

Examples of test questions for the UDBS final test

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There will be 3 - 4 task on each test and 45 minutes to solve them.

Task [1] 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]

Write an SQL query corresponding to the relational algebra query in task 1.

Task [3]

Let us a relation $R(a, b, c, d, e)$ and set of functional dependencies $\{c \rightarrow b, ad \rightarrow e, ec \rightarrow b\}$. Find cover of attributes **ac**. What can be concluded from attributes cover?

Task [4]

Let us have an table **Person**(**id**, **name**, **age**), where **id** is a primary key. Create a conceptual model and include a fact that one person knows another person. Use any notation, but write which notation you have used.

Task [5]

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 [6]

Let us have a relation **Run**(**person_id**, **name**, **sport**) and functional dependency (FD) **person_id** \rightarrow **name**. Write what has to be satisfied in order to meet the FD. Give an example, where you show that a FD **person_id** \rightarrow **sport** is not satisfied.

Task [7]

Write what is a functional dependency between two attributes A, B? What has to be satisfied? Give an example of some functional dependency.

Task [8]

You have two entities **Student**(**sId**, **name**) and **Subject**(**suID**, **name**) having M:N relationship. How you draw the relational data model for such task? Write which notation have you used (Oracle/TOAD data modeler).ace.

Task [9]

Let us have a relation **R**(**a**, **b**, **c**, **d**, **e**) and a set of functional dependencies $\{ab \rightarrow cd, bc \rightarrow ae\}$. Are there any redundant functional dependencies or redundant attributes? Perform the minimization and show minimal cover.

Task [10]

Let us have two relations R1(a, b) and R2(a, c) and SQL commands S1:

```
SELECT * FROM R1
```

```
LEFT JOIN R2 ON R1.a = R2.a AND R2.c = 'x'
```

and S2:

```
SELECT * FROM R1
```

```
LEFT JOIN R2 ON R1.a = R2.a
```

```
WHERE R2.c = 'x'
```

Give an example of relations R1 and R2 such that S1 and S2 returns different results. Write result of the SQL commands S1 and S2 using the your relations R1 and R2.
