INTRODUCTION TO DATABASE SYSTEMS *13.1.2021*

min/max: 5b/10b, time: 40 min Version: **A**

`Name and surname, student number`

Task [1] (2 points)

Let us have the following two relation schemas R1(a, b, c) a R2(a, b, d). What will be the result of the following relational algebra expression:
$\pi_b\ \sigma_{a='Tony'}\ R1 \cap\ \pi_b\ \sigma_{a='Ivan'}\ R2$?

a	b	c
Tony	Barel	26
Tony	Koule	98
Ivan	Barel	36
Ivan	Barel	42
Ivan	Datel	77
Petr	Houba	84
Petr	Jisti	23
Petr	Jisti	28

Tabulka 1: R1

a	b	d
Tony	Barel	13
Ivan	Barel	56
Ivan	Datel	63
Ivan	Humr	30
Petr	Jisti	10
Petr	Jisti	59

Tabulka 2: R2

Task [2] (3 points)

Let us have a table `Person(id, name, age)`, where `id` is a primary key. Create a conceptual model and include a fact that each person may know many other persons and the way around. Use any notation, but write which notation you have used.

Task [3] (2 points)

Let us have an table `Person(id, name, age)`, where `id` is a primary key. We want to process three operations. Write which SQL command we call in each case (the first two words are enough):

- Inserting of a new person with name 'Karel Vichr'
- Adding new column into the table
- Adding an `age` 22 to an existing person with `id` 1.

id	name	age
1	Tony Barel	null
2	Ivan Barel	36
6	Petr Houba	null
7	Petr Jistí	28

Tabulka 3: Person

Task [4] (3 points)

Let us have a relation `Run(person_id, name, sport)`. Give an example of a relation (i.e. write a table), where we can clearly say that:

- `person_id` $\rightarrow$ `name` is satisfied
- `person_id` $\rightarrow$ `sport` is **not** satisfied.
