) NOT NULL
);


ALTER TABLE bookshop.category OWNER TO postgres;


--

-- TOC entry 211 (class 1259 OID 16573)
-- Name: category_item; Type: TABLE; Schema: bookshop; Owner: postgres
--

-- Создаём элемент категории

CREATE TABLE bookshop.category_item (
    isbn_code integer NOT NULL,
    "category_id " integer NOT NULL
);


ALTER TABLE bookshop.category_item OWNER TO postgres;


--

-- TOC entry 212 (class 1259 OID 16576)
-- Name: order; Type: TABLE; Schema: bookshop; Owner: postgres
--

```

-- Создаем заказ

```
CREATE TABLE bookshop."order" (  
    id integer NOT NULL,  
    status character varying(10) NOT NULL,  
    order_date date NOT NULL,  
    delivery_date date NOT NULL,  
    customer_id integer NOT NULL  
);
```

```
ALTER TABLE bookshop."order" OWNER TO postgres;
```

--

-- TOC entry 213 (class 1259 OID 16579)

-- Name: order_item; Type: TABLE; Schema: bookshop; Owner: postgres

--

-- Создаём элемент заказа

```
CREATE TABLE bookshop.order_item (  
    order_id integer NOT NULL,  
    isbn_code integer NOT NULL,  
    book_amount integer NOT NULL  
);
```

```
ALTER TABLE bookshop.order_item OWNER TO postgres;
```

--

-- TOC entry 3316 (class 0 OID 16546)

```

-- Dependencies: 202

-- Data for Name: author; Type: TABLE DATA; Schema: bookshop; Owner: postgres
--

COPY bookshop.author (email, id, name) FROM stdin;
\.
```

```

--

-- TOC entry 3322 (class 0 OID 16561)
-- Dependencies: 208
-- Data for Name: author_book; Type: TABLE DATA; Schema: bookshop; Owner:
postgres
--

COPY bookshop.author_book (author_id, isbn_code, "position") FROM stdin;
\.
```

```

--

-- TOC entry 3323 (class 0 OID 16564)
-- Dependencies: 209
-- Data for Name: book; Type: TABLE DATA; Schema: bookshop; Owner: postgres
--

COPY bookshop.book (isbn_code, start_of_sales, is_illustrated, name, pages,
circulation_id) FROM stdin;
\.
```

--

-- TOC entry 3324 (class 0 OID 16570)

-- Dependencies: 210

-- Data for Name: category; Type: TABLE DATA; Schema: bookshop; Owner: postgres

--

COPY bookshop.category (id, name) FROM stdin;

\.

--

-- TOC entry 3325 (class 0 OID 16573)

-- Dependencies: 211

-- Data for Name: category_item; Type: TABLE DATA; Schema: bookshop; Owner:
postgres

--

COPY bookshop.category_item (isbn_code, "category_id ") FROM stdin;

\.

--

-- TOC entry 3318 (class 0 OID 16551)

-- Dependencies: 204

-- Data for Name: circulation; Type: TABLE DATA; Schema: bookshop; Owner: postgres

--

```
COPY bookshop.circulation (id, price, date, printed_amount, retains_amount) FROM
stdin;
```

```
\.
```

```
--
```

```
-- TOC entry 3320 (class 0 OID 16556)
```

```
-- Dependencies: 206
```

```
-- Data for Name: customer; Type: TABLE DATA; Schema: bookshop; Owner: postgres
```

```
--
```

```
COPY bookshop.customer (id, name, phone, address) FROM stdin;
```

```
\.
```

```
--
```

```
-- TOC entry 3326 (class 0 OID 16576)
```

```
-- Dependencies: 212
```

```
-- Data for Name: order; Type: TABLE DATA; Schema: bookshop; Owner: postgres
```

```
--
```

```
COPY bookshop."order" (id, status, order_date, delivery_date, customer_id) FROM stdin;
```

```
\.
```

```
--
```

```
-- TOC entry 3327 (class 0 OID 16579)
```

```
-- Dependencies: 213
```

```

-- Data for Name: order_item; Type: TABLE DATA; Schema: bookshop; Owner: postgres
--

COPY bookshop.order_item (order_id, isbn_code, book_amount) FROM stdin;
\

--

-- TOC entry 3334 (class 0 OID 0)
-- Dependencies: 203
-- Name: Author_id_seq; Type: SEQUENCE SET; Schema: bookshop; Owner: postgres
--

SELECT pg_catalog.setval('bookshop."Author_id_seq"', 1, false);

--

-- TOC entry 3335 (class 0 OID 0)
-- Dependencies: 205
-- Name: Circulation_id_seq; Type: SEQUENCE SET; Schema: bookshop; Owner:
postgres
--

SELECT pg_catalog.setval('bookshop."Circulation_id_seq"', 1, false);

--

-- TOC entry 3336 (class 0 OID 0)

```

```

-- Dependencies: 207

-- Name: Customer_id_seq; Type: SEQUENCE SET; Schema: bookshop; Owner: postgres
--

SELECT pg_catalog.setval('bookshop."Customer_id_seq"', 1, false);

--

-- TOC entry 3161 (class 2606 OID 16583)

-- Name: author Author_pkey; Type: CONSTRAINT; Schema: bookshop; Owner:
postgres
--

ALTER TABLE ONLY bookshop.author

    ADD CONSTRAINT "Author_pkey" PRIMARY KEY (id);

--

-- TOC entry 3171 (class 2606 OID 16585)

-- Name: category Category_pkey; Type: CONSTRAINT; Schema: bookshop; Owner:
postgres
--

ALTER TABLE ONLY bookshop.category

    ADD CONSTRAINT "Category_pkey" PRIMARY KEY (id);

--

-- TOC entry 3163 (class 2606 OID 16587)

```



```
-- Name: circulation Circulation_pkey; Type: CONSTRAINT; Schema: bookshop; Owner:
postgres
```

```
--
```

```
ALTER TABLE ONLY bookshop.circulation
```

```
ADD CONSTRAINT "Circulation_pkey" PRIMARY KEY (id);
```

```
--
```

```
-- TOC entry 3165 (class 2606 OID 16589)
```

```
-- Name: customer Customer_pkey; Type: CONSTRAINT; Schema: bookshop; Owner:
postgres
```

```
--
```

```
ALTER TABLE ONLY bookshop.customer
```

```
ADD CONSTRAINT "Customer_pkey" PRIMARY KEY (id);
```

```
--
```

```
-- TOC entry 3167 (class 2606 OID 16593)
```

```
-- Name: author_book author_book_pkey; Type: CONSTRAINT; Schema: bookshop;
Owner: postgres
```

```
--
```

```
ALTER TABLE ONLY bookshop.author_book
```

```
ADD CONSTRAINT author_book_pkey PRIMARY KEY (author_id, isbn_code);
```

```
--
```

```

-- TOC entry 3169 (class 2606 OID 16595)

-- Name: book book_pkey; Type: CONSTRAINT; Schema: bookshop; Owner: postgres
--

ALTER TABLE ONLY bookshop.book

    ADD CONSTRAINT book_pkey PRIMARY KEY (isbn_code);

--

-- TOC entry 3173 (class 2606 OID 16597)

-- Name: category_item category_item_pkey; Type: CONSTRAINT; Schema: bookshop;
Owner: postgres
--

ALTER TABLE ONLY bookshop.category_item

    ADD CONSTRAINT category_item_pkey PRIMARY KEY (isbn_code, "category_id
");

--

-- TOC entry 3159 (class 2606 OID 16645)

-- Name: order_item chk_book_amount; Type: CHECK CONSTRAINT; Schema:
bookshop; Owner: postgres
--

ALTER TABLE bookshop.order_item

-- Устанавливаем ограничение на количество книг в заказе

    ADD CONSTRAINT chk_book_amount CHECK ((book_amount > 0)) NOT VALID;

```

```

--
-- TOC entry 3157 (class 2606 OID 16641)
-- Name: book chk_pages; Type: CHECK CONSTRAINT; Schema: bookshop; Owner:
postgres
--

ALTER TABLE bookshop.book

-- Устанавливаем ограничение на количество страниц в книге

ADD CONSTRAINT chk_pages CHECK ((pages > 0)) NOT VALID;

--
-- TOC entry 3156 (class 2606 OID 16640)
-- Name: author_book chk_position; Type: CHECK CONSTRAINT; Schema: bookshop;
Owner: postgres
--

ALTER TABLE bookshop.author_book

-- Устанавливаем ограничение на позиции автора

ADD CONSTRAINT chk_position CHECK (("position" > 0)) NOT VALID;

--
-- TOC entry 3154 (class 2606 OID 16642)
-- Name: circulation chk_price; Type: CHECK CONSTRAINT; Schema: bookshop;
Owner: postgres
--

```

```
ALTER TABLE bookshop.circulation
```

```
-- Устанавливаем ограничение на цену
```

```
ADD CONSTRAINT chk_price CHECK ((price > 0)) NOT VALID;
```

```
--
```

```
-- TOC entry 3155 (class 2606 OID 16643)
```

```
-- Name: circulation chk_retains_amount; Type: CHECK CONSTRAINT; Schema:  
bookshop; Owner: postgres
```

```
--
```

```
ALTER TABLE bookshop.circulation
```

```
-- Устанавливаем ограничения на количество книг в запасе у издательства
```

```
ADD CONSTRAINT chk_retains_amount CHECK ((retains_amount <=  
printed_amount)) NOT VALID;
```

```
--
```

```
-- TOC entry 3177 (class 2606 OID 16599)
```

```
-- Name: order_item order_item_pkey; Type: CONSTRAINT; Schema: bookshop; Owner:  
postgres
```

```
--
```

```
ALTER TABLE ONLY bookshop.order_item
```

```
ADD CONSTRAINT order_item_pkey PRIMARY KEY (order_id, isbn_code);
```

```
--
```

```
-- TOC entry 3175 (class 2606 OID 16591)
```

```

-- Name: order order_pkey; Type: CONSTRAINT; Schema: bookshop; Owner: postgres
--

ALTER TABLE ONLY bookshop."order"

    ADD CONSTRAINT order_pkey PRIMARY KEY (id);

--

-- TOC entry 3158 (class 2606 OID 16644)

-- Name: order order_status_check; Type: CHECK CONSTRAINT; Schema: bookshop;
Owner: postgres
--

ALTER TABLE bookshop."order"

-- Устанавливаем ограничения на возможные статусы заказа

    ADD CONSTRAINT order_status_check CHECK (((status)::text = ANY
((ARRAY['not_paid'::character varying, 'in_process'::character varying, 'delivered'::character
varying])::text[]))) NOT VALID;

--

-- TOC entry 3178 (class 2606 OID 16600)

-- Name: author_book author_id; Type: FK CONSTRAINT; Schema: bookshop; Owner:
postgres
--

ALTER TABLE ONLY bookshop.author_book

    ADD CONSTRAINT author_id FOREIGN KEY (author_id) REFERENCES
bookshop.author(id);

```

```
--  
-- TOC entry 3181 (class 2606 OID 16605)  
-- Name: category_item category_id; Type: FK CONSTRAINT; Schema: bookshop;  
Owner: postgres  
--
```

```
ALTER TABLE ONLY bookshop.category_item  
  
ADD CONSTRAINT category_id FOREIGN KEY ("category_id ") REFERENCES  
bookshop.category(id);
```

```
--  
-- TOC entry 3180 (class 2606 OID 16610)  
-- Name: book circulation_id; Type: FK CONSTRAINT; Schema: bookshop; Owner:  
postgres  
--
```

```
ALTER TABLE ONLY bookshop.book  
  
ADD CONSTRAINT circulation_id FOREIGN KEY (circulation_id) REFERENCES  
bookshop.circulation(id);
```

```
--  
-- TOC entry 3183 (class 2606 OID 16615)  
-- Name: order fr_customer_id; Type: FK CONSTRAINT; Schema: bookshop; Owner:  
postgres  
--
```

```
ALTER TABLE ONLY bookshop."order"
```

```
        ADD CONSTRAINT fr_customer_id FOREIGN KEY (customer_id) REFERENCES
bookshop.customer(id);
```

```
--
-- TOC entry 3184 (class 2606 OID 16620)
-- Name: order_item isbn_code; Type: FK CONSTRAINT; Schema: bookshop; Owner:
postgres
```

```
--
ALTER TABLE ONLY bookshop.order_item
        ADD CONSTRAINT isbn_code FOREIGN KEY (isbn_code) REFERENCES
bookshop.book(isbn_code);
```

```
--
-- TOC entry 3182 (class 2606 OID 16625)
-- Name: category_item isbn_code; Type: FK CONSTRAINT; Schema: bookshop; Owner:
postgres
```

```
--
ALTER TABLE ONLY bookshop.category_item
        ADD CONSTRAINT isbn_code FOREIGN KEY (isbn_code) REFERENCES
bookshop.book(isbn_code);
```

```
--
-- TOC entry 3179 (class 2606 OID 16630)
-- Name: author_book isbn_code; Type: FK CONSTRAINT; Schema: bookshop; Owner:
postgres
```

```
--
```

```

ALTER TABLE ONLY bookshop.author_book

    ADD CONSTRAINT isbn_code FOREIGN KEY (isbn_code) REFERENCES
bookshop.book(isbn_code);

--

-- TOC entry 3185 (class 2606 OID 16635)

-- Name: order_item order_id; Type: FK CONSTRAINT; Schema: bookshop; Owner:
postgres

--

ALTER TABLE ONLY bookshop.order_item

    ADD CONSTRAINT order_id FOREIGN KEY (order_id) REFERENCES
bookshop."order"(id);

-- Completed on 2021-05-04 13:03:46 MSK

--

-- PostgreSQL database dump complete

--

```

Выводы:

- Создана БД **courses** с использованием pgAdmin 4 (согласно индивидуальному заданию).
- Созданы таблицы **course, recruitment, inclusion, subject, student, class, area, auditorium, teacher, enrollment** и **group**.
- Установлены ограничения на данные: *Primary Key, Unique, Check, Foreign Key*.
- Таблицы БД заполнены рабочими данными.
- Создана резервная копия БД.
- БД восстановлена.