

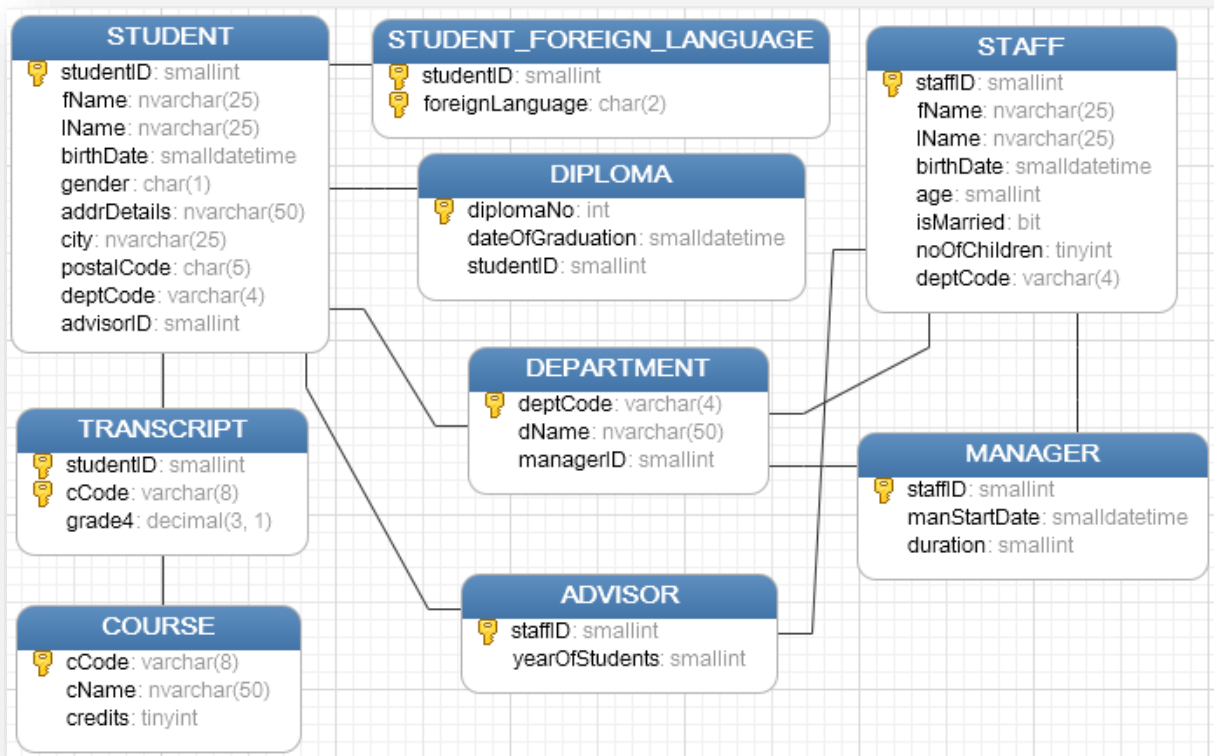
Marmara University – Faculty of Engineering – Department of Computer Engineering

## Summer 2015 – CSE355 Database Systems Homework #2

(Due: 02.08.2015)

**1) [30 pts] Basic SQL.**

- a) [0 pts] Restore the database *cse355-sis* using the file *cse355-sis\_20150724.bak* that has been e-mailed to you. Write the following SQL statements on this database. For each of the following query, take a screenshot of both your SQL query and output of the query on MS SQL Server.



- b) [5 pts] List first name, last name, birthdate and city of students.
- c) [5 pts] List first name, last name, department name, advisor's first name and last name. Order the list by department name ascending and student's last name.
- d) [5 pts] List distinct first and last name of students whose department is Computer Engineering.
- e) [5 pts] List all attributes of the students whose first name contains 'at'.
- f) [5 pts] List staff ID, first name and last name of married managers who is older than 40 and have at least 2 children. Order the list by birthdate.
- g) [5 pts] List student ID, first and last name, department name and graduation date of students who have graduated after 21.05.2010.
- h) [0 pts] Compress your database backup file with the screenshots in a rar file. Name it as *hw2\_1\_firstname\_lastname.rar* and submit it.

**2) [50 pts] Advanced SQL.**

Consider the *Turkish Super League* database that has been e-mailed to you.

**player** (playerID: int, *firstName*: nvarchar(25), *lastName*: nvarchar(25), *nationality*: varchar(25), *birthDate*: smalldatetime, *age*: smallint, *position*: varchar(25))

**team** (teamID: int, *name*: nvarchar(50), *city*: nvarchar(25))

**player\_team** (playerID: int, teamID: int, *season*: varchar(5))

**match** (matchID: int, *homeTeamID*: int, *visitingTeamID*: int, *dateOfMatch*: smalldatetime, *week*: tinyint)

**goals** (matchID: int, playerID: int, *isOwnGoal*: bit, minute: tinyint)

Notes:

- Table *match* stores data only for season 2013-2014.
- Table *goals* stores data only for season 2013-2014.

- a) [0 pts] Restore the database *Turkish\_Super\_League* using the file *Turkish\_Super\_League\_20150724.bak* that has been e-mailed to you. Write the following SQL statements on this database. For each of the following query, take a screenshot of both your SQL query and output of the query on MS SQL Server.
- b) [5 pts] Update the field *age* for all players.
- c) [10 pts] List the “younger” players whose first name does not contain “nec” and play in “Beşiktaş”. “Younger” players are the ones whose ages are less than the average age of all players. Retrieve playerID, firstname + “ ” + lastname.
- d) [15 pts] Update all *city* values of the table *team* as: “city” + “ #p” + “number of players” + “g” + “number of goals forward” (e.g. “İstanbul #p25 g74”). Do not forget to include own goals in your calculations.
- e) [20 pts] List the top 10 top scorers. Retrieve playerID, first name, last name, number of goals scored, number of matches that player did not score a goal, average number of goals per scored matches.
- f) [0 pts] Compress your database backup file with the screenshots in a rar file. Name it as *hw2\_2\_firstname\_lastname.rar* and submit it.

**3) [11 pts] Normalization I.**

Consider the unnormalized relation R with six attributes ABCDEF and the following functional dependencies:

$AB \rightarrow CDE$

$B \rightarrow F$

$C \rightarrow D$

- a) [0 pts] You can either solve the following questions in electronic format or manually. Take a screenshot of your solution.
- b) [3 pts] What is the key(s) for the relation?
- c) [3 pts] What is the normal form of this relation? Explain it.
- d) [5 pts] Decompose R into 3NF relations step by step if it is not in 3NF.
- e) [0 pts] Compress your screenshot in a rar file. Name it as *hw2\_3\_firstname\_lastname.rar* and submit it.

**4) [9 pts] Normalization II.**

Consider the following *Appointment* relation:

**Appointment** (doctorID, appointDate, appointTime, doctorName, patientID, patientName, surgeryNo)

Primary Key = {doctorID, appointDate, appointTime} and you have the following functional dependencies:

- **FD1:** {doctorID, appointDate, appointTime}  $\rightarrow$  {patientID, patientName}
- **FD2:** {doctorID}  $\rightarrow$  {doctorName}
- **FD3:** {patientID}  $\rightarrow$  {patientName, surgeryNo}
- **FD4:** {doctorID, appointDate}  $\rightarrow$  {surgeryNo}
- **FD5:** {appointDate, appointTime, patientID}  $\rightarrow$  {doctorID, doctorName}

According to the functional dependencies given above, which one(s) of them violates corresponding NF?

- a) [0 pts] You can either solve the following questions in electronic format or manually. Take a screenshot of your solution.
- b) [3 pts] First Normal Form (1NF): ☐ None ☐ FD1 ☐ FD2 ☐ FD3 ☐ FD4 ☐ FD5
- c) [3 pts] Second Normal Form (2NF): ☐ None ☐ FD1 ☐ FD2 ☐ FD3 ☐ FD4 ☐ FD5
- d) [3 pts] Third Normal Form (3NF): ☐ None ☐ FD1 ☐ FD2 ☐ FD3 ☐ FD4 ☐ FD5
- e) [0 pts] Compress your screenshot in a rar file. Name it as *hw2\_4\_firstname\_lastname.rar* and submit it.