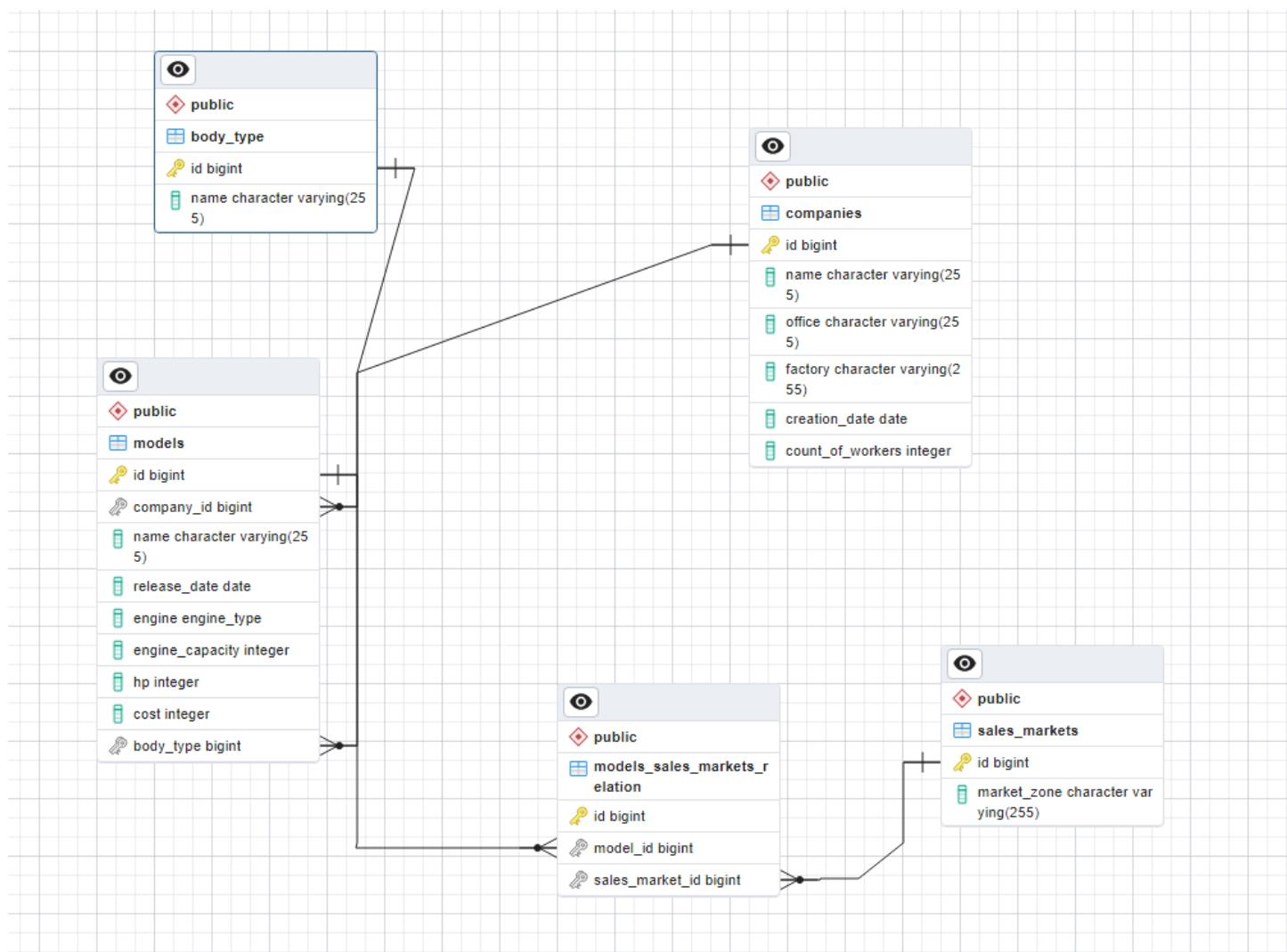


Описание базы данных "Автомобильный журнал"

Схема базы данных



DDL SQL создание БД + заполнение данными:

```

DROP TABLE IF EXISTS models;
DROP TABLE IF EXISTS sales_markets;
DROP TABLE IF EXISTS companies;
DROP TABLE IF EXISTS models_range;
DROP TABLE IF EXISTS models_sales_markets_relation;
DROP TABLE IF EXISTS body_type;
DROP TYPE IF EXISTS engine_type;

CREATE TYPE engine_type AS ENUM (
    'hybrid',
    'electric',
  
```

```
'internal combustion engine'
);

CREATE TABLE body_type (
    id bigserial primary key,
    name varchar(255) NOT NULL
);

CREATE TABLE companies(
    id bigserial primary key,
    name varchar(255) NOT NULL,
    office varchar(255) NOT NULL,
    factory varchar(255),
    creation_date date NOT NULL,
    count_of_workers int
);

CREATE TABLE models (
    id bigserial primary key,
    company_id bigint NOT NULL,
    name varchar(255) NOT NULL,
    release_date date,
    engine engine_type,
    engine_capacity int,
    HP int,
    cost int,
    body_type bigint NOT NULL,
    FOREIGN KEY (body_type) REFERENCES body_type
    ON DELETE SET NULL
    ON UPDATE CASCADE,
    FOREIGN KEY (company_id) REFERENCES companies
    ON DELETE SET NULL
    ON UPDATE CASCADE
);

CREATE TABLE sales_markets (
    id bigserial primary key,
    market_zone varchar(255) NOT NULL
);

CREATE TABLE models_sales_markets_relation (
    id bigserial primary key,
    model_id bigint NOT NULL,
    sales_market_id bigint NOT NULL,
    FOREIGN KEY (model_id) REFERENCES models
    ON DELETE CASCADE
    ON UPDATE CASCADE,
    FOREIGN KEY (sales_market_id) REFERENCES sales_markets
    ON DELETE CASCADE
    ON UPDATE CASCADE
);
```

```

CREATE UNIQUE INDEX IF NOT EXISTS uix_companies_name ON companies (name);
CREATE UNIQUE INDEX IF NOT EXISTS uix_body_type_name ON body_type (name);
CREATE UNIQUE INDEX IF NOT EXISTS uix_sales_market_zone ON sales_markets (market_zone);
CREATE UNIQUE INDEX IF NOT EXISTS uix_models_sales_markets_relation ON models_sales_markets_re

INSERT
INTO sales_markets (market_zone) VALUES
('Europe'),
('Russia'),
('Asia'),
('China'),
('USA'),
('South America'),
('Africa');

INSERT
INTO body_type (name) VALUES
('Hatchback'),
('Coupe'),
('Sedan'),
('Station wagon'),
('Kammback'),
('Cabriolet'),
('Roadster'),
('Targa'),
('CrossOver'),
('Jeep'),
('Pickup'),
('Limousine'),
('Minivan'),
('Campervan');

INSERT
INTO companies (name, office, factory, creation_date, count_of_workers) VALUES
('Volkswagen', 'Wolfsburg', 'Wolfsburg', '28.05.1937', 670000),
('Audi', 'Ingolstadt', 'Ingolstadt', '16.07.1909', 87000),
('Porsche', 'Stuttgart', 'Zuffenhausen', '06.03.1931', 36359),
('Ford', 'Las Vegas', 'Tehas', '16.06.1903', 183000),
('BMW', 'Munich', 'Munich', '07.03.1916', 118909),
('Mercedes-Benz', 'Stuttgart', 'Sindelfingen', '28.06.1926', 145436),
('Mazda', 'Hiroshima', 'Hiroshima', '30.01.1920', 49786),
('Maserati', 'Modena', 'Modena', '01.12.1914', 1100);

INSERT
INTO models (company_id, name, release_date, body_type) VALUES
(1, 'Golf', '01.01.1974', 1),
(1, 'ID.4', '01.01.2020', 9),
(2, 'A1', '01.01.2010', 1),
(2, 'A2', '01.01.1999', 1),
(2, 'A4', '01.01.1994', 3),
(2, 'A5', '01.06.2007', 2),
(2, 'A6', '01.01.1994', 3),

```

```
(2, 'A7', '01.01.2010', 5),
(2, 'A8', '01.01.1994', 3),
(3, 'Cayenne', '01.12.2002', 9),
(3, '911', '01.01.1965', 8),
(4, 'Focus', '01.01.1998', 1),
(4, 'F-150', '01.01.1979', 11),
(5, '3 Series', '01.01.1975', 4),
(5, '7 Series', '01.01.1977', 3),
(6, 'E-Class', '01.01.1993', 3),
(6, 'A-Class', '01.01.1997', 1),
(7, 'MX-5', '01.01.1989', 7),
(7, 'RX-7', '01.01.1978', 2),
(8, 'Ghibli', '01.01.1967', 3);
```

INSERT

```
INTO models_sales_markets_relation (model_id, sales_market_id) VALUES
```

```
(1, 1),
(1, 2),
(1, 3),
(1, 4),
(1, 5),
(1, 6),
(2, 1),
(2, 2),
(2, 4),
(2, 5),
(3, 1),
(3, 2),
(3, 4),
(4, 1),
(4, 3),
(5, 1),
(5, 4),
(6, 1),
(6, 2),
(6, 4),
(6, 5),
(7, 1),
(7, 2),
(7, 3),
(7, 4),
(7, 5),
(7, 7),
(8, 1),
(8, 2),
(8, 3),
(8, 4),
(8, 5),
(8, 7),
(9, 1),
(9, 2),
(9, 5),
(10, 1),
```

```
(10, 2),  
(10, 4),  
(10, 5),  
(11, 1),  
(11, 2),  
(11, 4),  
(11, 5),  
(12, 1),  
(12, 2),  
(12, 5),  
(12, 6),  
(12, 7),  
(13, 5),  
(13, 6),  
(14, 1),  
(14, 2),  
(14, 4),  
(14, 5),  
(15, 1),  
(15, 4),  
(15, 5),  
(16, 1),  
(16, 2),  
(16, 5),  
(17, 1),  
(17, 2),  
(18, 1),  
(18, 3),  
(18, 4),  
(18, 5),  
(18, 6),  
(18, 7),  
(19, 3),  
(19, 4),  
(20, 1),  
(20, 2),  
(20, 5);
```

Запросы к базе данных "Автомобильный журнал"

Реляционные и булевые операторы

Запрос 1:

- Назначение: Узнать компании, в которых количество работников меньше 100К человек

- Запрос:

```
SELECT * from companies where count_of_workers < 100000
```

- Результат:

	id [PK] bigint	name character varying (255)	office character varying (255)	factory character varying (255)	creation_date date	count_of_workers integer
1	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000
2	3	Porsche	Stuttgart	Zuffenhausen	1931-03-06	36359
3	7	Mazda	Hiroshima	Hiroshima	1920-01-30	49786
4	8	Maserati	Modena	Modena	1914-12-01	1100

Запрос 2:

- Назначение: Узнать компании, в которых количество работников больше 100К человек и они были образованы после конца первой мировой войны
- Запрос:

```
SELECT * from companies where count_of_workers > 100000 AND creation_date > '11.11.1918'
```

- Результат:

	id [PK] bigint	name character varying (255)	office character varying (255)	factory character varying (255)	creation_date date	count_of_workers integer
1	1	Volkswagen	Wolfsburg	Wolfsburg	1937-05-28	670000
2	6	Mercedes-Benz	Stuttgart	Sindelfingen	1926-06-28	145436

Запрос 3:

- Назначение: Узнать компании, в которых количество работников не меньше 50К человек, а также головной офис и завод компании находятся в одном городе
- Запрос:

```
SELECT * from companies where NOT count_of_workers < 50000 AND office = factory
```

- Результат:

	id [PK] bigint	name character varying (255)	office character varying (255)	factory character varying (255)	creation_date date	count_of_workers integer
1	1	Volkswagen	Wolfsburg	Wolfsburg	1937-05-28	670000
2	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000
3	5	BMW	Munich	Munich	1916-03-07	118909

Операторы IN BETWEEN LIKE

Запрос 1:

- Назначение: Узнать компании, головной офис которых находится в одном из перечисленных городов
- Запрос:

```
SELECT * from companies where office IN ('Wolfsburg', 'Las Vegas', 'Moscow')
```

- Результат:

	id [PK] bigint	name character varying (255)	office character varying (255)	factory character varying (255)	creation_date date	count_of_workers integer
1	1	Volkswagen	Wolfsburg	Wolfsburg	1937-05-28	670000
2	4	Ford	Las Vegas	Tehas	1903-06-16	183000

Запрос 2:

- Назначение: Узнать компании, в которых количество работников находится в диапазоне между двух значений
- Запрос:

```
SELECT * from companies where count_of_workers BETWEEN 80000 AND 500000
```

- Результат:

	id [PK] bigint	name character varying (255)	office character varying (255)	factory character varying (255)	creation_date date	count_of_workers integer
1	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000
2	4	Ford	Las Vegas	Tehas	1903-06-16	183000
3	5	BMW	Munich	Munich	1916-03-07	118909
4	6	Mercedes-Benz	Stuttgart	Sindelfingen	1926-06-28	145436

Запрос 3:

- Назначение: Узнать модели автомобилей, название которых начинается с буквы А
- Запрос:

```
SELECT * from models where name LIKE 'A%'
```

- Результат:

	id [PK] bigint	company_id bigint	name character varying (255)	release_date date	engine engine_type	engine_capacity integer	hp integer	cost integer	body_type bigint
1	3	2	A1	2010-01-01	[null]	[null]	[null]	[null]	1
2	4	2	A2	1999-01-01	[null]	[null]	[null]	[null]	1
3	5	2	A4	1994-01-01	[null]	[null]	[null]	[null]	3
4	6	2	A5	2007-06-01	[null]	[null]	[null]	[null]	2
5	7	2	A6	1994-01-01	[null]	[null]	[null]	[null]	3
6	8	2	A7	2010-01-01	[null]	[null]	[null]	[null]	5
7	9	2	A8	1994-01-01	[null]	[null]	[null]	[null]	3
8	17	6	A-Class	1997-01-01	[null]	[null]	[null]	[null]	1

Агрегирующие функции

Запрос 1:

- Назначение: Посчитать количество моделей Audi начинающихся с буквы А
- Запрос:

```
SELECT count(id) from models
where name LIKE 'A%'
AND models.company_id = (select id from companies where name = 'Audi')
```

- Результат:

	count bigint
1	7

Запрос 2:

- Назначение: Узнать среднее количество работников среди компаний с головным офисом в определённых городах
- Запрос:

```
SELECT CEIL(AVG(count_of_workers)) from companies
where office IN ('Munich', 'Hiroshima', 'Zuffenhausen')
```

- Результат:

	ceil numeric
1	84348

Запрос 3:

- Назначение: Узнать название компании с минимальным количеством работников

- Запрос:

```
SELECT name from companies
where count_of_workers = (select MIN(count_of_workers) from companies)
```

- Результат:

	name character varying (255) 
1	Maserati

Форматирование результата

Запрос 1:

- Назначение: Вывести названия моделей вместе с названием их бренда
- Запрос:

```
SELECT FORMAT( '%s %s', companies.name, models.name) from models
JOIN companies ON models.company_id = companies.id
```

- Результат:

	format	
text		
1	Volkswagen Golf	
2	Volkswagen ID.4	
3	Audi A1	
4	Audi A2	
5	Audi A4	
6	Audi A5	
7	Audi A6	
8	Audi A7	
9	Audi A8	
10	Porsche Cayenne	
11	Porsche 911	
12	Ford Focus	
13	Ford F-150	
14	BMW 3 Series	
15	BMW 7 Series	
16	Mercedes-Benz E-Class	
17	Mercedes-Benz A-Class	
18	Mazda MX-5	
19	Mazda RX-7	
20	Maserati Ghibli	

Запрос 2:

- Назначение: Вывести название компании и год её основания (только год)
- Запрос:

```
SELECT name as company, extract(year from creation_date) AS foundation_year from companies
```

- Результат:

	company character varying (255) 	foundation_year numeric 
1	Volkswagen	1937
2	Audi	1909
3	Porsche	1931
4	Ford	1903
5	BMW	1916
6	Mercedes-Benz	1926
7	Mazda	1920
8	Maserati	1914

Запрос 3:

- Назначение: Вывести название компании и дату её основания в формате ГГГГ-Мес
- Запрос:

```
SELECT name as company,
TO_CHAR(creation_date, 'YYYY-Mon') AS foundation_date from companies
```

- Результат:

	company character varying (255) 	foundation_date text 
1	Volkswagen	1937-May
2	Audi	1909-Jul
3	Porsche	1931-Mar
4	Ford	1903-Jun
5	BMW	1916-Mar
6	Mercedes-Benz	1926-Jun
7	Mazda	1920-Jan
8	Maserati	1914-Dec

Несколько таблиц в запросе

Запрос 1:

- Назначение: Вывести названия моделей и названия рынков, на которых они продаются
- Запрос:

```
SELECT models.name, sales_markets.market_zone
FROM models, sales_markets, models_sales_markets_relation
WHERE (models.id = models_sales_markets_relation.model_id
AND sales_markets.id = models_sales_markets_relation.sales_market_id)
```

- Результат:

	name character varying (255)	market_zone character varying (255)
1	Golf	Europe
2	Golf	Russia
3	Golf	Asia
4	Golf	China
5	Golf	USA
6	Golf	South America
7	ID.4	Europe
8	ID.4	Russia
9	ID.4	China
10	ID.4	USA
11	A1	Europe
12	A1	Russia
13	A1	China
14	A2	Europe
15	A2	Asia
16	A4	Europe
17	A4	China
18	A5	Europe
19	A5	Russia

59	E-Class	Europe
60	E-Class	Russia
61	E-Class	USA
62	A-Class	Europe
63	A-Class	Russia
64	MX-5	Europe
65	MX-5	Asia
66	MX-5	China
67	MX-5	USA
68	MX-5	South America
69	MX-5	Africa
70	RX-7	Asia
71	RX-7	China
72	Ghibli	Europe
73	Ghibli	Russia
74	Ghibli	USA

Запрос 2:

- Назначение: Вывести названия моделей вместе с названием их бренда
- Запрос:

```
SELECT companies.name, models.name from models, companies
WHERE companies.id = models.company_id
```

- Результат:

	name character varying (255)	name character varying (255)
1	Volkswagen	Golf
2	Volkswagen	ID.4
3	Audi	A1
4	Audi	A2
5	Audi	A4
6	Audi	A5
7	Audi	A6
8	Audi	A7
9	Audi	A8
10	Porsche	Cayenne
11	Porsche	911
12	Ford	Focus
13	Ford	F-150
14	BMW	3 Series
15	BMW	7 Series
16	Mercedes-Benz	E-Class
17	Mercedes-Benz	A-Class
18	Mazda	MX-5
19	Mazda	RX-7
20	Maserati	Ghibli

Запрос 3:

- Назначение: Вывести название компании и год релиза её самой ранней модели (из БД)
- Запрос:

```
SELECT companies.name, MIN(extract(year from models.release_date))
  FROM companies, models
 WHERE companies.id = models.company_id
 GROUP BY companies.name
```

- Результат:

	name character varying (255)	min numeric
1	Ford	1979
2	Maserati	1967
3	Porsche	1965
4	Audi	1994
5	Mercedes-Benz	1993
6	Mazda	1978
7	BMW	1975
8	Volkswagen	1974

Вложенные запросы

Запрос 1:

- Назначение: Узнать название компании с минимальным количеством работников
- Запрос:

```
SELECT name from companies
where count_of_workers = (select MIN(count_of_workers) from companies)
```

- Результат:

	name character varying (255)
1	Maserati

Запрос 2:

- Назначение: Вывести названия компаний и кол-во работников, где их количество больше среднего значения работников среди всех компаний
- Запрос:

```
SELECT name, count_of_workers from companies
where count_of_workers > (select AVG(count_of_workers) from companies)
```

- Результат:

	name character varying (255) 	count_of_workers integer 
1	Volkswagen	670000
2	Ford	183000

Запрос 3:

- Назначение: Вывести название моделей, которые были представлены спустя 70 лет после основания компании производителя
- Запрос:

```
SELECT models.name FROM models
WHERE models.release_date - (SELECT creation_date FROM companies
                             WHERE companies.id = models.company_id) > 364 * 70
```

- Результат:

	name character varying (255) 
1	ID.4
2	A1
3	A2
4	A4
5	A5
6	A6
7	A7
8	A8
9	Cayenne
10	Focus
11	F-150
12	A-Class

Связанные подзапросы

Запрос 1:

- Назначение: Вывести компании и рынки сбыта, в которых у этой компании представлено наибольшее количество моделей
- Запрос:

```
WITH companies_markets AS
(SELECT companies.name, market_zone, COUNT(market_zone) as market_models
from companies JOIN models
ON models.company_id = companies.id
JOIN models_sales_markets_relation
ON models.id = models_sales_markets_relation.model_id
JOIN sales_markets
ON sales_markets.id = models_sales_markets_relation.sales_market_id
GROUP BY companies.name, market_zone
ORDER BY companies.name)
```

```
SELECT name, market_zone from companies_markets CM1 where
market_models = (SELECT MAX(market_models) from companies_markets CM2
WHERE CM1.name = CM2.name)
```

- Результат:

	name character varying (255)	market_zone character varying (255)
1	Audi	Europe
2	BMW	China
3	BMW	Europe
4	BMW	USA
5	Ford	South America
6	Ford	USA
7	Maserati	Europe
8	Maserati	Russia
9	Maserati	USA
10	Mazda	Asia
11	Mazda	China
12	Mercedes-Benz	Europe
13	Mercedes-Benz	Russia
14	Porsche	China
15	Porsche	Europe
16	Porsche	Russia
17	Porsche	USA
18	Volkswagen	China
19	Volkswagen	Europe
20	Volkswagen	Russia
21	Volkswagen	USA

Оператор JOIN

Запрос 1:

- Назначение: Полная информация о модели и компании, которой она принадлежит
- Запрос:

```
SELECT * from companies JOIN models ON models.company_id = companies.id
```

- Результат:

	id bigint	name character varying (255)	office character varying (255)	factory character varying (255)	creation_date date	count_of_workers integer	id bigint	company_id bigint	name character varying (255)	release_date date	engine engine_type	er in
1	1	Volkswagen	Wolfsburg	Wolfsburg	1937-05-28	670000	1	1	Golf	1974-01-01	[null]	
2	1	Volkswagen	Wolfsburg	Wolfsburg	1937-05-28	670000	2	1	ID.4	2020-01-01	[null]	
3	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000	3	2	A1	2010-01-01	[null]	
4	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000	4	2	A2	1999-01-01	[null]	
5	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000	5	2	A4	1994-01-01	[null]	
6	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000	6	2	A5	2007-06-01	[null]	
7	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000	7	2	A6	1994-01-01	[null]	
8	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000	8	2	A7	2010-01-01	[null]	
9	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000	9	2	A8	1994-01-01	[null]	
10	3	Porsche	Stuttgart	Zuffenhausen	1931-03-06	36359	10	3	Cayenne	2002-12-01	[null]	
11	3	Porsche	Stuttgart	Zuffenhausen	1931-03-06	36359	11	3	911	1965-01-01	[null]	
12	4	Ford	Las Vegas	Tehas	1903-06-16	183000	12	4	Focus	1998-01-01	[null]	
13	4	Ford	Las Vegas	Tehas	1903-06-16	183000	13	4	F-150	1979-01-01	[null]	
14	5	BMW	Munich	Munich	1916-03-07	118909	14	5	3 Series	1975-01-01	[null]	
15	5	BMW	Munich	Munich	1916-03-07	118909	15	5	7 Series	1977-01-01	[null]	
16	6	Mercedes-Benz	Stuttgart	Sindelfingen	1926-06-28	145436	16	6	E-Class	1993-01-01	[null]	
17	6	Mercedes-Benz	Stuttgart	Sindelfingen	1926-06-28	145436	17	6	A-Class	1997-01-01	[null]	
18	7	Mazda	Hiroshima	Hiroshima	1920-01-30	49786	18	7	MX-5	1989-01-01	[null]	
19	7	Mazda	Hiroshima	Hiroshima	1920-01-30	49786	19	7	RX-7	1978-01-01	[null]	
20	8	Maserati	Modena	Modena	1914-12-01	1100	20	8	Ghibli	1967-01-01	[null]	

Запрос 2:

- Назначение: Вывод названия моделей и их рынков сбыта
- Запрос:

```
SELECT models.name, market_zone FROM models JOIN models_sales_markets_relation
ON models.id = models_sales_markets_relation.model_id
JOIN sales_markets ON sales_markets.id = models_sales_markets_relation.sales_market_id
```

- Результат:

	name character varying (255) 	market_zone character varying (255) 
1	Golf	Europe
2	Golf	Russia
3	Golf	Asia
4	Golf	China
5	Golf	USA
6	Golf	South America
7	ID.4	Europe
8	ID.4	Russia
9	ID.4	China
10	ID.4	USA
11	A1	Europe
12	A1	Russia
13	A1	China
14	A2	Europe
15	A2	Asia
16	A4	Europe
17	A4	China
18	A5	Europe
19	A5	Russia
20	A5	China
21	A5	USA
22	A6	Europe
23	A6	Russia

	name character varying (255)	market_zone character varying (255)
52	3 Series	Europe
53	3 Series	Russia
54	3 Series	China
55	3 Series	USA
56	7 Series	Europe
57	7 Series	China
58	7 Series	USA
59	E-Class	Europe
60	E-Class	Russia
61	E-Class	USA
62	A-Class	Europe
63	A-Class	Russia
64	MX-5	Europe
65	MX-5	Asia
66	MX-5	China
67	MX-5	USA
68	MX-5	South America
69	MX-5	Africa
70	RX-7	Asia
71	RX-7	China
72	Ghibli	Europe
73	Ghibli	Russia
74	Ghibli	USA

Запрос 3:

- Назначение: Вывести компании и кол-во представленных ими моделей на каждом из рынков сбыта
- Запрос:

```
WITH companies_markets AS
(SELECT companies.name, market_zone, COUNT(market_zone) as market_models
from companies JOIN models
ON models.company_id = companies.id
JOIN models_sales_markets_relation
```

```

ON models.id = models_sales_markets_relation.model_id
JOIN sales_markets
ON sales_markets.id = models_sales_markets_relation.sales_market_id
GROUP BY companies.name, market_zone
ORDER BY companies.name)

```

```
SELECT * from companies_markets
```

- Результат:

	name character varying (255) 	market_zone character varying (255) 	market_models bigint 
1	Audi	Africa	2
2	Audi	Asia	3
3	Audi	China	5
4	Audi	Europe	7
5	Audi	Russia	5
6	Audi	USA	4
7	BMW	China	2
8	BMW	Europe	2
9	BMW	Russia	1
10	BMW	USA	2
11	Ford	Africa	1
12	Ford	Europe	1
13	Ford	Russia	1
14	Ford	South America	2
15	Ford	USA	2
16	Maserati	Europe	1
17	Maserati	Russia	1
18	Maserati	USA	1
19	Mazda	Africa	1
20	Mazda	Asia	2

Операторы EXIST ANY ALL SOME

Запрос 1:

- Назначение: Полная информация о моделях и рынках сбыта, если среди моделей есть названия начинающиеся с А
- Запрос:

```
WITH models_markets AS (SELECT * from models
JOIN models_sales_markets_relation
ON models.id = models_sales_markets_relation.model_id)
```

```
SELECT * from models_markets
where EXISTS(select *
            from models_markets
            where name LIKE 'A%')
```

- Результат:

	id bigint	company_id bigint	name character varying (255)	release_date date	engine engine_type	engine_capacity integer	hp integer	cost integer	body_type bigint	id bigint	model_id bigint	sales_market_id bigint
1	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1	1	1	1
2	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1	2	1	2
3	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1	3	1	3
4	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1	4	1	4
5	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1	5	1	5
6	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1	6	1	6
7	2	1	ID.4	2020-01-01	[null]	[null]	[null]	[null]	9	7	2	1
8	2	1	ID.4	2020-01-01	[null]	[null]	[null]	[null]	9	8	2	2
9	2	1	ID.4	2020-01-01	[null]	[null]	[null]	[null]	9	9	2	4
10	2	1	ID.4	2020-01-01	[null]	[null]	[null]	[null]	9	10	2	5
11	3	2	A1	2010-01-01	[null]	[null]	[null]	[null]	1	11	3	1
12	3	2	A1	2010-01-01	[null]	[null]	[null]	[null]	1	12	3	2

Запрос 2:

- Назначение: Вывод информации о моделях, продаваемых на азиатском рынке (включая Китай)
- Запрос:

```
WITH models_markets AS (SELECT * from models
JOIN models_sales_markets_relation
ON models.id = models_sales_markets_relation.model_id)
```

```
SELECT * from models_markets
where sales_market_id = ANY(select id from sales_markets
                            where market_zone IN ('Asia', 'China'))
```

- Результат:

	id bigint	company_id bigint	name character varying (255)	release_date date	engine engine_type	engine_capacity integer	hp integer	cost integer	body_type bigint	id bigint	model_id bigint	sales_market_id bigint
1	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1	3	1	3
2	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1	4	1	4
3	2	1	ID.4	2020-01-01	[null]	[null]	[null]	[null]	9	9	2	4
4	3	2	A1	2010-01-01	[null]	[null]	[null]	[null]	1	13	3	4
5	4	2	A2	1999-01-01	[null]	[null]	[null]	[null]	1	15	4	3
6	5	2	A4	1994-01-01	[null]	[null]	[null]	[null]	3	17	5	4
7	6	2	A5	2007-06-01	[null]	[null]	[null]	[null]	2	20	6	4
8	7	2	A6	1994-01-01	[null]	[null]	[null]	[null]	3	24	7	3
9	7	2	A6	1994-01-01	[null]	[null]	[null]	[null]	3	25	7	4
10	8	2	A7	2010-01-01	[null]	[null]	[null]	[null]	5	30	8	3
11	8	2	A7	2010-01-01	[null]	[null]	[null]	[null]	5	31	8	4
12	10	3	Cayenne	2002-12-01	[null]	[null]	[null]	[null]	9	39	10	4
13	11	3	911	1965-01-01	[null]	[null]	[null]	[null]	8	43	11	4
14	14	5	3 Series	1975-01-01	[null]	[null]	[null]	[null]	4	54	14	4
15	15	5	7 Series	1977-01-01	[null]	[null]	[null]	[null]	3	57	15	4
16	18	7	MX-5	1989-01-01	[null]	[null]	[null]	[null]	7	65	18	3
17	18	7	MX-5	1989-01-01	[null]	[null]	[null]	[null]	7	66	18	4
18	19	7	RX-7	1978-01-01	[null]	[null]	[null]	[null]	2	70	19	3
19	19	7	RX-7	1978-01-01	[null]	[null]	[null]	[null]	2	71	19	4

Запрос 3:

- Назначение: Вывести компании, которые были созданы позже ВСЕХ компаний, кол-во сотрудников которых не более 100К
- Запрос:

```
SELECT name from companies
where creation_date >
ALL(SELECT creation_date from companies where count_of_workers <= 100000)
```

- Результат:

name character varying (255)	
1	Volkswagen

Запрос 4:

- Назначение: Вывести модели, которые произведены компаниями с количеством работников не более 100К
- Запрос:

```
SELECT name from models
where company_id =
SOME(SELECT id from companies where count_of_workers <= 100000)
```

- Результат:

	name character varying (255)
1	A1
2	A2
3	A4
4	A5
5	A6
6	A7
7	A8
8	Cayenne
9	911
10	MX-5
11	RX-7
12	Ghibli

Операторы UNION INTERSECT EXCEPT

Запрос 1:

- Назначение: Совмещение результатов двух запросов поиска моделей по id компании
- Запрос:

```
SELECT * FROM models WHERE company_id IN (1, 2)
UNION
SELECT * FROM models WHERE company_id IN (2, 3)
```

- Результат:

	id bigint	company_id bigint	name character varying (255)	release_date date	engine engine_type	engine_capacity integer	hp integer	cost integer	body_type bigint
1	6	2	A5	2007-06-01	[null]	[null]	[null]	[null]	2
2	5	2	A4	1994-01-01	[null]	[null]	[null]	[null]	3
3	10	3	Cayenne	2002-12-01	[null]	[null]	[null]	[null]	9
4	4	2	A2	1999-01-01	[null]	[null]	[null]	[null]	1
5	3	2	A1	2010-01-01	[null]	[null]	[null]	[null]	1
6	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1
7	7	2	A6	1994-01-01	[null]	[null]	[null]	[null]	3
8	9	2	A8	1994-01-01	[null]	[null]	[null]	[null]	3
9	8	2	A7	2010-01-01	[null]	[null]	[null]	[null]	5
10	2	1	ID.4	2020-01-01	[null]	[null]	[null]	[null]	9
11	11	3	911	1965-01-01	[null]	[null]	[null]	[null]	8

Запрос 2:

- Назначение: Исключение результатов второго запроса из первого
- Запрос:

```
SELECT * FROM models WHERE company_id IN (1, 2)
EXCEPT
SELECT * FROM models WHERE company_id IN (2, 3)
```

- Результат:

	id bigint	company_id bigint	name character varying (255)	release_date date	engine engine_type	engine_capacity integer	hp integer	cost integer	body_type bigint
1	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1
2	2	1	ID.4	2020-01-01	[null]	[null]	[null]	[null]	9

Запрос 3:

- Назначение: Пересечение результатов двух запросов поиска моделей по id компании
- Запрос:

```
SELECT * FROM models WHERE company_id IN (1, 2)
INTERSECT
SELECT * FROM models WHERE company_id IN (2, 3)
```

- Результат:

	id bigint	company_id bigint	name character varying (255)	release_date date	engine engine_type	engine_capacity integer	hp integer	cost integer	body_type bigint
1	6	2	A5	2007-06-01	[null]	[null]	[null]	[null]	2
2	5	2	A4	1994-01-01	[null]	[null]	[null]	[null]	3
3	4	2	A2	1999-01-01	[null]	[null]	[null]	[null]	1
4	3	2	A1	2010-01-01	[null]	[null]	[null]	[null]	1
5	7	2	A6	1994-01-01	[null]	[null]	[null]	[null]	3
6	9	2	A8	1994-01-01	[null]	[null]	[null]	[null]	3
7	8	2	A7	2010-01-01	[null]	[null]	[null]	[null]	5

Оператор GROUP BY

Запрос 1:

- Назначение: Количество моделей для каждого типа кузова
- Запрос:

```
SELECT body_type.name, COUNT(*) FROM models
JOIN body_type ON models.body_type = body_type.id
GROUP BY body_type.name
```

- Результат:

	name character varying (255)	count bigint
1	Station wagon	1
2	Kammback	1
3	Coupe	2
4	CrossOver	2
5	Sedan	6
6	Pickup	1
7	Hatchback	5
8	Roadster	1
9	Targa	1

Запрос 2:

- Назначение: Количество моделей у каждой компании
- Запрос:

```
SELECT companies.name, count(models.id) FROM models JOIN companies
ON models.company_id = companies.id
GROUP BY companies.name
```

- Результат:

	name character varying (255)	count bigint
1	Ford	2
2	Maserati	1
3	Porsche	2
4	Audi	7
5	Mercedes-Benz	2
6	Mazda	2
7	BMW	2
8	Volkswagen	2

Запрос 3:

- Назначение: Город в котором находится завод и максимальное кол-во работников компании, завод которой находится в этом городе
- Запрос:

```
SELECT factory, MAX(count_of_workers) from models JOIN companies
ON models.company_id = companies.id
GROUP BY factory
```

- Результат:

	factory character varying (255)	max integer
1	Munich	118909
2	Sindelfingen	145436
3	Modena	1100
4	Wolfsburg	670000
5	Zuffenhausen	36359
6	Hiroshima	49786
7	Ingolstadt	87000
8	Tehas	183000

Оператор ORDER BY

Запрос 1:

- Назначение: Отсортировать компании от новых к старым
- Запрос:

```
SELECT * from companies
ORDER BY creation_date DESC
```

- Результат:

	id [PK] bigint	name character varying (255)	office character varying (255)	factory character varying (255)	creation_date date	count_of_workers integer
1	1	Volkswagen	Wolfsburg	Wolfsburg	1937-05-28	670000
2	3	Porsche	Stuttgart	Zuffenhausen	1931-03-06	36359
3	6	Mercedes-Benz	Stuttgart	Sindelfingen	1926-06-28	145436
4	7	Mazda	Hiroshima	Hiroshima	1920-01-30	49786
5	5	BMW	Munich	Munich	1916-03-07	118909
6	8	Maserati	Modena	Modena	1914-12-01	1100
7	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000
8	4	Ford	Las Vegas	Tehas	1903-06-16	183000

Запрос 2:

- Назначение: Отсортировать компании по количеству работников по убыванию
- Запрос:

```
SELECT * from companies
ORDER BY count_of_workers DESC
```

- Результат:

	id [PK] bigint	name character varying (255)	office character varying (255)	factory character varying (255)	creation_date date	count_of_workers integer
1	1	Volkswagen	Wolfsburg	Wolfsburg	1937-05-28	670000
2	4	Ford	Las Vegas	Tehas	1903-06-16	183000
3	6	Mercedes-Benz	Stuttgart	Sindelfingen	1926-06-28	145436
4	5	BMW	Munich	Munich	1916-03-07	118909
5	2	Audi	Ingolstadt	Ingolstadt	1909-07-16	87000
6	7	Mazda	Hiroshima	Hiroshima	1920-01-30	49786
7	3	Porsche	Stuttgart	Zuffenhausen	1931-03-06	36359
8	8	Maserati	Modena	Modena	1914-12-01	1100

Запрос 3:

- Назначение: Отсортировать модели в алфавитном порядке их названия
- Запрос:

```
SELECT * from models
ORDER BY name
```

- Результат:

	id [PK] bigint	company_id bigint	name character varying (255)	release_date date	engine engine_type	engine_capacity integer	hp integer	cost integer	body_type bigint
1	14	5	3 Series	1975-01-01	[null]	[null]	[null]	[null]	4
2	15	5	7 Series	1977-01-01	[null]	[null]	[null]	[null]	3
3	11	3	911	1965-01-01	[null]	[null]	[null]	[null]	8
4	17	6	A-Class	1997-01-01	[null]	[null]	[null]	[null]	1
5	3	2	A1	2010-01-01	[null]	[null]	[null]	[null]	1
6	4	2	A2	1999-01-01	[null]	[null]	[null]	[null]	1
7	5	2	A4	1994-01-01	[null]	[null]	[null]	[null]	3
8	6	2	A5	2007-06-01	[null]	[null]	[null]	[null]	2
9	7	2	A6	1994-01-01	[null]	[null]	[null]	[null]	3
10	8	2	A7	2010-01-01	[null]	[null]	[null]	[null]	5
11	9	2	A8	1994-01-01	[null]	[null]	[null]	[null]	3
12	10	3	Cayenne	2002-12-01	[null]	[null]	[null]	[null]	9
13	16	6	E-Class	1993-01-01	[null]	[null]	[null]	[null]	3
14	13	4	F-150	1979-01-01	[null]	[null]	[null]	[null]	11
15	12	4	Focus	1998-01-01	[null]	[null]	[null]	[null]	1
16	20	8	Ghibli	1967-01-01	[null]	[null]	[null]	[null]	3
17	1	1	Golf	1974-01-01	[null]	[null]	[null]	[null]	1
18	2	1	ID.4	2020-01-01	[null]	[null]	[null]	[null]	9
19	18	7	MX-5	1989-01-01	[null]	[null]	[null]	[null]	7
20	19	7	RX-7	1978-01-01	[null]	[null]	[null]	[null]	2

Выражение CASE

Запрос 1:

- Назначение: Определение и характеристика моделей, которые появились в 2000 или раньше
- Запрос:

```
SELECT name, release_date,
CASE
    WHEN release_date > '1999-12-30' THEN '20XX'
    ELSE '19XX'
END AS age
FROM models
```

- Результат:

	name character varying (255) 	release_date date 	age text 
1	Golf	1974-01-01	19XX
2	ID.4	2020-01-01	20XX
3	A1	2010-01-01	20XX
4	A2	1999-01-01	19XX
5	A4	1994-01-01	19XX
6	A5	2007-06-01	20XX
7	A6	1994-01-01	19XX
8	A7	2010-01-01	20XX
9	A8	1994-01-01	19XX
10	Cayenne	2002-12-01	20XX
11	911	1965-01-01	19XX
12	Focus	1998-01-01	19XX
13	F-150	1979-01-01	19XX
14	3 Series	1975-01-01	19XX
15	7 Series	1977-01-01	19XX
16	E-Class	1993-01-01	19XX
17	A-Class	1997-01-01	19XX
18	MX-5	1989-01-01	19XX
19	RX-7	1978-01-01	19XX
20	Ghibli	1967-01-01	19XX

Команды UPDATE INSERT DELETE

Запрос 1:

- Назначение: Добавление рынков сбыта
- Запрос:

INSERT

```
INTO sales_markets (market_zone) VALUES
('Europe'),
('Russia'),
('Asia'),
('China'),
('USA'),
```

```
('South America'),  
('Africa');
```

- Результат: INSERT 7

Запрос 2:

- Назначение: удаление начинающихся с А рынков
- Запрос:

```
DELETE FROM sales_markets WHERE market_zone LIKE 'A%'
```

- Результат: DELETE 2

Запрос 3:

- Назначение: Изменение названия рынка сбыта
- Запрос:

```
UPDATE sales_markets  
SET market_zone = 'RUS'  
WHERE market_zone = 'Russia'
```

- Результат: UPDATE 1