

CREATING SQL QUESTIONS IN RELATIONAL DATABASES

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Annotation: The article outlines the methods for creating SQL queries in relational databases. The relational database model is considered using the example of the Kokand Pedagogical Institute. Examples are given for compiling simple queries and sub queries in SQL using the SELECT statement.

Keywords and expressions: SQL SELECT statement, simple queries, sub queries, internal sub query, external query.

Currently, SQL (Structured Query Language) is the most popular database language. In everyday life we have to work with databases, the SQL language is designed specifically for this. Every time you select a name from your email address book, you are accessing a database. And even when you insert your plastic card into an ATM, the PIN code and account balance are checked through the database [Forta2014].

Let's consider the relational model using the example of the Kokand Pedagogical Institute. Let's start by drawing up a relational conceptual diagram.

A conceptual diagram is a description of the logical structure of the entire database. The conceptual diagram of a pedagogical institute includes 6 relationships called ЗДАНИЕ, ФАКУЛЬТЕТ, ЗАНЯТИЯ, ПРЕДМЕТ, ГРУППА, ЭКЗАМЕН (BUILDING, FACULTY, CLASSES, SUBJECT, GROUP and EXAM).

Below is a relational conceptual diagram of the information model of the pedagogical institute:



A relational database that conforms to this conceptual schema looks like this:

ЗДАНИЕ

1	Турон 23
2	Турон 24
3	Уста Бозор 16
4	Вакф чорси 21

ФАКУЛЬТЕТ

М	Математика	2
Ф	Физика	3
Ж	Физическая культура	4
ФГ	Филология	1

ЗАНЯТИЯ

2	М
1	ФГ
3	Ф
4	Ж

ГРУППА

М	1	1	Акбаров
Ф	2	3	Иномов
ФГ	3	2	Каримова
Ж	2	2	Пулатов

ПРЕДМЕТ

Ф-1	Астрономия
Ф-2	Физика твердых тел
М-8	Математический анализ
Ф-4	Философия
М-4	Высшая алгебра
М-2	Геометрия

ЭКЗАМЕН

М-8	М	1	8.06.14	Акбаров
Ф-2	Ф	4	5.06.14	Иномов
Ф-4	ФГ	3	18.06.14	Закирова
Ф-1	Ф	5	15.06.14	Иномов
М-4	М	8	20.06.14	Солиев
М-2	М	4	22.06.14	Джураев

The relational conceptual diagram of the information model of the pedagogical institute is depicted using a cluster (see Fig. 1). In this conceptual diagram, domain objects are depicted in the form of tables that differ from each other geometrically.

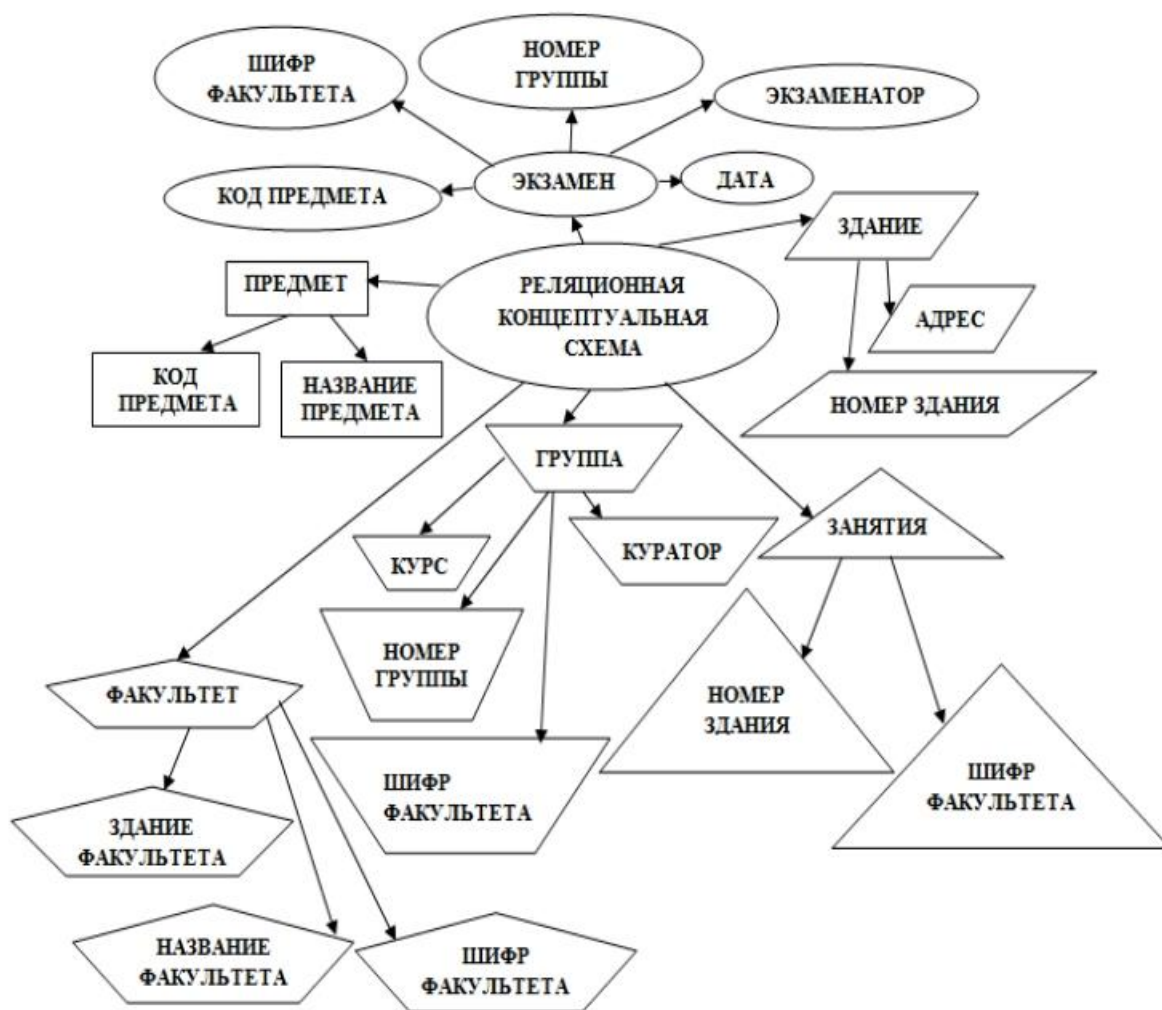


Fig.1. Relational Conceptual Diagram

Most often the task arises of building queries to retrieve data. For these purposes, the SQL SELECT statement is used. The SELECT statement is designed to retrieve one or more columns from a table. To use a SELECT statement to retrieve data from a table, you need to specify at least two things: what exactly you want to retrieve and from where.

Let's start with a simple SELECT statement.

Example1. It is required to obtain the keys of all exams taken by Иномов at the Faculty of Ф.

To solve this problem, you can write the following query:

```
SELECT КОД_ПРЕДМЕТА, ШИФР_ФАКУЛЬТЕТА, НОМЕР_
ГРУППЫ
FROM ЭКЗАМЕН
WHERE ЭКЗАМЕНАТОР= 'Иномов' AND
ШИФР_ФАКУЛЬТЕТА='Ф';
```

The result of this query:

КОД_ПРЕДМЕТА	ШИФР_ФАКУЛЬТЕТА	НОМЕР_ГРУППЫ
-----	-----	-----
Ф-2	Ф	4
Ф-1	Ф	5

Many statements are simple queries: individual statements retrieve data from specific tables. To retrieve data from multiple tables, SQL uses sub queries: queries that are nested within other queries.

Example2. Find the numbers of all buildings in which second-year groups can study.

To solve this problem, you can write the following sub query:

```
SELECT НОМЕР_ЗДАНИЯ
FROM ЗАНЯТИЯ
WHERE ШИФР_ФАКУЛЬТЕТА IN (SELECT ШИФР_ФАКУЛЬТЕТА
                             FROM ГРУППА
                             WHERE КУРС =2);
```

Sub queries are always processed starting with the innermost SELECT statement and working from the inside out. When processing the previous statement, the Database management systems actually perform two operations.

First it executes the inner sub query:

```
SELECT ШИФР_ФАКУЛЬТЕТА FROM ГРУППА WHERE КУРС =2
```

Result of the inner subquery:

```
ШИФР_ФАКУЛЬТЕТА
-----
ФГ
Ж
```

The inner sub query returns two department ciphers: ФГ and Ж, which are then used as the WHERE clause of the outer query in the comma-delimited format required by the IN operator.

Now the outer request becomes like this:

```
SELECT НОМЕР_ЗДАНИЯ FROM ЗАНЯТИЯ WHERE
ШИФР_ФАКУЛЬТЕТА IN (ФГ,Ж)
```

The outer layer query returns the data sought:

```
НОМЕР_ЗДАНИЯ
-----
```

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