Лабораторная работа №4 по дисциплине

"Базы данных"

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Санкт-Петербург, 2023

Задание

- Реализовать разработанную в рамках лабораторной работы №3 даталогическую модель в реляционной СУБД PostgreSQL.
- Заполнить созданные таблицы данными.
- Обеспечить целостность данных при помощи средств языка DDL.
- В рамках лабораторной работы должны быть разработаны скрипты для создания/удаления требуемых объектов базы данных, заполнения/удаления содержимого созданных таблиц.

Описание предметной области

В качестве предметной области, с которой мы в дальнейшем будем работать и которую будем развивать, мы выбрали сферу услуг, а именно — отели, оказывающиеся очень полезными во время путешествий. Обычно отель предлагает различные категории номеров: от стандартных одноместных до президентских люксов. Каждое такое "средство размещения" людей имеет собственную структуру и организацию и для его налаженной работы необходимо грамотное управление. Управление отелем включает в себя бронирование номеров, проверку гостей, налаживание графика уборки номеров, учёт финансовых операций и т.д.
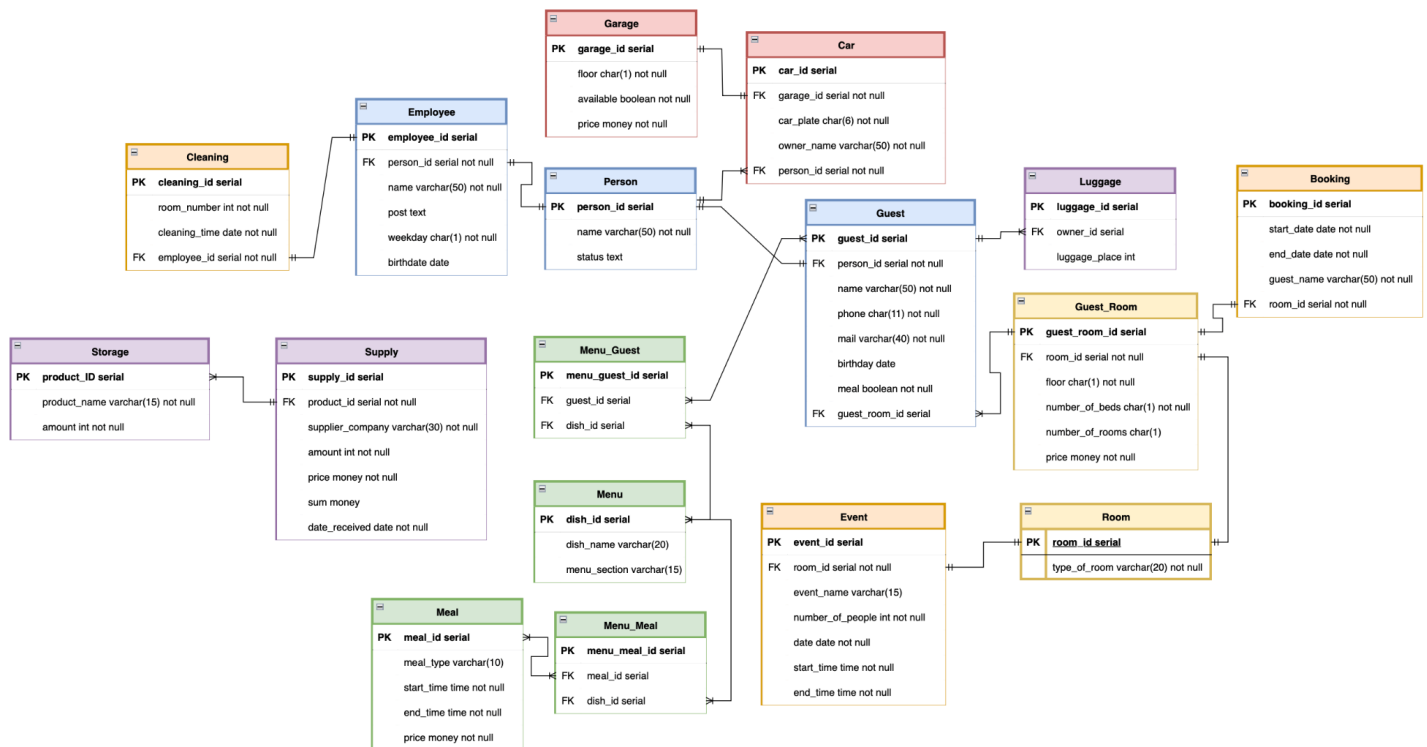Создание базы данных для такой обширной категории в сфере услуг значительно облегчит работу управляющему персоналу и положительно скажется на их эффективности. Например, можно хранить информацию о гостях, включая их личные данные, контактную информацию, историю пребывания(дата заселения/выселения), а также информацию о доступности номеров, тарифных планах, бронировании, платежах. Вдобавок ко всему можно также хранить информацию о персонале: их рабочие графики, должности, выплаты, учёт поставщиков и т.д.
Таким образом, база данных отеля позволяет эффективно управлять ресурсами, автоматизировать некоторые процессы и улучшать качество

обслуживания гостей.

Даталогическая модель:

Garage
PK	garage_id serial
	floor char(1) not null
	available boolean not null
	price money not null

Car
PK	car_id serial
FK	garage_id serial not null
	car_plate char(6) not null
	owner_name varchar(50) not null
FK	person_id serial not null

Employee
PK	employee_id serial
FK	person_id serial not null
	name varchar(50) not null
	post text
	weekday char(1) not null
	birthdate date

Cleaning
PK	cleaning_id serial
	room_number int not null
	cleaning_time date not null
FK	employee_id serial not null

Person
PK	person_id serial
	name varchar(50) not null
	status text

Guest
PK	guest_id serial
FK	person_id serial not null
	name varchar(50) not null
	phone char(11) not null
	mail varchar(40) not null
	birthday date
	meal boolean not null
FK	guest_room_id serial

Luggage
PK	luggage_id serial
FK	owner_id serial
	luggage_place int

Booking
PK	booking_id serial
	start_date date not null
	end_date date not null
	guest_name varchar(50) not null
FK	room_id serial not null

Guest_Room
PK	guest_room_id serial
FK	room_id serial not null
	floor char(1) not null
	number_of_beds char(1) not null
	number_of_rooms char(1)
	price money not null

Storage
PK	product_ID serial
	product_name varchar(15) not null
	amount int not null

Supply
PK	supply_id serial
FK	product_id serial not null
	supplier_company varchar(30) not null
	amount int not null
	price money not null
	sum money
	date_received date not null

Menu_Guest
PK	menu_guest_id serial
FK	guest_id serial
FK	dish_id serial

Menu
PK	dish_id serial
	dish_name varchar(20)
	menu_section varchar(15)

Event
PK	event_id serial
FK	room_id serial not null
	event_name varchar(15)
	number_of_people int not null
	date date not null
	start_time time not null
	end_time time not null

Room
PK	room_id serial
	type_of_room varchar(20) not null

Meal
PK	meal_id serial
	meal_type varchar(10)
	start_time time not null
	end_time time not null
	price money not null

Menu_Meal
PK	menu_meal_id serial
FK	meal_id serial
FK	dish_id serial

DDL-команды:
create table garage(garage_id serial PRIMARY KEY, place varchar(2) not null, available boolean not null, price money not null);

create table person(person_id serial primary key, name varchar(50) not null, status text);

CREATE TABLE car(car_id SERIAL PRIMARY KEY, garage_id serial unique, references garage(garage_id), car_plate CHAR(6) NOT NULL, owner_name, VARCHAR(50) NOT NULL, person_id INT, FOREIGN KEY (person_id) REFERENCES Person(person_id));

create table employee(employee_id serial primary key, person_id serial unique references person(person_id) not null, name varchar(50) not null, post text, weekday char(1) not null, birthdate date);
create table room(room_id serial primary key, type_of_room varchar(20) not null);

create table cleaning(cleaning_id serial primary key, room_number int not null, cleaning_time date not null, employee_id serial unique references employee(employee_id) not null);

create table guest_room(guest_room_id serial primary key, room_id serial unique references room(room_id) not null, floor char(1) not null, number_of_beds char(1) not null, number_of_rooms char(1), price money not null);

create table guest(guest_id serial primary key, person_id serial unique references person(person_id) not null, name varchar(50) not null, phone char(11) not null, mail varchar(40) not null, birthday date, meal boolean not null, guest_room_id serial references guest_room(guest_room_id));

create table luggage(luggage_id serial primary key, owner_id serial references guest(guest_id), luggage_place int);

create table booking(booking_id serial primary key, start_date date not null, end_date date not null, guest_name varchar(50) not null, room_id serial unique references guest_room(guest_room_id) not null);

create table event(event_id serial primary key, room_id serial unique references room(room_id) not null, event_name varchar(15), number_of_people int not null, date date not null, start_time time not null, end_time time not null);

create table storage(product_id serial primary key, product_name varchar(15) not null, amount int not null);

create table supply(supply_id serial primary key, product_id serial references storage(product_id), supplier_company varchar(30) not null, amount int not null, price money not null, sum money, date_received date not null);

create table menu(dish_id serial primary key, dish_name varchar(20), menu_section varchar(15));

create table meal(meal_id serial primary key, meal_type varchar(10), start_time time not null, end_time time not null, price money not null);

create table menu_meal(menu_meal_id serial primary key, meal_id serial references meal(meal_id), dish_id serial references menu(dish_id));

create table menu_guest(menu_guest_id serial primary key, guest_id serial references guest(guest_id), dish_id serial references menu(dish_id));

DML-команды:

INSERT INTO garage (garage_id, place, available, price) VALUES
    (1, '1A', false, 100.00),
    (2, '1B', false, 150.00),
    (3, '2A', false, 120.00),
    (4, '2B', false, 150.00),
    (5, '3A', false, 200.00),
    (6, '3B', true, 150.00),
    (7, '4A', true, 100.00),
    (8, '4B', true, 200.00),
    (9, '5A', true, 250.00),
    (10, '5B', true, 100.00),
    (11, '6A', true, 175.00),
    (12, '6B', true, 150.00),
    (13, '7A', false, 150.00),
    (14, '7B', true, 150.00),
    (15, '8A', false, 150.00),
    (16, '8B', true, 150.00);

INSERT INTO person (name, status) VALUES
    ('John Doe', 'employee'),
    ('Jane Smith', 'employee'),
    ('Bob Johnson', 'guest'),
    ('Alice Bradford', 'guest'),
    ('Alex Kim', 'guest'),
    ('Jimmy Donaldson', 'employee'),
    ('Margaret Howell', 'employee'),
    ('Michael Moore', 'guest'),

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    ('Eva Rodriguez', 'guest'),
    ('Chris Williams', 'employee'),
    ('Sophie Turner', 'guest'),
    ('Daniel Brown', 'employee'),
    ('Olivia Martinez', 'guest'),
    ('Ryan Thompson', 'employee'),
    ('Isabella White', 'guest'),
    ('Lucas Taylor', 'employee'),
    ('Emily Johnson', 'guest'),
    ('Liam Davis', 'employee');

INSERT INTO employee (person_id, name, post, weekday, birthdate) VALUES
    ((SELECT person_id FROM person WHERE name = 'John Doe'), 'John Doe',
'Manager', 'M', '1980-01-15'),
    ((SELECT person_id FROM person WHERE name = 'Jane Smith'), 'Jane Smith',
'Clerk', 'W', '1990-05-20'),
    ((SELECT person_id FROM person WHERE name = 'Jimmy Donaldson'), 'Jimmy
Donaldson', 'Owner', 'T', '1998-05-07'),
    ((SELECT person_id FROM person WHERE name = 'Margaret Howell'),
'Margaret Howell','Manager', 'F', '1995-03-13'),
    ((SELECT person_id FROM person WHERE name = 'Chris Williams'), 'Chris
Williams', 'Cleaner', 'W', '1985-04-12'),
    ((SELECT person_id FROM person WHERE name = 'Daniel Brown'), 'Daniel
Brown', 'Cleaner', 'T', '1993-10-11'),
    ((SELECT person_id FROM person WHERE name = 'Ryan Thompson'), 'Ryan
Thompson', 'Concierge', 'S', '1975-07-12'),
    ((SELECT person_id FROM person WHERE name = 'Lucas Taylor'), 'Lucas
Taylor', 'Cook', 'T', '1982-11-12'),
    ((SELECT person_id FROM person WHERE name = 'Liam Davis'), 'Liam Davis',
'Director', 'F', '1984-05-15');

INSERT INTO car (garage_id, car_plate, owner_name, person_id) VALUES
    ((SELECT garage_id FROM garage WHERE place = '1A'), 'ABC123', 'John Doe',
(SELECT person_id FROM person WHERE name = 'John Doe')),
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    ((SELECT garage_id FROM garage WHERE place = '1B'), 'XYZ456', 'Jane Smith',
(SELECT person_id FROM person WHERE name = 'Jane Smith')),
    ((SELECT garage_id FROM garage WHERE place = '2A'), 'DEF789', 'Bob
Johnson', (SELECT person_id FROM person WHERE name = 'Bob Johnson')),
    ((SELECT garage_id FROM garage WHERE place = '2B'), 'OEF342', 'Alice
Bradford', (SELECT person_id FROM person WHERE name = 'Alice Bradford')),
    ((SELECT garage_id FROM garage WHERE place = '3A'), TUY251, 'John Doe',
(SELECT person_id FROM person WHERE name = 'John Doe'));

INSERT INTO room (type_of_room) VALUES
    ('Guest room'),
    ('Guest room'),
    ('Guest room'),
    ('Suite'),
    ('Banquet'),
    ('Banquet'),
    ('Concert hall'),
    ('Guest room'),
    ('Guest room');

INSERT INTO guest_room (room_id, floor, number_of_beds,
number_of_rooms, price) VALUES
    (1, 'A', '1', '1', 100.00),
    (2, 'B', '2', '1', 150.00),
    (3, 'C', '2', '2', 200.00),
    (4, 'D', '3', '3', 500.00),
    (8, 'A', '1', '1', 100.00),
    (9, 'B', '2', '1', 150.00);

INSERT INTO guest (person_id, name, phone, mail, birthday, meal,
guest_room_id) VALUES ((SELECT person_id FROM person WHERE name = 'Bob
Johnson'), 'Bob Johnson', '55555555555', 'bob@example.com', '1985-11-10',
true, 2);
INSERT INTO guest (person_id, name, phone, mail, birthday, meal,
guest_room_id) VALUES ((SELECT person_id FROM person WHERE name =
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'Alice Bradford'), 'Alice Bradford', '33333333333', 'alice@example.com', '1997-10-02', true, 1);
INSERT INTO guest (person_id, name, phone, mail, birthday, meal, guest_room_id) VALUES ((SELECT person_id FROM person WHERE name = 'Alex Kim'), 'Alex Kim', '44444444444', 'alex@example.com', '2000-03-08', true, 2);
INSERT INTO guest (person_id, name, phone, mail, birthday, meal, guest_room_id) VALUES ((SELECT person_id FROM person WHERE name = 'Michael Moore'), 'Michael Moore', '11111111111', 'moore@example.com', '1983-04-12', true, 4);
 ('Isabella White', 'guest'),
 ('Emily Johnson', 'guest'),

INSERT INTO guest (person_id, name, phone, mail, birthday, meal, guest_room_id) VALUES ((SELECT person_id FROM person WHERE name = 'Eva Rodriguez'), 'Eva Rodriguez', '99999999999', 'eva@example.com', '1982-02-12', true, 4);
INSERT INTO guest (person_id, name, phone, mail, birthday, meal, guest_room_id) VALUES ((SELECT person_id FROM person WHERE name = 'Sophie Turner'), 'Sophie Turner', '88888888888', 'turner@example.com', '1986-06-16', true, 4);
INSERT INTO guest (person_id, name, phone, mail, birthday, meal, guest_room_id) VALUES ((SELECT person_id FROM person WHERE name = 'Olivia Martinez'), 'Olivia Martinez', '44444445555', 'olivia@example.com', '1983-01-24', true, 2);
INSERT INTO guest (person_id, name, phone, mail, birthday, meal, guest_room_id) VALUES ((SELECT person_id FROM person WHERE name = 'Olivia Martinez'), 'Olivia Martinez', '44444445555', 'olivia@example.com', '1983-01-24', true, 5);
INSERT INTO guest (person_id, name, phone, mail, birthday, meal, guest_room_id) VALUES ((SELECT person_id FROM person WHERE name = 'Isabella White'), 'Isabella White', '44433335555', 'white@example.com', '1998-01-12', true, 6);

INSERT INTO luggage (owner_id, luggage_place) VALUES
((SELECT guest_id FROM guest WHERE name = 'Michael Moore'), 1),

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((SELECT guest_id FROM guest WHERE name = 'Michael Moore'),2),
((SELECT guest_id FROM guest WHERE name = 'Alice Bradford'),3),
((SELECT guest_id FROM guest WHERE name = 'Alex Kim'),4);


INSERT INTO booking (start_date, end_date, guest_name, room_id) VALUES
    ('2023-01-01', '2023-01-05', 'Alice Bradford', 1),
    ('2023-02-01', '2023-02-10', 'Alex Kim', 2),
    ('2023-03-01', '2023-03-15', 'Bob Johnson', 3),
    ('2023-04-01', '2023-04-12', 'Michael Moore', 4);

INSERT INTO event (room_id, event_name, number_of_people, date,
start_time, end_time) VALUES
    (7, 'Conference', 50, '2023-04-01', '10:00:00', '17:00:00'),
    (8, 'Party', 30, '2023-05-01', '20:00:00', '23:00:00'),
    (9, 'Seminar', 40, '2023-06-01', '14:00:00', '18:00:00');

INSERT INTO cleaning (room_number, cleaning_time, employee_id) VALUES
    (101, '2023-04-01', (SELECT employee_id FROM employee WHERE name =
'Chris Williams')),
    (202, '2023-05-01', (SELECT employee_id FROM employee WHERE name =
'Daniel Brown')),
    (303, '2023-06-01', (SELECT employee_id FROM employee WHERE name =
'Daniel Brown'));

INSERT INTO storage (product_name, amount) VALUES
    ('Towels', 100),
    ('Soap', 200),
    ('Shampoo', 150);

INSERT INTO supply (product_id, supplier_company, amount, price, sum,
date_received) VALUES
    ((SELECT product_id FROM storage WHERE product_name = 'Towels'), 'ABC
Supplier', 50, 1.50, 75.00, '2023-04-01'),
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    ((SELECT product_id FROM storage WHERE product_name = 'Soap'), 'XYZ
Supplier', 100, 1.00, 100.00, '2023-05-01'),
    ((SELECT product_id FROM storage WHERE product_name = 'Shampoo'), '123
Supplier', 75, 2.00, 150.00, '2023-06-01');

INSERT INTO menu (dish_name, menu_section) VALUES
    ('Pasta', 'Main Course'),
    ('Salad', 'Appetizer'),
    ('Cake', 'Dessert'),
    ('Pizza', 'Main Course'),
    ('Coffee', 'Drink'),
    ('Tea', 'Drink'),
    ('Porridge', 'Main Course'),
    ('Soup', 'Main Course'),
    ('Steak', 'Main Course'),
    ('Caesar Salad', 'Appetizer'),
    ('Fish Tacos', 'Main Course'),
    ('Mango Smoothie', 'Drink'),
    ('Cheesecake', 'Dessert');

INSERT INTO meal (meal_type, start_time, end_time, price) VALUES
    ('Breakfast', '07:00:00', '10:00:00', 15.00),
    ('Lunch', '12:00:00', '14:00:00', 20.00),
    ('Dinner', '18:00:00', '21:00:00', 25.00);

INSERT INTO menu_meal (meal_id, dish_id) VALUES
    (SELECT meal_id FROM meal WHERE meal_name = 'Breakfast',SELECT dish_id
FROM dish WHERE dish_name = 'Cake'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Breakfast',SELECT dish_id
FROM dish WHERE dish_name = 'Tea'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Breakfast',SELECT dish_id
FROM dish WHERE dish_name = 'Coffee'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Breakfast',SELECT dish_id
FROM dish WHERE dish_name = 'Porridge'),
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    (SELECT meal_id FROM meal WHERE meal_name = 'Lunch',SELECT dish_id
FROM dish WHERE dish_name = 'Soup'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Lunch',SELECT dish_id
FROM dish WHERE dish_name = 'Pizza'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Lunch',SELECT dish_id
FROM dish WHERE dish_name = 'Salad'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Lunch',SELECT dish_id
FROM dish WHERE dish_name = 'Tea'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Lunch',SELECT dish_id
FROM dish WHERE dish_name = 'Coffee'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Lunch',SELECT dish_id
FROM dish WHERE dish_name = 'Pasta'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Dinner',SELECT dish_id
FROM dish WHERE dish_name = 'Pizza'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Dinner',SELECT dish_id
FROM dish WHERE dish_name = 'Salad'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Dinner',SELECT dish_id
FROM dish WHERE dish_name = 'Tea'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Dinner',SELECT dish_id
FROM dish WHERE dish_name = 'Coffee'),
    (SELECT meal_id FROM meal WHERE meal_name = 'Dinner',SELECT dish_id
FROM dish WHERE dish_name = 'Pasta');

INSERT INTO menu_guest (guest_id, dish_id) VALUES
    (SELECT guest_id FROM guest WHERE name = 'Bob Johnson',SELECT dish_id
FROM dish WHERE dish_name = 'Coffee'),
    (SELECT guest_id FROM guest WHERE name = 'Bob Johnson',SELECT dish_id
FROM dish WHERE dish_name = 'Pasta'),
    (SELECT guest_id FROM guest WHERE name = 'Alice Bradford',SELECT dish_id
FROM dish WHERE dish_name = 'Tea'),
    (SELECT guest_id FROM guest WHERE name = 'Alice Bradford',SELECT dish_id
FROM dish WHERE dish_name = 'Soup'),
    (SELECT guest_id FROM guest WHERE name = 'Alex Kim',SELECT dish_id
FROM dish WHERE dish_name = 'Pizza'),
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(SELECT guest_id FROM guest WHERE name = 'Alex Kim',SELECT dish_id FROM dish WHERE dish_name = 'Pasta'),
    (SELECT guest_id FROM guest WHERE name = 'Michael Moore',SELECT dish_id FROM dish WHERE dish_name = 'Cake'),
    (SELECT guest_id FROM guest WHERE name = 'Michael Moore',SELECT dish_id FROM dish WHERE dish_name = 'Tea');

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                    Список отношений
   Схема    |      Имя      |   Тип    | Владелец
 ---------+--------------+---------+-----------
  s333571 | booking      | таблица | s333571
  s333571 | car          | таблица | s333571
  s333571 | civilization | таблица | s333571
  s333571 | cleaning     | таблица | s333571
  s333571 | employee     | таблица | s333571
  s333571 | event        | таблица | s333571
  s333571 | garage       | таблица | s333571
  s333571 | gender       | таблица | s333571
  s333571 | guest        | таблица | s333571
  s333571 | guest_room   | таблица | s333571
  s333571 | human        | таблица | s333571
  s333571 | luggage      | таблица | s333571
  s333571 | meal         | таблица | s333571
  s333571 | menu         | таблица | s333571
  s333571 | menu_guest   | таблица | s333571
  s333571 | menu_meal    | таблица | s333571
  s333571 | person       | таблица | s333571
  s333571 | robot        | таблица | s333571
  s333571 | room         | таблица | s333571
  s333571 | storage      | таблица | s333571
  s333571 | supply       | таблица | s333571
  s333571 | transport    | таблица | s333571
 (22 строки)
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Выводы:

В ходе выполнения лабораторной работы была реализована разработанная в рамках лабораторной работы №3 даталогическую модель в реляционной СУБД PostgreSQL. Она была заполнена данными, была обеспечена целостность данных при помощи средств

языка DDL, а также разработаны скрипты для создания/удаления требуемых объектов БД, заполнения/удаления содержимого созданных таблиц.