**Exercises from sql-ex.ru**

**Made by Vukolov Rodion**

**Databases:**

**1. Computer firm**

The database scheme consists of four tables:

**Product** (maker, model, type)

**PC** (code, model, speed, ram, hd, cd, price)

**Laptop** (code, model, speed, ram, hd, screen, price)

**Printer** (code, model, color, type, price)

The Product table contains data on the maker, model number, and type of product ('PC', 'Laptop', or 'Printer'). It is assumed that model numbers in the Product table are unique for all makers and product types. Each personal computer in the PC table is unambiguously identified by a unique code and is additionally characterized by its model (foreign key referring to the Product table), processor speed (in MHz) – speed field, RAM capacity (in Mb) - ram, hard disk drive capacity (in Gb) – hd, CD-ROM speed (e.g, '4x') - cd, and its price. The Laptop table is similar to the PC table, except that instead of the CD-ROM speed, it contains the screen size (in inches) – screen. For each printer model in the Printer table, its output type (‘y’ for color and ‘n’ for monochrome) – color field, printing technology ('Laser', 'Jet', or 'Matrix') – type, and price are specified.

Изображение выглядит как стол

Автоматически созданное описание

**3. Ships**

The database of naval ships that took part in World War II is under consideration. The database consists of the following relations:

**Classes** (class, type, country, numGuns, bore, displacement)

**Ships** (name, class, launched)

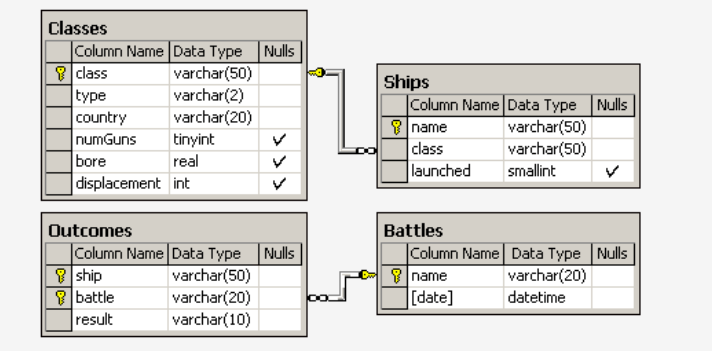
**Battles** (name, date)

**Outcomes** (ship, battle, result)

Ships in classes all have the same general design. A class is normally assigned either the name of the first ship built according to the corresponding design, or a name that is different from any ship name in the database. The ship whose name is assigned to a class is called a lead ship.

The Classes relation includes the name of the class, type (can be either bb for a battle ship, or bc for a battle cruiser), country the ship was built in, the number of main guns, gun caliber (bore diameter in inches), and displacement (weight in tons). The Ships relation holds information about the ship name, the name of its corresponding class, and the year the ship was launched. The Battles relation contains names and dates of battles the ships participated in, and the Outcomes relation - the battle result for a given ship (may be sunk, damaged, or OK, the last value meaning the ship survived the battle unharmed).

Notes: 1) The Outcomes relation may contain ships not present in the Ships relation. 2) A ship sunk can’t participate in later battles. 3) For historical reasons, lead ships are referred to as head ships in many exercises.4) A ship found in the Outcomes table but not in the Ships table is still considered in the database. This is true even if it is sunk.



**Exercises:**

**Exercise: 1** (Serge I: 2002-09-30)

Find the model number, speed, and hard drive capacity for all the PCs with prices below $500.

Result set: model, speed, hd.

**Query:**

SELECT model, speed, hd

FROM PC

WHERE price < 500

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 2** (Serge I: 2002-09-21)

List all printer makers. Result set: maker.

**Query:**

SELECT DISTINCT maker

FROM Product

WHERE type = 'Printer'

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 3** (Serge I: 2002-09-30)

Find the model number, RAM and screen size of the laptops with prices over $1000.

**Query:**

SELECT model, ram, screen

FROM Laptop

WHERE price > 1000

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 4** (Serge I: 2002-09-21)

Find all records from the Printer table containing data about color printers.

**Query:**

SELECT \*

FROM Printer

WHERE color = 'y'

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 5** (Serge I: 2002-09-30)

Find the model number, speed and hard drive capacity of PCs cheaper than $600 having a 12x or a 24x CD drive.

**Query:**

SELECT model, speed, hd

FROM PC

WHERE PC.cd IN ('12x','24x') AND price < 600

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 6** (Serge I: 2002-10-28)

For each maker producing laptops with a hard drive capacity of 10 Gb or higher, find the speed of such laptops. Result set: maker, speed.

**Query:**

SELECT DISTINCT maker, speed

FROM Product LEFT JOIN Laptop ON Laptop.model = Product.model

WHERE hd >= 10

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 7** (Serge I: 2002-11-02)

Get the models and prices for all commercially available products (of any type) produced by maker B.

**Query:**

SELECT DISTINCT PC.model, PC.price

FROM PC JOIN

Product ON Product.model = PC.model

WHERE maker = 'B'

UNION ALL

SELECT DISTINCT Laptop.model, Laptop.price

FROM Laptop JOIN

Product ON Product.model = Laptop.model

WHERE maker = 'B'

UNION ALL

SELECT DISTINCT Printer.model, Printer.price

FROM Printer JOIN

Product ON Product.model = Printer.model

WHERE maker = 'B'

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 8** (Serge I: 2003-02-03)

Find the makers producing PCs but not laptops.

**Query:**

SELECT DISTINCT maker

FROM Product

WHERE type = 'PC'

EXCEPT

SELECT DISTINCT maker

FROM Product

WHERE type = 'Laptop'

**Result:**



**Exercise: 9** (Serge I: 2002-11-02)

Find the makers of PCs with a processor speed of 450 MHz or more. Result set: maker.

**Query:**

SELECT DISTINCT maker AS Maker

FROM Product JOIN PC ON Product.model = PC.model

WHERE PC.speed >= 450

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 10** (Serge I: 2002-09-23)

Find the printer models having the highest price. Result set: model, price.

**Query:**

SELECT model, price

FROM Printer

WHERE price = (SELECT MAX(price)

FROM Printer

)

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 11** (Serge I: 2002-11-02)

Find out the average speed of PCs.

**Query:**

SELECT DISTINCT AVG(speed)

FROM PC

**Result:**



**Exercise: 12** (Serge I: 2002-11-02)

Find out the average speed of the laptops priced over $1000.

**Query:**

SELECT AVG(speed)

FROM Laptop

WHERE price > 1000

**Result:**



**Exercise: 13** (Serge I: 2002-11-02)

Find out the average speed of the PCs produced by maker A.

**Query:**

SELECT AVG(speed)

FROM PC JOIN Product ON Product.model = PC.model

WHERE Product.maker = 'A'

**Result:**



**Exercise: 14** (Serge I: 2002-11-05)

For the ships in the Ships table that have at least 10 guns, get the class, name, and country.

**Query:**

SELECT DISTINCT Ships.class, Ships.name, Classes.country

FROM Ships JOIN Classes ON Ships.class = Classes.class

Where Classes.numGuns >= 10

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 15** (Serge I: 2003-02-03)

Get hard drive capacities that are identical for two or more PCs.

Result set: hd.

**Query:**

SELECT hd AS HD

FROM PC

GROUP BY hd

HAVING COUNT(hd) >= 2

**Result:**



**Exercise: 16** (Serge I: 2003-02-03)

Get pairs of PC models with identical speeds and the same RAM capacity. Each resulting pair should be displayed only once, i.e. (i, j) but not (j, i).

Result set: model with the bigger number, model with the smaller number, speed, and RAM.

**Query:**

SELECT DISTINCT A.model AS model, B.model AS model, A.speed, A.ram

FROM PC AS A, PC B

WHERE A.model <> B.model AND A.model > B.model AND A.speed = B.speed AND A.RAM = B.RAM

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 17** (Serge I: 2003-02-03)

Get the laptop models that have a speed smaller than the speed of any PC.

Result set: type, model, speed.

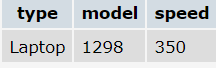
**Query:**

SELECT DISTINCT Product.type AS type, Laptop.model AS model, Laptop.speed AS speed

FROM Laptop JOIN Product ON Laptop.model = Product.model

WHERE Laptop.speed < ALL (SELECT speed FROM PC)

**Result:**



**Exercise: 18** (Serge I: 2003-02-03)

Find the makers of the cheapest color printers.

Result set: maker, price.

**Query:**

SELECT DISTINCT Product.maker AS maker, Printer.price AS price

FROM Printer JOIN Product ON Printer.model = Product.model

WHERE price = (SELECT MIN(price) FROM Printer WHERE color = 'y') AND color = 'y'

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 19** (Serge I: 2003-02-13)

For each maker having models in the Laptop table, find out the average screen size of the laptops he produces.

Result set: maker, average screen size.

**Query:**

SELECT Product.maker AS maker, AVG(Laptop.screen) AS avg\_screen

FROM Laptop JOIN Product ON Product.model = Laptop.model

GROUP BY Product.maker

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 20** (Serge I: 2003-02-13)

Find the makers producing at least three distinct models of PCs.

Result set: maker, number of PC models.

**Query:**

SELECT maker AS Maker, COUNT(model) AS Count\_Model

FROM Product

WHERE type = 'PC'

GROUP BY maker

HAVING COUNT(model) >= 3

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 21** (Serge I: 2003-02-13)

Find out the maximum PC price for each maker having models in the PC table. Result set: maker, maximum price.

**Query:**

SELECT Product.maker AS maker, MAX(PC.price) AS Max\_price

FROM PC JOIN Product ON PC.model = Product.model

GROUP BY Product.maker

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 22** (Serge I: 2003-02-13)

For each value of PC speed that exceeds 600 MHz, find out the average price of PCs with identical speeds.

Result set: speed, average price.

**Query:**

SELECT speed, AVG(price) AS Avg\_Price

FROM PC

GROUP BY speed

HAVING speed > 600

**Result:**

Изображение выглядит как стол

Автоматически созданное описание

**Exercise: 23** (Serge I: 2003-02-14)

Get the makers producing both PCs having a speed of 750 MHz or higher and laptops with a speed of 750 MHz or higher.

Result set: maker

**Query:**

SELECT Product.maker AS maker

FROM PC JOIN Product ON Product.model = PC.model

WHERE PC.speed >= 750

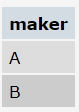
INTERSECT

SELECT Product.maker AS maker

FROM Laptop JOIN Product ON Product.model = Laptop.model

WHERE Laptop.speed >= 750

**Result:**



**Exercise: 24** (Serge I: 2003-02-03)

List the models of any type having the highest price of all products present in the database.

**Query:**

WITH CTE (model, price) AS(

SELECT model, price

FROM PC

UNION ALL

SELECT model, price

FROM Laptop

UNION ALL

SELECT model, price

FROM Printer

)

SELECT DISTINCT model

FROM CTE

WHERE price = (SELECT MAX(price) FROM CTE)

**Result:**

