

CS 3335

Final Exam

Dec. 11, 2008

100 points

Name: _____

1. Let $R = (A, B, C, D, E)$ be a relation. Let $F = \{D \rightarrow BE, AB \rightarrow C\}$ be the set of functional dependencies that hold on R . Using the algorithm described in class and in the text, create a BCNFLJ decomposition. Using the rules discussed in class, determine the highest normal form for each relation in your decomposition. State whether or not your decomposition is dependency preserving. (10)

2. (a) Provide the ER representation of an aggregation of relationship C between entity A and entity B, where A's may participate any number of times in C, but each B must participate at least once but not more than 3 times in C. (5)

- (b) Provide the ER representation of a specialization of entity D into entities E and F. (5)
An entity can be both an E and an F, but it cannot be just a D.

3. Using a B+-Tree with 3 values per node, insert the following data points into the tree. (10)
Show the resulting tree at every split. Data: {0, 10, 25, 50, 67, 75, 100, 150, 200, 250}.

4. (a) Provide a schedule which is not recoverable.

(5)

(b) Provide a schedule which is recoverable but not cascadeless.

(5)

5. (a) What is the definition of 3NF? (2)

(b) Define the I in ACID. (2)

(c) Define reflexivity in Armstrong's Axioms. (2)

(d) Give the formula for support in association rules. (2)

(e) Define DBMS. (2)

6. (a) _____ The JDBC concept of a ResultSet is related to the SQL concept of (a) query response (b) metadata query (c) table definition (d) all of the above (e) none of the above (1)
- (b) _____ Within ER design, a primary key is (a) a candidate key (b) a super key (c) unique for an entity set (d) all of the above (e) none of the above (1)
- (c) _____ If $X \rightarrow Y$, then if two tuples agree on Y , it must be the case that (a) the functional dependency is violated (b) $Y \subseteq X$ (c) the tuples agree on X (d) all of the above (e) none of the above (1)
- (d) _____ Most database users access data via (a) SQL (b) JDBC (c) web interfaces (d) all of the above (e) none of the above (1)
- (e) _____ An example of a client-side scripting language is (a) JSP (b) Javascript (c) VBScript (d) all of the above (e) none of the above (1)
- (f) _____ The difference between a two-tier and three-tier web architecture is (a) there is no database server (b) the application server and the database server are combined (c) the webserver and the application server are combined (d) it can be a, b, or c (e) none of the above (1)
- (g) _____ An example of a server-side scripting language is (a) JSP (b) Javascript (c) VBScript (d) all of the above (e) none of the above (1)
- (h) _____ A database user can grant privileges to another user if (a) the user has the privilege (b) and only if the user is the DBA (c) nobody else has the privilege (d) all of the above (e) none of the above (1)
- (i) _____ A log of all changes to the database used to track erroneous or fraudulent updates is (a) always performed in the application layer (b) an audit trail (c) supported by the operating system (d) all of the above (e) none of the above (1)
- (j) _____ In IR, very common words are called (a) common words (b) stop words (c) problem words (d) all of the above (e) none of the above (1)

SQL Portion

Name: _____

7. In a single SQL query, find all cities that have played all other cities. (10)

8. In a single SQL query, find the total number of points scored by all teams in all seasons and series. (10)

9. (a) Add a column to the Team table called wins.

(5)

(b) Update the wins total for each team to be equal to the number of games won in that season (the team scored more points than its opponent).

(5)

10. In a single SQL query, find the city, the season and the game that scored the most points in a single game. (10)

Schema for SQL questions. In this database, games are played between teams from different cities, and teams cannot play themselves. The team with the most points wins the game. Series consist of an odd number of games. A season is a collection of series, and the seasonId is a year.

Team(city, seasonId)

Season(seasonId, seriesId)

Series(seriesId, gameId)

Game(gameId, city, opponentCity, points)