

DBMSs - Practical Test

1p (of) will be added to the final grade.

1h + 10min

* This form will record your name, please fill your name.

I

Consider relation FootballClub[ClubID, ClubName, FoundingDate, Country] and the interleaved execution below (in SQL Server). There are no indexes on FootballClub and no other concurrent transactions.

When T1 begins execution: only one row in FootballClub has ClubID 10; there are no rows with ClubID 46 or 50; the Country value for the club with ClubID 10 is Serbia.

Choose the correct answer(s) for multiple choice questions 1 to 3.

T1	T2
BEGIN TRAN	
	BEGIN TRAN SELECT Country FROM FootballClub WHERE ClubID = 10
INSERT INTO FootballClub VALUES (46, 'Universitatea Cluj', '11.23.1919', 'Romania')	
	SELECT Country FROM FootballClub WHERE ClubID = 50
INSERT INTO FootballClub VALUES (50, 'Universitatea Craiova', '09.05.1948', 'Romania') COMMIT TRAN	
	ROLLBACK TRAN

time

1

T1 and T2 run under READ UNCOMMITTED. After the ROLLBACK TRAN statement in T2, the Country value for the club with ClubID 50 is:
(1 Point)

- ☐ Serbia
- ☐ Romania
- ☐ Universitatea Craiova
- ☐ NULL
- ☐ None of the above answers is correct.

2

T1 runs under SERIALIZABLE and T2 under READ UNCOMMITTED. After the ROLLBACK TRAN statement in T2, the Country value for the club with ClubID 10 is:
(1 Point)

- ☐ Germany
- ☐ Serbia
- ☐ Romania
- ☐ NULL
- ☐ None of the above answers is correct.

T1 runs under REPEATABLE READ and T2 under READ COMMITTED. Then:
(1 Point)

- ☐ T1 needs an exclusive lock for its first INSERT statement.
- ☐ An exclusive lock acquired by T1 is held until T1 completes.
- ☐ T2 needs an exclusive lock for its second SELECT statement.
- ☐ After the ROLLBACK TRAN statement in T2, the Country value for the club with ClubID 46 is Romania.
- ☐ None of the above answers is correct.

II

Create a database for a game that introduces children to oceanography. The entities of interest to the problem domain are: Sensors, Teams, Oceans, and Ships. In-game sensors are deployed all around the globe by teams of oceanographers, providing players with simulated data. A sensor is deployed by a team in an ocean; it has a serial number, and the latitude and longitude of its location. A team has a name and several ships. A ship has a capacity and belongs to one team. An ocean has a name and average depth. Each sensor provides data about waves: wave height, length, and period. Generated records have the form <sensorid, wheight, wlength, wperiod>.

- a. Write an SQL script that creates the corresponding relational data model in 3NF.
- b. Create a Master/Detail Form that allows one to display the ships for a given team, to carry out <insert, update, delete> operations on the ships of a given team. The form should have a DataGridView named dgvTeams to display the teams, a DataGridView named dgvShips to display all the ships of the selected team, and a button for saving added / deleted / modified ships. You must use the following classes: DataSet, SqlDataAdapter, BindingSource.
- c. Create a scenario that reproduces the dirty read phenomenon on this database. Explain why the dirty read occurs, and describe a solution to prevent this concurrency problem. Don't use stored procedures.

Prepare a pdf file named Group_LastName_FirstName.pdf (e.g., 929_Ionescu_Ana.pdf) that contains:

- the database diagram;
- the SQL script that creates the relational data model (a);
- the C# code that (b):
 - connects to the database;
 - fetches data into the application;
 - binds the DataGridViews such that whenever a different team is selected in dgvTeams, dgvShips displays all its ships;
 - sends changes operated through dgvShips back to the database;
- the SQL script that reproduces the dirty read phenomenon (c).

Send the file by email to pop_emilia_loredana@yahoo.com (mailto:pop_emilia_loredana@yahoo.com). Use your stud.ubbcluj.ro (<http://stud.ubbcluj.ro>) email address and sign your mail. Enter your first name, last name and group in the box below.

Due time: 3:10 PM.

Good luck!

- a. 2p
 - b. 2p
 - c. 2p
- (6 Points)