

CS 445 Exam 2 Review Questions

Functional Dependencies & Normalization

Definitions (FD, key, super key, 3rd normal form, BCNF)
3NF vs BCNF

Describe the anomalies that can occur with redundant data in the database.

Given: $R = \{A, B, C, D, E\}$
and FD: $A \rightarrow B, B \rightarrow DE, C \rightarrow DB$

What are the keys?

Is the relation in BCNF or 3NF? If not, build a table of data and show the redundancy.

Put the Relation into BCNF, 3NF.

Given: $R = \{A, B, C, D, E, F, G\}$
and FD: $A \rightarrow G, F \rightarrow DE, G \rightarrow DB, D \rightarrow C, E \rightarrow D$

What are the keys?

Is the relation in BCNF or 3NF? If not, build a table of data and show the redundancy.

Put the Relation into BCNF, 3NF.

Build the minimal cover for each of the above relations.

19.4.1

19.7.1 Change part (b) to: Is R in 3NF? If no, put it into 3NF.

Change part (c) to: Is R in BCNF? If no, put it into BCNF. Does this new breakdown preserve all dependencies and is it lossless?

19.8.2

Define lossless decomposition.

Define functional dependency preserving decomposition.

Advanced SQL:

Indexes/Joins

When to use, what is the benefit of. Given a table definition and query, what should the indexes be? Explain what indexes are useful in the tables used below and why.

Using your assignment one database:

List all employees that earn more than \$10,000 per product they work on.

Determine how many employees work on each product (ignoring managers).

Display the one product with the most employees working on it

(show 1 row, if there is a tie at the top, display the product that is alphabetically first.).

Determine how many clients use each product.

Determine which products have more clients than workers.

Determine which products have more workers than clients.

List all employees that make less than the average employee salary.

List all employees as either WORKER, MANAGER, BOTH if the employee is only a worker, only a manager, or does both.

FOR EXAMPLE:

	Aline		Maddox		MANAGER
	Ursula		Stewart		BOTH
	Emmanuel		Pace		WOKER

List all products that have 2 or more clients.

Relational Algebra

Take the above queries and build their relational algebra representation.