min/max: 30b/55b, Time: 40 min Variant: **A**

First name, last name, login

Example [1] (9 points)

Describe the deferred update technique of the DBMS recovery. What and where is stored? Which operation from UNDO and REDO is performed in this case?

Example [2] (9 points)

Describe a query evaluation plan for the query SELECT * from Student where login='kra2286' for the heap table and the index created for the login attribute.

Example [3] (10 points)

Describe the ACID property of transaction processing.

| Example [4] (9 points) Describe the SQL injection, write an example. How it is possible to prevent it? |
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| Example [5] (9 points) |
| Describe the meaning of the DTO and DAO objects in ORM, write an example. |
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| Example [6] (9 points) Write a minispecification of one function from your project including at least 3 database operations (do not write money transfer, cascade delete and so on). |
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