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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Дата: «02» мая 2021г.
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:

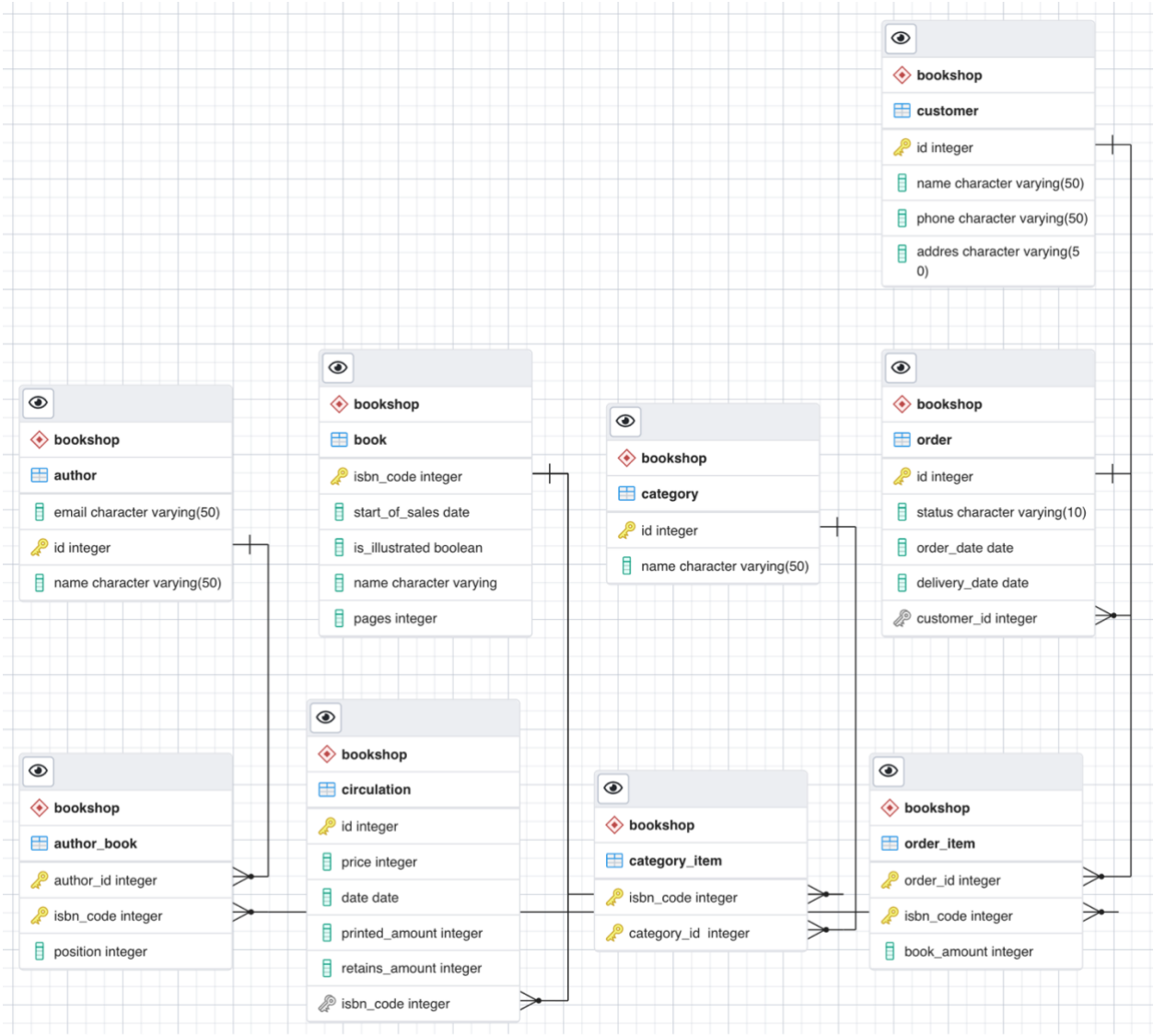
1. Создать базу данных с использованием pgAdmin 4 (согласно индивидуальному заданию).
2. Создать схему в составе базы данных.
3. Создать таблицы базы данных.
4. Установить ограничения на данные: *Primary Key, Unique, Check, Foreign Key*.
5. Заполнить таблицы БД рабочими данными.
6. Создать резервную 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, addres) 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.