ОТЧЁТ
по дисциплине «Проектирование баз знаний»
Лабораторная работа №1
Вариант 5

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Создание и заполнение таблиц:

```sql
CREATE TABLE suppliers (
    id SERIAL PRIMARY KEY NOT NULL,
    name VARCHAR(30) NOT NULL,
    status INTEGER NOT NULL,
    city VARCHAR(30) NOT NULL
);

CREATE TABLE products (
    id SERIAL PRIMARY KEY NOT NULL,
    name VARCHAR(30) NOT NULL,
    color VARCHAR(30) NOT NULL,
    size INTEGER NOT NULL,
    city VARCHAR(30) NOT NULL
);

CREATE TABLE projects (
    id SERIAL PRIMARY KEY NOT NULL,
    name VARCHAR(30) NOT NULL,
    city VARCHAR(30) NOT NULL
);

CREATE TABLE counts (
    supplier_id INTEGER NOT NULL,
    product_id INTEGER NOT NULL,
    project_id INTEGER NOT NULL,
    count INTEGER NOT NULL,
    FOREIGN KEY (supplier_id) REFERENCES suppliers(id),
    FOREIGN KEY (product_id) REFERENCES products(id),
    FOREIGN KEY (product_id) REFERENCES products(id)
);
```

```sql
INSERT INTO suppliers(name, status, city) VALUES ( name 'Петров', status 20, city 'Москва');
INSERT INTO suppliers(name, status, city) VALUES ( name 'Синицин', status 10, city 'Таллинн');
INSERT INTO suppliers(name, status, city) VALUES ( name 'Федоров', status 30, city 'Таллинн');
INSERT INTO suppliers(name, status, city) VALUES ( name 'Чаянов', status 20, city 'Минск');
INSERT INTO suppliers(name, status, city) VALUES ( name 'Крюков', status 30, city 'Киев');

INSERT INTO products(name, color, size, city) VALUES ( name 'Болт', color 'Красный', size 12, city 'Москва');
INSERT INTO products(name, color, size, city) VALUES ( name 'Гайка', color 'Зеленый', size 17, city 'Минск');
INSERT INTO products(name, color, size, city) VALUES ( name 'Диск', color 'Черный', size 17, city 'Вильнюс');
INSERT INTO products(name, color, size, city) VALUES ( name 'Диск', color 'Черный', size 14, city 'Москва');
INSERT INTO products(name, color, size, city) VALUES ( name 'Корпус', color 'Красный', size 12, city 'Минск');
INSERT INTO products(name, color, size, city) VALUES ( name 'Крышки', color 'Красный', size 19, city 'Москва');

INSERT INTO projects(name, city) VALUES ( name 'ИПР1', city 'Минск');
INSERT INTO projects(name, city) VALUES ( name 'ИПР2', city 'Таллинн');
INSERT INTO projects(name, city) VALUES ( name 'ИПР3', city 'Псков');
INSERT INTO projects(name, city) VALUES ( name 'ИПР4', city 'Псков');
INSERT INTO projects(name, city) VALUES ( name 'ИПР5', city 'Москва');
INSERT INTO projects(name, city) VALUES ( name 'ИПР6', city 'Саратов');
INSERT INTO projects(name, city) VALUES ( name 'ИПР7', city 'Москва');

INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 1, product_id 1, project_id 1, count 200);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 1, product_id 1, project_id 2, count 700);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 2, product_id 3, project_id 1, count 400);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 2, product_id 3, project_id 2, count 200);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 2, product_id 3, project_id 3, count 200);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 2, product_id 3, project_id 4, count 500);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 2, product_id 3, project_id 5, count 600);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 2, product_id 3, project_id 6, count 400);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 2, product_id 3, project_id 7, count 800);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 2, product_id 5, project_id 2, count 100);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 3, product_id 3, project_id 1, count 200);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 3, product_id 4, project_id 2, count 500);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 4, product_id 6, project_id 3, count 300);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 4, product_id 6, project_id 7, count 300);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 2, project_id 2, count 200);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 2, project_id 4, count 100);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 5, project_id 5, count 500);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 5, project_id 7, count 100);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 6, project_id 2, count 200);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 1, project_id 2, count 100);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 3, project_id 4, count 200);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 4, project_id 4, count 800);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 5, project_id 4, count 400);
INSERT INTO counts(supplier_id, product_id, project_id, count) VALUES ( supplier_id 5, product_id 6, project_id 4, count 500);
```

Задание 1

```sql
SELECT p.id
FROM projects AS p
WHERE p.id NOT IN (
    SELECT DISTINCT c.project_id
    FROM counts AS c
    JOIN suppliers AS s  1..n<->1: ON c.supplier_id = s.id
    JOIN products AS pr  1..n<->1: ON c.product_id = pr.id
    WHERE s.city = 'Минск' AND pr.color = 'Красный'
);
```

id
1
2
4
5
6

Задание 2

```sql
SELECT COUNT(DISTINCT counts.project_id) AS total FROM counts
WHERE supplier_id = '1';
```

total
2

Задание 3

```sql
SELECT DISTINCT s.id
FROM suppliers AS s
WHERE EXISTS (
    SELECT 1
    FROM counts AS c1
    JOIN products AS p1  1..n<->1: ON c1.product_id = p1.id
    WHERE c1.supplier_id = s.id
    AND p1.id IN (
        SELECT DISTINCT c2.product_id
        FROM counts AS c2
        JOIN products AS p2  1..n<->1: ON c2.product_id = p2.id
        WHERE c2.supplier_id IN (
            SELECT DISTINCT c3.supplier_id
            FROM counts AS c3
            JOIN products AS p3  1..n<->1: ON c3.product_id = p3.id
            WHERE p3.color = 'Красный'
        )
    )
);
```

id
3
5
4
2
1

Задание 4

```sql
SELECT DISTINCT c.product_id
FROM counts c
JOIN suppliers s  1..n<->1: ON c.supplier_id = s.id
JOIN projects p  1..n<->1: ON c.project_id = p.id
WHERE s.city = 'Минск' AND p.city = 'Минск';
```
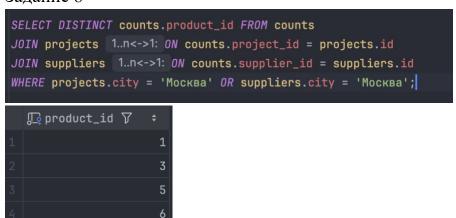
product_id

Задание 5

```sql
SELECT supplier_id FROM counts
WHERE project_id = 1;
```

	supplier_id
1	1
2	2
3	3

Задание 6

```sql
SELECT color, city FROM products;
```

	color	city
1	Красный	Москва
2	Зеленый	Минск
3	Черный	Вильнюс
4	Черный	Москва
5	Красный	Минск
6	Красный	Москва

Задание 7

```sql
SELECT DISTINCT counts.product_id FROM counts
JOIN suppliers  1..n<->1: ON counts.supplier_id = suppliers.id
WHERE suppliers.city = 'Минск';
```

	product_id
1	6

Задание 8

```sql
SELECT DISTINCT counts.product_id FROM counts
JOIN projects  1..n<->1: ON counts.project_id = projects.id
JOIN suppliers  1..n<->1: ON counts.supplier_id = suppliers.id
WHERE projects.city = 'Москва' OR suppliers.city = 'Москва';
```

	product_id
1	1
2	3
3	5
4	6

Задание 9

```sql
SELECT DISTINCT
    c1.product_id AS product_id1,
    c2.product_id AS product_id2
FROM counts c1
JOIN counts c2 ON c1.supplier_id = c2.supplier_id AND c1.product_id < c2.product_id
```

	product_id1	product_id2
1	1	3
2	4	6
3	3	4
4	1	2
5	2	3
6	3	5
7	1	5
8	2	5
9	1	4
10	5	6
11	4	5
12	1	6
13	2	6
14	2	4
15	3	6

Задание 10

project_id

```sql
WITH SupplierProjects AS (
    SELECT
        c.project_id,
        COUNT(DISTINCT c.product_id) AS total_products
    FROM counts AS c
    WHERE c.supplier_id = 1
    GROUP BY c.project_id
),
AllProducts AS (
    SELECT
        c.project_id,
        COUNT(DISTINCT c.product_id) AS total_products
    FROM counts AS c
    GROUP BY c.project_id
)
SELECT sp.project_id
FROM SupplierProjects AS sp
JOIN AllProducts ap ON sp.project_id = ap.project_id
WHERE sp.total_products = ap.total_products;
```