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«Национальный исследовательский университет ИТМО»
Факультет инфокоммуникационных технологий

Лабораторная работа №3

«Создание таблиц базы данных Postgresql. Заполнение таблиц рабочими данными»

по дисциплине

«Проектирование и реализация баз данных»

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

Выполнение практического задания:

Наименование БД: data.

Схема логической модели базы данных: рисунок 1.

Dump, содержащий скрипты работы с бд:

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

-- Dumped from database version 13.2
-- Dumped by pg_dump version 13.2

-- Started on 2021-04-24 21:37:37 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;

DROP DATABASE data;
--
-- TOC entry 3325 (class 1262 OID 16394)
-- Name: data; Type: DATABASE; Schema: -; Owner: postgres
--

CREATE DATABASE data WITH TEMPLATE = template0 ENCODING = 'UTF8' LOCALE
= 'C';


ALTER DATABASE data OWNER TO postgres;

\connect data

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: data1; Type: SCHEMA; Schema: -; Owner: postgres
--

CREATE SCHEMA data1;


ALTER SCHEMA data1 OWNER TO postgres;

SET default_tablespace = '';

SET default_table_access_method = heap;

--
-- TOC entry 201 (class 1259 OID 16399)
-- Name:  organization; Type: TABLE; Schema: data1; Owner: postgres
--

CREATE TABLE data1." organization" (
    id_organization integer NOT NULL,
    email character varying(150) NOT NULL,
    address character varying(200) NOT NULL,
    phone_number character varying(45) NOT NULL,
    website character varying(300)
);


ALTER TABLE data1." organization" OWNER TO postgres;

--
-- TOC entry 202 (class 1259 OID 16404)
-- Name: contract; Type: TABLE; Schema: data1; Owner: postgres
--

CREATE TABLE data1.contract (
    id_contract integer NOT NULL,
    signing_date date NOT NULL,
    terms character varying(3000) NOT NULL,
    "id_organizasion " integer NOT NULL
);


ALTER TABLE data1.contract OWNER TO postgres;

--
-- TOC entry 203 (class 1259 OID 16412)
-- Name: department; Type: TABLE; Schema: data1; Owner: postgres
--

CREATE TABLE data1.department (
    id_department integer NOT NULL,
    name character varying(100) NOT NULL,
    phone_number character varying(45) NOT NULL
);


ALTER TABLE data1.department OWNER TO postgres;
```

```
--
-- TOC entry 205 (class 1259 OID 16422)
-- Name: imployee; Type: TABLE; Schema: data1; Owner: postgres
--

CREATE TABLE data1.imployee (
    id_imployee integer NOT NULL,
    id_position integer NOT NULL,
    id_department integer NOT NULL,
    birth date,
    email character varying(150) NOT NULL,
    address character varying(200) NOT NULL,
    phone_number character varying(45),
    last_name character varying(45) NOT NULL,
    name character varying(45) NOT NULL,
    patronymic character varying(45) NOT NULL
);


ALTER TABLE data1.imployee OWNER TO postgres;

--
-- TOC entry 206 (class 1259 OID 16427)
-- Name: position; Type: TABLE; Schema: data1; Owner: postgres
--

CREATE TABLE data1."position" (
    id_position integer NOT NULL,
    name character varying(100) NOT NULL,
    duty character varying(1024),
    salary numeric(9,2) NOT NULL
);


ALTER TABLE data1."position" OWNER TO postgres;

--
-- TOC entry 204 (class 1259 OID 16417)
-- Name: project; Type: TABLE; Schema: data1; Owner: postgres
--

CREATE TABLE data1.project (
    id_project integer NOT NULL,
    id_imployee integer NOT NULL,
    id_contract integer NOT NULL,
    name character varying(100) NOT NULL,
    status smallint NOT NULL,
    period_execution character varying(100) NOT NULL
);


ALTER TABLE data1.project OWNER TO postgres;

--
-- TOC entry 207 (class 1259 OID 16435)
-- Name: task; Type: TABLE; Schema: data1; Owner: postgres
--
```

```
CREATE TABLE data1.task (
    id_task integer NOT NULL,
    id_imployee integer NOT NULL,
    id_project integer NOT NULL,
    deadline date NOT NULL,
    data_start date NOT NULL,
    mark_execution smallint,
    period_execution date NOT NULL
);


ALTER TABLE data1.task OWNER TO postgres;

--
-- TOC entry 208 (class 1259 OID 16440)
-- Name: uncompleted_task; Type: TABLE; Schema: data1; Owner: postgres
--

CREATE TABLE data1.uncompleted_task (
    id_uncompleted_task integer NOT NULL,
    "id_task " integer NOT NULL,
    reason character varying(2000) NOT NULL,
    date_uncompleted date NOT NULL
);


ALTER TABLE data1.uncompleted_task OWNER TO postgres;

--
-- TOC entry 3312 (class 0 OID 16399)
-- Dependencies: 201
-- Data for Name:  organization; Type: TABLE DATA; Schema: data1; Owner:
postgres
--

INSERT INTO data1." organization" (id_organization, email, address, phone_number,
website) VALUES (1, 'organ1@gmail.com', 'street 1', '+71234567891', 'organ1.com');
INSERT INTO data1." organization" (id_organization, email, address, phone_number,
website) VALUES (2, 'organ2@gmail.com', 'street 2', '+71234567892', 'organ2.com');
INSERT INTO data1." organization" (id_organization, email, address, phone_number,
website) VALUES (3, 'organ3@gmail.com', 'street 2', '+71234567893', 'organ3.com');
INSERT INTO data1." organization" (id_organization, email, address, phone_number,
website) VALUES (4, 'organ4@gmail.com', 'street 3', '+71234567894', 'organ4.com');


--
-- TOC entry 3313 (class 0 OID 16404)
-- Dependencies: 202
-- Data for Name: contract; Type: TABLE DATA; Schema: data1; Owner: postgres
--

INSERT INTO data1.contract (id_contract, signing_date, terms, "id_organizasion ")
VALUES (1, '2021-04-01', 'complete on time', 1);
INSERT INTO data1.contract (id_contract, signing_date, terms, "id_organizasion ")
VALUES (2, '2021-04-01', 'complete on time', 1);
INSERT INTO data1.contract (id_contract, signing_date, terms, "id_organizasion ")
VALUES (3, '2021-04-10', 'complete on time', 2);
INSERT INTO data1.contract (id_contract, signing_date, terms, "id_organizasion ")
```

```
VALUES (4, '2021-04-12', 'complete on time', 3);
INSERT INTO data1.contract (id_contract, signing_date, terms, "id_organizasion ")
VALUES (5, '2021-04-02', 'complete on time', 3);
INSERT INTO data1.contract (id_contract, signing_date, terms, "id_organizasion ")
VALUES (6, '2021-04-17', 'complete on time', 4);
INSERT INTO data1.contract (id_contract, signing_date, terms, "id_organizasion ")
VALUES (7, '2021-04-22', 'complete on time', 4);


--
-- TOC entry 3314 (class 0 OID 16412)
-- Dependencies: 203
-- Data for Name: department; Type: TABLE DATA; Schema: data1; Owner: postgres
--

INSERT INTO data1.department (id_department, name, phone_number) VALUES (1,
'account', '+7123456780');
INSERT INTO data1.department (id_department, name, phone_number) VALUES (2,
'management', '+7123456781');
INSERT INTO data1.department (id_department, name, phone_number) VALUES (3,
'security', '+7123456782');
INSERT INTO data1.department (id_department, name, phone_number) VALUES (4,
'human resource', '+7123456783');


--
-- TOC entry 3316 (class 0 OID 16422)
-- Dependencies: 205
-- Data for Name: imployee; Type: TABLE DATA; Schema: data1; Owner: postgres
--

INSERT INTO data1.imployee (id_imployee, id_position, id_department, birth, email,
address, phone_number, last_name, name, patronymic) VALUES (1, 1, 2, '1995-01-
01', 'imployee1@gmail.com', 'street 10', '+71234567890', 'Иванов', 'Алексей',
'Александрович');
INSERT INTO data1.imployee (id_imployee, id_position, id_department, birth, email,
address, phone_number, last_name, name, patronymic) VALUES (2, 2, 2, '1994-01-
01', 'imployee2@gmail.com', 'street 11', '+71234567891', 'Смирнов', 'Денис',
'Игоревич');
INSERT INTO data1.imployee (id_imployee, id_position, id_department, birth, email,
address, phone_number, last_name, name, patronymic) VALUES (3, 3, 1, '1996-06-
01', 'imployee3@gmail.com', 'street 12', '+71234567892', 'Соколов', 'Никита',
'Александрович');
INSERT INTO data1.imployee (id_imployee, id_position, id_department, birth, email,
address, phone_number, last_name, name, patronymic) VALUES (4, 4, 4, '1995-05-
19', 'imployee4@gmail.com', 'street 13', '+71234567893', 'Алексеев', 'Сергей',
'Сергеевич');
INSERT INTO data1.imployee (id_imployee, id_position, id_department, birth, email,
address, phone_number, last_name, name, patronymic) VALUES (5, 4, 4, '1995-07-
09', 'imployee5@gmail.com', 'street 14', '+71234567894', 'Попов', 'Леонид',
'Геннадьевич');
INSERT INTO data1.imployee (id_imployee, id_position, id_department, birth, email,
address, phone_number, last_name, name, patronymic) VALUES (6, 5, 3, '1992-10-
01', 'imployee6@gmail.com', 'street 15', '+71234567895', 'Егоров', 'Максим',
'Никитич');
INSERT INTO data1.imployee (id_imployee, id_position, id_department, birth, email,
address, phone_number, last_name, name, patronymic) VALUES (7, 6, 4, '1995-09-
15', 'imployee7@gmail.com', 'street 16', '+71234567896', 'Степанов', 'Станислав',
```

'Ильич');
INSERT INTO data1.imployee (id_imployee, id_position, id_department, birth, email, address, phone_number, last_name, name, patronymic) VALUES (8, 6, 4, '1997-04-12', 'imployee8@gmail.com', 'street 17', '+71234567897', 'Лебедев', 'Олег', 'Александрович');

--
-- TOC entry 3317 (class 0 OID 16427)
-- Dependencies: 206
-- Data for Name: position; Type: TABLE DATA; Schema: data1; Owner: postgres
--

INSERT INTO data1."position" (id_position, name, duty, salary) VALUES (1, 'director', '', 2000.00);
INSERT INTO data1."position" (id_position, name, duty, salary) VALUES (2, 'manager', '', 1500.00);
INSERT INTO data1."position" (id_position, name, duty, salary) VALUES (3, 'account', '', 1000.00);
INSERT INTO data1."position" (id_position, name, duty, salary) VALUES (4, 'designer', '', 1300.00);
INSERT INTO data1."position" (id_position, name, duty, salary) VALUES (5, 'guard', '', 600.00);
INSERT INTO data1."position" (id_position, name, duty, salary) VALUES (6, 'staff', '', 800.00);

--
-- TOC entry 3315 (class 0 OID 16417)
-- Dependencies: 204
-- Data for Name: project; Type: TABLE DATA; Schema: data1; Owner: postgres
--

INSERT INTO data1.project (id_project, id_imployee, id_contract, name, status, period_execution) VALUES (1, 2, 1, 'project1', 1, '2021-04-01 - 2021-05-01');
INSERT INTO data1.project (id_project, id_imployee, id_contract, name, status, period_execution) VALUES (2, 4, 2, 'project2', 1, '2021-04-01 - 2021-06-01');
INSERT INTO data1.project (id_project, id_imployee, id_contract, name, status, period_execution) VALUES (3, 5, 3, 'project3', 1, '2021-04-10 - 2021-06-01');
INSERT INTO data1.project (id_project, id_imployee, id_contract, name, status, period_execution) VALUES (4, 7, 4, 'project4', 1, '2021-04-12 - 2021-05-22');
INSERT INTO data1.project (id_project, id_imployee, id_contract, name, status, period_execution) VALUES (5, 8, 5, 'project5', 1, '2021-04-02 - 2021-07-02');
INSERT INTO data1.project (id_project, id_imployee, id_contract, name, status, period_execution) VALUES (6, 4, 6, 'project6', 0, '2021-04-17 - 2021-12-01');
INSERT INTO data1.project (id_project, id_imployee, id_contract, name, status, period_execution) VALUES (7, 7, 7, 'project7', 1, '2021-04-22 - 2021-05-22');

--
-- TOC entry 3318 (class 0 OID 16435)
-- Dependencies: 207
-- Data for Name: task; Type: TABLE DATA; Schema: data1; Owner: postgres
--

INSERT INTO data1.task (id_task, id_imployee, id_project, deadline, data_start, mark_execution, period_execution) VALUES (1, 2, 1, '2021-04-30', '2021-04-01', 1, '2021-04-30');

```
INSERT INTO data1.task (id_task, id_imployee, id_project, deadline, data_start,
mark_execution, period_execution) VALUES (2, 4, 2, '2021-05-31', '2021-04-01', 1,
'2021-06-01');
INSERT INTO data1.task (id_task, id_imployee, id_project, deadline, data_start,
mark_execution, period_execution) VALUES (3, 5, 3, '2021-06-01', '2021-04-10', 1,
'2021-06-02');
INSERT INTO data1.task (id_task, id_imployee, id_project, deadline, data_start,
mark_execution, period_execution) VALUES (4, 7, 4, '2021-05-22', '2021-04-12', 1,
'2021-05-22');
INSERT INTO data1.task (id_task, id_imployee, id_project, deadline, data_start,
mark_execution, period_execution) VALUES (5, 8, 5, '2021-07-01', '2021-04-02', 1,
'2021-07-02');
INSERT INTO data1.task (id_task, id_imployee, id_project, deadline, data_start,
mark_execution, period_execution) VALUES (6, 4, 6, '2021-11-30', '2021-04-17', 0,
'2021-12-15');
INSERT INTO data1.task (id_task, id_imployee, id_project, deadline, data_start,
mark_execution, period_execution) VALUES (7, 7, 7, '2021-05-22', '2021-04-22', 1,
'2021-05-22');



--
-- TOC entry 3319 (class 0 OID 16440)
-- Dependencies: 208
-- Data for Name: uncompleted_task; Type: TABLE DATA; Schema: data1; Owner:
postgres
--

INSERT INTO data1.uncompleted_task (id_uncompleted_task, "id_task ", reason,
date_uncompleted) VALUES (1, 6, 'слишком сложно', '2021-12-02');



--
-- TOC entry 3151 (class 2606 OID 16403)
-- Name:  organization  organization_pkey; Type: CONSTRAINT; Schema: data1;
Owner: postgres
--

ALTER TABLE ONLY data1." organization"
    ADD CONSTRAINT " organization_pkey" PRIMARY KEY (id_organization);



--
-- TOC entry 3153 (class 2606 OID 16411)
-- Name: contract contract_pkey; Type: CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1.contract
    ADD CONSTRAINT contract_pkey PRIMARY KEY (id_contract);



--
-- TOC entry 3148 (class 2606 OID 16448)
-- Name: task data; Type: CHECK CONSTRAINT; Schema: data1; Owner: postgres
--

ALTER TABLE data1.task
    ADD CONSTRAINT data CHECK ((data_start < deadline)) NOT VALID;
```

```
--
-- TOC entry 3149 (class 2606 OID 16449)
-- Name: task data1; Type: CHECK CONSTRAINT; Schema: data1; Owner: postgres
--

ALTER TABLE data1.task
    ADD CONSTRAINT data1 CHECK ((deadline > data_start)) NOT VALID;


--
-- TOC entry 3156 (class 2606 OID 16416)
-- Name: department department_pkey; Type: CONSTRAINT; Schema: data1;
Owner: postgres
--

ALTER TABLE ONLY data1.department
    ADD CONSTRAINT department_pkey PRIMARY KEY (id_department);


--
-- TOC entry 3164 (class 2606 OID 16426)
-- Name: imployee imployee_pkey; Type: CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1.imployee
    ADD CONSTRAINT imployee_pkey PRIMARY KEY (id_imployee);


--
-- TOC entry 3166 (class 2606 OID 16434)
-- Name: position position_pkey; Type: CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1."position"
    ADD CONSTRAINT position_pkey PRIMARY KEY (id_position);


--
-- TOC entry 3160 (class 2606 OID 16421)
-- Name: project project_pkey; Type: CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1.project
    ADD CONSTRAINT project_pkey PRIMARY KEY (id_project);


--
-- TOC entry 3147 (class 2606 OID 16622)
-- Name: position salary; Type: CHECK CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE data1."position"
```

```
    ADD CONSTRAINT salary CHECK ((salary > (0)::numeric)) NOT VALID;


--
-- TOC entry 3170 (class 2606 OID 16439)
-- Name: task task_pkey; Type: CONSTRAINT; Schema: data1; Owner: postgres
--

ALTER TABLE ONLY data1.task
    ADD CONSTRAINT task_pkey PRIMARY KEY (id_task);


--
-- TOC entry 3173 (class 2606 OID 16447)
-- Name: uncompleted_task uncompleted_pkey; Type: CONSTRAINT; Schema:
data1; Owner: postgres
--

ALTER TABLE ONLY data1.uncompleted_task
    ADD CONSTRAINT uncompleted_pkey PRIMARY KEY (id_uncompleted_task);


--
-- TOC entry 3167 (class 1259 OID 16500)
-- Name: fki_task_to_imployee; Type: INDEX; Schema: data1; Owner: postgres
--

CREATE INDEX fki_task_to_imployee ON data1.task USING btree (id_imployee);


--
-- TOC entry 3168 (class 1259 OID 16506)
-- Name: fki_task_to_project; Type: INDEX; Schema: data1; Owner: postgres
--

CREATE INDEX fki_task_to_project ON data1.task USING btree (id_project);


--
-- TOC entry 3157 (class 1259 OID 16489)
-- Name: fki_to_contract; Type: INDEX; Schema: data1; Owner: postgres
--

CREATE INDEX fki_to_contract ON data1.project USING btree (id_contract);


--
-- TOC entry 3161 (class 1259 OID 16471)
-- Name: fki_to_department; Type: INDEX; Schema: data1; Owner: postgres
--

CREATE INDEX fki_to_department ON data1.imployee USING btree (id_department);


--
-- TOC entry 3158 (class 1259 OID 16483)
-- Name: fki_to_imployee; Type: INDEX; Schema: data1; Owner: postgres
--
```

```
CREATE INDEX fki_to_imployee ON data1.project USING btree (id_imployee);


--
-- TOC entry 3154 (class 1259 OID 16455)
-- Name: fki_to_organization; Type: INDEX; Schema: data1; Owner: postgres
--

CREATE INDEX fki_to_organization ON data1.contract USING btree ("id_organizasion
");



--
-- TOC entry 3162 (class 1259 OID 16477)
-- Name: fki_to_position; Type: INDEX; Schema: data1; Owner: postgres
--

CREATE INDEX fki_to_position ON data1.imployee USING btree (id_position);



--
-- TOC entry 3171 (class 1259 OID 16512)
-- Name: fki_to_task; Type: INDEX; Schema: data1; Owner: postgres
--

CREATE INDEX fki_to_task ON data1.uncompleted_task USING btree ("id_task ");



--
-- TOC entry 3174 (class 2606 OID 16461)
-- Name: contract fk_to_organization; Type: FK CONSTRAINT; Schema: data1;
Owner: postgres
--

ALTER TABLE ONLY data1.contract
    ADD CONSTRAINT fk_to_organization FOREIGN KEY ("id_organizasion ")
REFERENCES data1." organization"(id_organization) ON UPDATE CASCADE ON
DELETE CASCADE NOT VALID;



--
-- TOC entry 3179 (class 2606 OID 16495)
-- Name: task task_to_imployee; Type: FK CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1.task
    ADD CONSTRAINT task_to_imployee FOREIGN KEY (id_imployee) REFERENCES
data1.imployee(id_imployee) ON UPDATE CASCADE ON DELETE CASCADE NOT
VALID;



--
-- TOC entry 3180 (class 2606 OID 16501)
-- Name: task task_to_project; Type: FK CONSTRAINT; Schema: data1; Owner:
postgres
--
```

```
ALTER TABLE ONLY data1.task
    ADD CONSTRAINT task_to_project FOREIGN KEY (id_project) REFERENCES
data1.project(id_project) ON UPDATE CASCADE ON DELETE CASCADE NOT VALID;


--
-- TOC entry 3176 (class 2606 OID 16484)
-- Name: project to_contract; Type: FK CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1.project
    ADD CONSTRAINT to_contract FOREIGN KEY (id_contract) REFERENCES
data1.contract(id_contract) ON UPDATE CASCADE ON DELETE CASCADE NOT VALID;


--
-- TOC entry 3177 (class 2606 OID 16466)
-- Name: imployee to_department; Type: FK CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1.imployee
    ADD CONSTRAINT to_department FOREIGN KEY (id_department) REFERENCES
data1.department(id_department) ON UPDATE CASCADE ON DELETE CASCADE NOT
VALID;


--
-- TOC entry 3175 (class 2606 OID 16478)
-- Name: project to_imployee; Type: FK CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1.project
    ADD CONSTRAINT to_imployee FOREIGN KEY (id_imployee) REFERENCES
data1.imployee(id_imployee) ON UPDATE CASCADE ON DELETE CASCADE NOT
VALID;


--
-- TOC entry 3178 (class 2606 OID 16472)
-- Name: imployee to_position; Type: FK CONSTRAINT; Schema: data1; Owner:
postgres
--

ALTER TABLE ONLY data1.imployee
    ADD CONSTRAINT to_position FOREIGN KEY (id_position) REFERENCES
data1."position"(id_position) ON UPDATE CASCADE ON DELETE CASCADE NOT
VALID;


--
-- TOC entry 3181 (class 2606 OID 16507)
-- Name: uncompleted_task to_task; Type: FK CONSTRAINT; Schema: data1;
Owner: postgres
--
```

```
ALTER TABLE ONLY data1.uncompleted_task
    ADD CONSTRAINT to_task FOREIGN KEY ("id_task ") REFERENCES
data1.task(id_task) ON UPDATE CASCADE ON DELETE CASCADE NOT VALID;


-- Completed on 2021-04-24 21:37:37 MSK

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

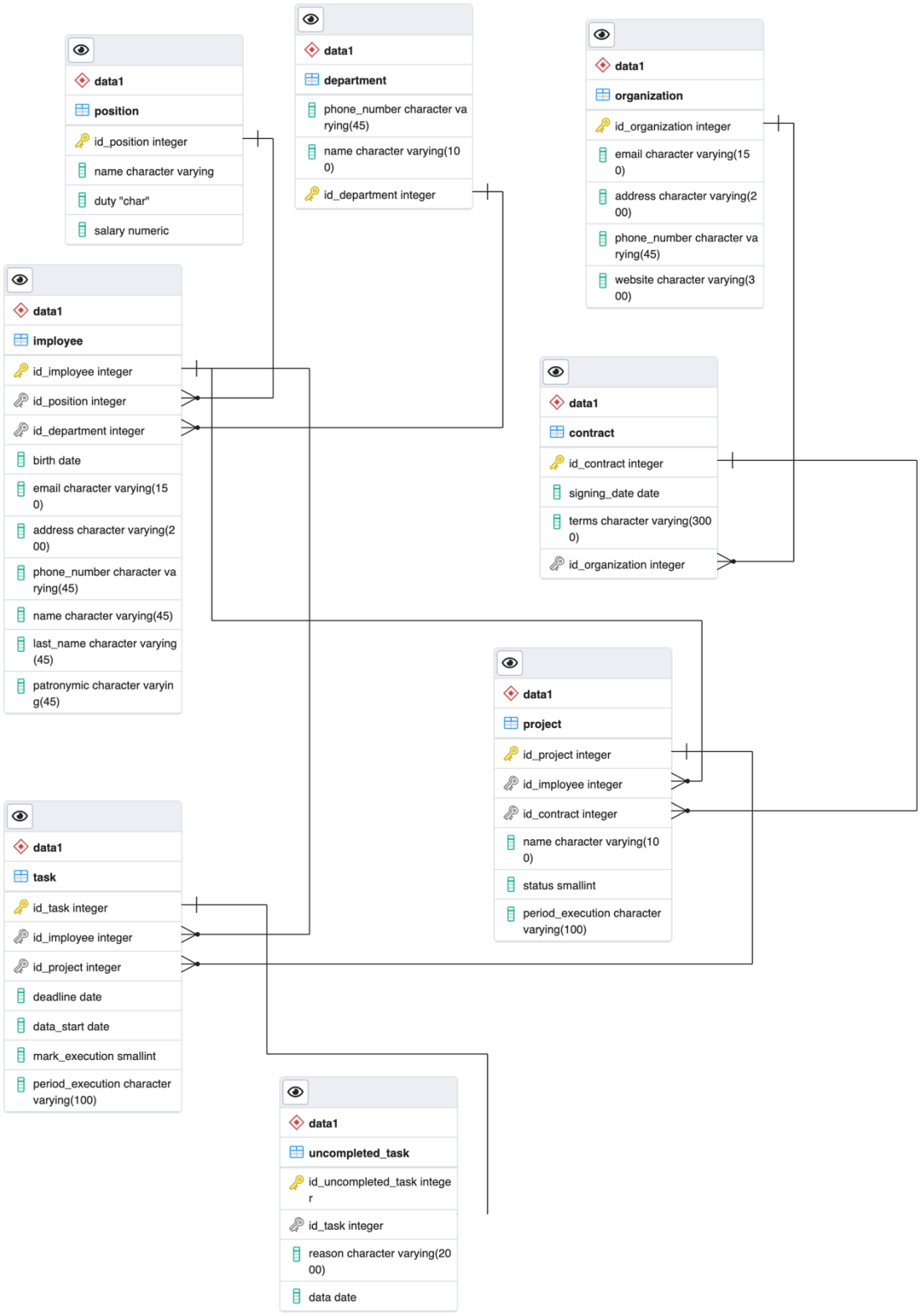

Рисунок 1 – логическая модель базы данных

Вывод: в ходе выполнения работы была создана база данных в Postgresql, созданы таблицы и ограничения на значения столбцов, в базу данных были занесены рабочие данные, а также была создана логическая модель базы данных и dump.