Programming Applications with Databases

Exercise Set 4

1. Explain shortly meaning and reasoning for ACID in transactions.
   [**1p**]

2. Explain shortly *savepoints* concept in DBMS. Using the example presented at `https://learn.microsoft.com/en-us/sql/t-sql/language-elements/save-transaction-transact-sql` create a new one based on *AdventureWorksLT* database. Propose and implement a use case including the context where a stored procedure is executed.
   [**1p**]

3. Create three examples showing the anomalies of dirty read, non-repeatable read, and phantom read, respectively.
   [**2p**]

4. Execute samples 1 and 2 from the example *02-poziomy-izolacji-blokady.sql* from the attached materials. Present and explain the locks on the high level.
   [**2p**]

5. Execute the example *03-zakleszczenie.sql* from the attached materials several times on different isolation levels. Check when the deadlock occurs and when not, and explain why it happens.
   [**2p**]

6. Explain the locking hints concept. Prepare a small example where the current level of transaction isolation is serializable and SELECT ... WITH (NOLOCK) is executed. Show the difference in applied locks where NOLOCK is introduced and where it is not introduced.
   [**1p**]

7. Based on a small (theoretical) example, explain the difference between pessimistic and optimistic concurrency control mechanism.
   [**1p**]

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