Copy your solutions into one word or pdf file and send it to the following email address: nikovits@inf.elte.hu. You should send the <mark>queries</mark> and also the <mark>results of the queries</mark>!!!

<mark>**Exercise 1**</mark> (3x3 points)
We have the following two relations: R(A,B,C) and S(C,D). Rewrite the following relational algebra expressions into SQL. Run the SQL queries on the tables NIKOVITS.R and NIKOVITS.S in Ullman or Aramis database and give the results too. **Send the <mark>SQL and the result</mark>**.

a) $\gamma_{A,AVG(B)}\ \delta\ (\Pi_{A,B}\ R)$

b) $\tau_B\ \Pi_{B,AV}\ (\sigma_{AV\ >\ 10\ AND\ SM\ >23}(\gamma_{B,AVG(D)->AV,SUM(D)->SM}(R \bowtie S)))$

c) $\gamma_{C,AVG(B)}\ (\sigma_{R.C=S.C}\ R\ x\ (\delta\ (\Pi_C\ S))$

<mark>**Exercise 2**</mark> (5 points)
Based on relation **Emp** express the following query in relational algebra, run the query in Relax and **send the <mark>query and the result</mark>**. (Use Relax_Emp_Dept.txt on my homepage to upload the data.)
List the **(job, deptno)** pairs where the job occurs on the department, but this job does not occur on department 20.

<mark>**SQL queries**</mark>
The tables on which the SQL queries below are based are the following:

    NIKOVITS.EMP (empno, ename, job, mgr, hiredate, sal, comm, deptno)
    NIKOVITS.DEPT(deptno, dname, loc)
    NIKOVITS.SAL_CAT(category, lowest_sal, highest_sal)

For the following queries send the <mark>**SQL**</mark> and the <mark>**results of the query**</mark>. The columns of the result are in bracket. You can use ARAMIS or ULLMAN database.

<mark>**Exercise 3**</mark> (5 points)
Give the employees who have at least two subordinates who started to work in the same named month (e.g. January). Give the name of the employee (the boss), the name of the month, and the number of employees who started to work in the named month. **(ename, month_name, num_emps)**

<mark>**Exercise 4**</mark> (5 points)
Give the salary categories for which it is true that the employees whose salary falls into this category have exactly two different jobs. Give the category and the difference between the highest_sal and lowest_sal of these categories.
(category, diff)

<mark>**Exercise 5**</mark> (5 points)
First create an EMP2 table which has the same content as table nikovits.emp. Then give an UPDATE statement which increases the salary of the employees who don't have a subordinate. The increment is the salary of the employee's manager plus 100. After the UPDATE list the names and new salaries of the employees who don't have a subordinate. **(Ename, Sal)**

<mark>**Exercise 6**</mark> (6 points)
Give the following result for which you should use the `WITH` statement. Give the employees for whom it is true that his salary is less than the average salary of his department, but his salary is greater, than the average salary of the employees falling into his salary category. In the result give the employee's name, his salary, the department average salary, and the average salary of his category. **(ename, sal, dept_avg, cat_avg)**