Information Management II Questions

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Introduction

Some questions from, or relevant to, the course.

Questions

Theory

- List three advantages of a database
- What are data definition, modification, query and control languages? What is SQL?
- What are the three levels of a database architecture?
- What are relations, tuples and attributes?
- What is the domain?
- What is the degree?
- Is the value in a tuple atomic?
- What is a null value?
- What is a primary key?
- What is an entity integrity constraint? What is referential integrity?
- What is a foreign key?
- Give an example of selection, projection and combining in SQL
- List the SQL set operations. How would you include duplicates?
- What is a join in SQL?
- What are the the requirements for a normalised table?
- What is a determinant? Explain giving an example
- What is a composite attribute?
- What does a determinant diagram look like?
- What is Codd Normal Form?
- What is an identifier?
- What is a candidate key?
- What is Boyce/Codd Normal Form?
- What is a fully normalised table?
- Give an example entity relationship diagram

- Give an example entity relationship diagram with relationships that have roles, recursiveness, constraints (cardinality) and constraints (participation)
- Map your entity relationship diagram to a relational schema
- What are the four design optimisation guidelines?
- How can you disprove a functional dependency?
- How can you specify in a schema that a functional dependency should hold?
- List the four steps for modelling a database
- What is the super key?
- Are integrity constraints concerned with accidental corruption?
- Are explicit constraints expressed in the relational schema?
- Can semantic constraints be expressed in the relational schema?
- What are the integrity constraints? What are they in SQL?
- Can foreign keys be null?
- List constraint violations possible for key, entity and referential. How can these violations be handled? What are they in SQL?
- What does cascading mean?
- What are the constraints for?
  - PRIMARY KEY
  - FOREIGN KEY
  - UNIQUE
  - NOT NULL
  - CHECK
  - ASSERTION
  - TRIGGER
- Explain security with reference to accounts, privileges and security levels
- What is a transaction? What is concurrency control?
- Contrast SQL to NOSQL
- What is sharding? What is replication?
- What is the CAP theorem?
- What is ACID? What is BASE?
- List four NoSQL data models?
- What is the data model and the storage model?

SQL

These questions assume you have a suitable database with some schemas created already.

Question 1

- Using the appropriate SQL command, update your contact table to include a contact type

- How would the database ensure that the contact is of an appropriate type? For example, only work colleagues could be added to a work conversation

Question 2

- One of the users in the database has decided to change their name; update the name of the user to reflect this change

Question 3

- Retrieve all of the conversations that, "Jared Dunn" was a participant in during 2017

Question 4

- Write a retrieval command which returns all video chat sessions which have more than ten participants

Question 5

- What adjustments would have to be made to link the player table and the team table? Demonstrate using SQL

Question 6

- Using the appropriate SQL command, demonstrate how the database ensures that both players in a battle are of the appropriate level

Question 7

- How do you handle referential integrity?

Question 8

- Create a supplier table that is used to store entries for each of Pablo's suppliers. The table should have a "type" attribute, which should always have one of the following values, "farmer", "chemical" or "equipment"

Question 9

- Write a retrieval command which returns a list of customer names and a total value of all the purchases that that customer has made