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 БАЗЫ ДАННЫХ POSTGRESQL. ЗАПОЛНЕНИЕ ТАБЛИЦ БД РАБОЧИМИ ДАННЫМИ.**
по дисциплине: Проектирование и реализация баз данных

Специальность:
45.03.04 Интеллектуальные системы в гуманитарной сфере

Проверил:
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Цель работы: Создание таблиц базы данных PostgreSQL 1X, заполнение их рабочими данными, осуществление 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.

Ход работы:

1. Индивидуальное задание – вариант 4 «Учет выполнения заданий»

2. Схема инфологической модели данных БД

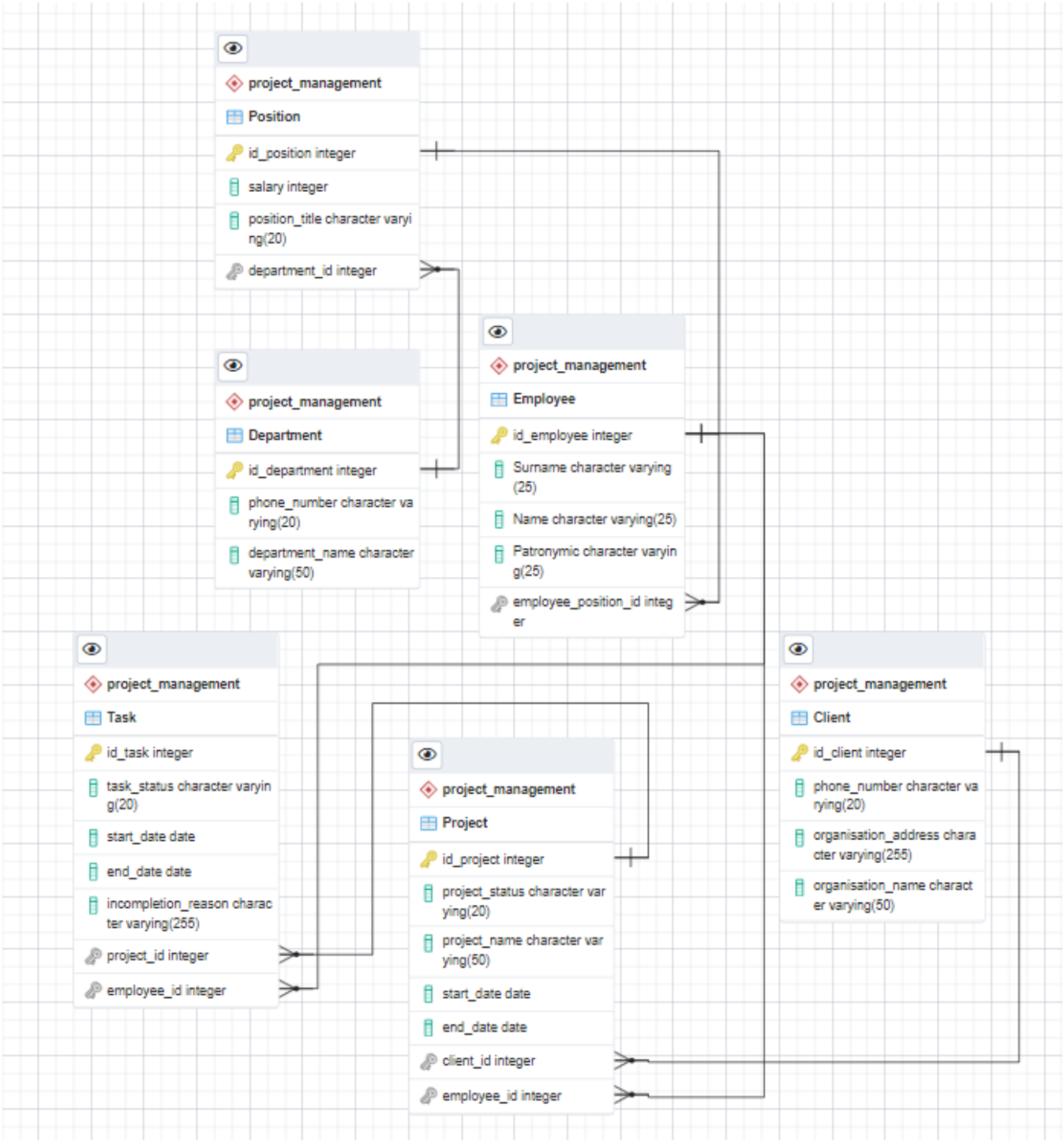

Рисунок 1 – Схема инфологической модели БД, сгенерированная в Generate ERD

3. Plain dump

--

```
-- PostgreSQL database dump
--
-- Dumped from database version 13.2
-- Dumped by pg_dump version 13.2
-- Started on 2021-05-07 16:39:00
-- 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 16395)
-- Name: project_management; Type: SCHEMA; Schema: -; Owner: postgres
--
CREATE SCHEMA project_management;
ALTER SCHEMA project_management OWNER TO postgres;
SET default_tablespace = '';
SET default_table_access_method = heap;
--
-- TOC entry 202 (class 1259 OID 16411)
-- Name: Client; Type: TABLE; Schema: project_management; Owner: postgres
--
--Создаем таблицу Заказчик
CREATE TABLE project_management."Client" (
    id_client integer NOT NULL,
    phone_number character varying(20) NOT NULL,
    organisation_address character varying(255) NOT NULL,
    organisation_name character varying(50) NOT NULL
);
ALTER TABLE project_management."Client" OWNER TO postgres;
--
-- TOC entry 204 (class 1259 OID 16421)
-- Name: Department; Type: TABLE; Schema: project_management; Owner: postgres
--
--Создаем таблицу Отдел

CREATE TABLE project_management."Department" (
    id_department integer NOT NULL,
    phone_number character varying(20) NOT NULL,
    department_name character varying(50) NOT NULL
);
ALTER TABLE project_management."Department" OWNER TO postgres;
--
-- TOC entry 203 (class 1259 OID 16416)
-- Name: Employee; Type: TABLE; Schema: project_management; Owner: postgres
--
--Создаем таблицу Сотрудник
CREATE TABLE project_management."Employee" (
    id_employee integer NOT NULL,
    "Surname" character varying(25) NOT NULL,
    "Name" character varying(25) NOT NULL,
    "Patronymic" character varying(25),
    employee_position_id integer NOT NULL
);
ALTER TABLE project_management."Employee" OWNER TO postgres;
--
```

```
-- TOC entry 205 (class 1259 OID 16426)
-- Name: Position; Type: TABLE; Schema: project_management; Owner: postgres
--
--Создаем таблицу Должность
CREATE TABLE project_management."Position" (
    id_position integer NOT NULL,
    salary integer NOT NULL,
    position_title character varying(20) NOT NULL,
    department_id integer
);
ALTER TABLE project_management."Position" OWNER TO postgres;
--
-- TOC entry 200 (class 1259 OID 16401)
-- Name: Project; Type: TABLE; Schema: project_management; Owner: postgres
--
--Создаем таблицу Проект
CREATE TABLE project_management."Project" (
    id_project integer NOT NULL,
    project_status character varying(20) NOT NULL,
    project_name character varying(50) NOT NULL,
    start_date date NOT NULL,
    end_date date NOT NULL,
    client_id integer NOT NULL,
    employee_id integer NOT NULL
);
ALTER TABLE project_management."Project" OWNER TO postgres;
--
-- TOC entry 201 (class 1259 OID 16406)
-- Name: Task; Type: TABLE; Schema: project_management; Owner: postgres
--
--Создаем таблицу Задание
CREATE TABLE project_management."Task" (
    id_task integer NOT NULL,
    task_status character varying(20) NOT NULL,
    start_date date NOT NULL,
    end_date date NOT NULL,
    incompletion_reason character varying(255),
    project_id integer NOT NULL,
    employee_id integer NOT NULL
);
ALTER TABLE project_management."Task" OWNER TO postgres;
--
-- TOC entry 3035 (class 0 OID 16411)
-- Dependencies: 202
-- Data for Name: Client; Type: TABLE DATA; Schema: project_management; Owner:
postgres
--
COPY project_management."Client" (id_client, phone_number, organisation_address,
organisation_name) FROM stdin;
\.
--
-- TOC entry 3037 (class 0 OID 16421)
-- Dependencies: 204
-- Data for Name: Department; Type: TABLE DATA; Schema: project_management; Owner:
postgres
--
COPY project_management."Department" (id_department, phone_number, department_name)
FROM stdin;
\.
--
-- TOC entry 3036 (class 0 OID 16416)
-- Dependencies: 203
```

```
-- Data for Name: Employee; Type: TABLE DATA; Schema: project_management; Owner:
postgres
--
COPY project_management."Employee" (id_employee, "Surname", "Name", "Patronymic",
employee_position_id) FROM stdin;
\.
--
-- TOC entry 3038 (class 0 OID 16426)
-- Dependencies: 205
-- Data for Name: Position; Type: TABLE DATA; Schema: project_management; Owner:
postgres
--
COPY project_management."Position" (id_position, salary, position_title,
department_id) FROM stdin;
\.
--
-- TOC entry 3033 (class 0 OID 16401)
-- Dependencies: 200
-- Data for Name: Project; Type: TABLE DATA; Schema: project_management; Owner:
postgres
--
COPY project_management."Project" (id_project, project_status, project_name,
start_date, end_date, client_id, employee_id) FROM stdin;
\.
--
-- TOC entry 3034 (class 0 OID 16406)
-- Dependencies: 201
-- Data for Name: Task; Type: TABLE DATA; Schema: project_management; Owner:
postgres
--
COPY project_management."Task" (id_task, task_status, start_date, end_date,
incompletion_reason, project_id, employee_id) FROM stdin;
\.
--
-- TOC entry 2888 (class 2606 OID 16415)
-- Name: Client Client_pkey; Type: CONSTRAINT; Schema: project_management; Owner:
postgres
--
--Устанавливаем ограничения

ALTER TABLE ONLY project_management."Client"
    ADD CONSTRAINT "Client_pkey" PRIMARY KEY (id_client);
--
-- TOC entry 2893 (class 2606 OID 16425)
-- Name: Department Department_pkey; Type: CONSTRAINT; Schema: project_management;
Owner: postgres
--
ALTER TABLE ONLY project_management."Department"
    ADD CONSTRAINT "Department_pkey" PRIMARY KEY (id_department);
--
-- TOC entry 2890 (class 2606 OID 16420)
-- Name: Employee Employee_pkey; Type: CONSTRAINT; Schema: project_management;
Owner: postgres
--
ALTER TABLE ONLY project_management."Employee"
    ADD CONSTRAINT "Employee_pkey" PRIMARY KEY (id_employee);
--
-- TOC entry 2895 (class 2606 OID 16430)
-- Name: Position Position_pkey; Type: CONSTRAINT; Schema: project_management;
Owner: postgres
--
ALTER TABLE ONLY project_management."Position"
```

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    ADD CONSTRAINT "Position_pkey" PRIMARY KEY (id_position);
--
-- TOC entry 2880 (class 2606 OID 16405)
-- Name: Project Project_pkey; Type: CONSTRAINT; Schema: project_management; Owner:
postgres
--
ALTER TABLE ONLY project_management."Project"
    ADD CONSTRAINT "Project_pkey" PRIMARY KEY (id_project);
--
-- TOC entry 2884 (class 2606 OID 16410)
-- Name: Task Task_pkey; Type: CONSTRAINT; Schema: project_management; Owner:
postgres
--
ALTER TABLE ONLY project_management."Task"
    ADD CONSTRAINT "Task_pkey" PRIMARY KEY (id_task);
--
-- TOC entry 2874 (class 2606 OID 16444)
-- Name: Client id_client_check; Type: CHECK CONSTRAINT; Schema:
project_management; Owner: postgres
--
ALTER TABLE project_management."Client"
    ADD CONSTRAINT id_client_check CHECK ((id_client > 0)) NOT VALID;
--
-- TOC entry 2876 (class 2606 OID 16463)
-- Name: Department id_department_check; Type: CHECK CONSTRAINT; Schema:
project_management; Owner: postgres
--
ALTER TABLE project_management."Department"
    ADD CONSTRAINT id_department_check CHECK ((id_department > 0)) NOT VALID;
--
-- TOC entry 2875 (class 2606 OID 24581)
-- Name: Employee id_employee_check; Type: CHECK CONSTRAINT; Schema:
project_management; Owner: postgres
--
ALTER TABLE project_management."Employee"
    ADD CONSTRAINT id_employee_check CHECK ((id_employee > 0)) NOT VALID;
--
-- TOC entry 2877 (class 2606 OID 16474)
-- Name: Position id_position_check; Type: CHECK CONSTRAINT; Schema:
project_management; Owner: postgres
--
ALTER TABLE project_management."Position"
    ADD CONSTRAINT id_position_check CHECK ((id_position > 0)) NOT VALID;
--
-- TOC entry 2868 (class 2606 OID 24582)
-- Name: Project id_project_check; Type: CHECK CONSTRAINT; Schema:
project_management; Owner: postgres
--
ALTER TABLE project_management."Project"
    ADD CONSTRAINT id_project_check CHECK ((id_project > 0)) NOT VALID;
--
-- TOC entry 2871 (class 2606 OID 16450)
-- Name: Task id_task; Type: CHECK CONSTRAINT; Schema: project_management; Owner:
postgres
--
ALTER TABLE project_management."Task"
    ADD CONSTRAINT id_task CHECK ((id_task > 0)) NOT VALID;
--
-- TOC entry 2869 (class 2606 OID 16433)
-- Name: Project project_date_check; Type: CHECK CONSTRAINT; Schema:
project_management; Owner: postgres
--
```

```
ALTER TABLE project_management."Project"
    ADD CONSTRAINT project_date_check CHECK ((end_date > start_date)) NOT VALID;
--
-- TOC entry 2870 (class 2606 OID 16432)
-- Name: Project project_status_check; Type: CHECK CONSTRAINT; Schema:
project_management; Owner: postgres
--
ALTER TABLE project_management."Project"
    ADD CONSTRAINT project_status_check CHECK ((((project_status)::text =
'Выполнен'::text) OR ((project_status)::text = 'В процессе'::text) OR
((project_status)::text = 'Приостановлен'::text) OR ((project_status)::text = 'Не
выполнен'::text))) NOT VALID;
--
-- TOC entry 2878 (class 2606 OID 16480)
-- Name: Position salary_check; Type: CHECK CONSTRAINT; Schema: project_management;
Owner: postgres
--
ALTER TABLE project_management."Position"
    ADD CONSTRAINT salary_check CHECK ((salary > 0)) NOT VALID;
--
-- TOC entry 2872 (class 2606 OID 16457)
-- Name: Task task_date_check; Type: CHECK CONSTRAINT; Schema: project_management;
Owner: postgres
--
ALTER TABLE project_management."Task"
    ADD CONSTRAINT task_date_check CHECK ((end_date > start_date)) NOT VALID;
--
-- TOC entry 2873 (class 2606 OID 16451)
-- Name: Task task_status_check; Type: CHECK CONSTRAINT; Schema:
project_management; Owner: postgres
--
ALTER TABLE project_management."Task"
    ADD CONSTRAINT task_status_check CHECK ((((task_status)::text =
'Выполнено'::text) OR ((task_status)::text = 'Не выполнено'::text) OR
((task_status)::text = 'В процессе'::text))) NOT VALID;
--
-- TOC entry 2896 (class 1259 OID 16527)
-- Name: fki_department_id; Type: INDEX; Schema: project_management; Owner:
postgres
--
CREATE INDEX fki_department_id ON project_management."Position" USING btree
(department_id);
--
-- TOC entry 2885 (class 1259 OID 16516)
-- Name: fki_employee_id; Type: INDEX; Schema: project_management; Owner: postgres
--
CREATE INDEX fki_employee_id ON project_management."Task" USING btree
(employee_id);
--
-- TOC entry 2881 (class 1259 OID 16498)
-- Name: fki_id_client; Type: INDEX; Schema: project_management; Owner: postgres
--
CREATE INDEX fki_id_client ON project_management."Project" USING btree (client_id);
--
-- TOC entry 2882 (class 1259 OID 16504)
-- Name: fki_id_employee; Type: INDEX; Schema: project_management; Owner: postgres
--
CREATE INDEX fki_id_employee ON project_management."Project" USING btree
(employee_id);
--
-- TOC entry 2891 (class 1259 OID 16486)
-- Name: fki_id_position; Type: INDEX; Schema: project_management; Owner: postgres
```

```
--
CREATE INDEX fki_id_position ON project_management."Employee" USING btree
(employee_position_id);
--
-- TOC entry 2886 (class 1259 OID 16510)
-- Name: fki_id_project; Type: INDEX; Schema: project_management; Owner: postgres
--
CREATE INDEX fki_id_project ON project_management."Task" USING btree (project_id);
--
-- TOC entry 2902 (class 2606 OID 16522)
-- Name: Position department_id; Type: FK CONSTRAINT; Schema: project_management;
Owner: postgres
--
ALTER TABLE ONLY project_management."Position"
    ADD CONSTRAINT department_id FOREIGN KEY (department_id) REFERENCES
project_management."Department"(id_department) NOT VALID;
--
-- TOC entry 2900 (class 2606 OID 16511)
-- Name: Task employee_id; Type: FK CONSTRAINT; Schema: project_management; Owner:
postgres
--
ALTER TABLE ONLY project_management."Task"
    ADD CONSTRAINT employee_id FOREIGN KEY (employee_id) REFERENCES
project_management."Employee"(id_employee) NOT VALID;
--
-- TOC entry 2897 (class 2606 OID 16493)
-- Name: Project id_client; Type: FK CONSTRAINT; Schema: project_management; Owner:
postgres
--
ALTER TABLE ONLY project_management."Project"
    ADD CONSTRAINT id_client FOREIGN KEY (client_id) REFERENCES
project_management."Client"(id_client) NOT VALID;
--
-- TOC entry 2898 (class 2606 OID 16499)
-- Name: Project id_employee; Type: FK CONSTRAINT; Schema: project_management;
Owner: postgres
--
ALTER TABLE ONLY project_management."Project"
    ADD CONSTRAINT id_employee FOREIGN KEY (employee_id) REFERENCES
project_management."Employee"(id_employee) ON UPDATE RESTRICT ON DELETE RESTRICT
NOT VALID;
--
-- TOC entry 2901 (class 2606 OID 24576)
-- Name: Employee id_position; Type: FK CONSTRAINT; Schema: project_management;
Owner: postgres
--
ALTER TABLE ONLY project_management."Employee"
    ADD CONSTRAINT id_position FOREIGN KEY (employee_position_id) REFERENCES
project_management."Position"(id_position) NOT VALID;
--
-- TOC entry 2899 (class 2606 OID 16505)
-- Name: Task id_project; Type: FK CONSTRAINT; Schema: project_management; Owner:
postgres
--
ALTER TABLE ONLY project_management."Task"
    ADD CONSTRAINT id_project FOREIGN KEY (project_id) REFERENCES
project_management."Project"(id_project) NOT VALID;
-- Completed on 2021-05-07 16:39:01
--
-- PostgreSQL database dump complete
--
```

Вывод: В ходе выполнения лабораторной работы были созданы таблицы базы данных PostgreSQL 1X. Были установлены ограничения на данные (первичный и внешний ключи, проверки на наличие и корректность значения). Затем таблицы были заполнены рабочими данными. Были созданы две резервные копии (в текстовом и кастомном вариантах), первая использовалась для листинга в отчете, а с помощью второй было произведено восстановление базы данных.