Exam 1 Study Guide  CSE30246 - Database Concepts

ER Diagrams
Entity Sets
Relationships
Attributes
Weak Entity Sets and Referential Integrity
Hierarchical Entity Sets

Understand how to draw an ER Diagram, including relationship cardinality

Relational Model
Relation
Schema
Instance
Type
Tuple
SQL to create table and drop table
Keys (SQL)
nulls
defaults

Difference between ER Diagram and Relational Model

How to translate between ER Diagram and a Relational Model

- Combining relations
- Translating Weak Entity Sets
- Translating Hierarchies – three choices: OO, ER

Relational Design
Normal Forms – 1NF through BCNF
How do we know we have a good design?
How do the different normal forms address the criteria for good design?

- What is a functional dependency?
- How are they related to keys and superkeys?
- Use Armstrongs Axioms to define the closure of FD sets
- Use Armstrongs Axioms to define the closure on a set of Attributes.
- Reason about the keys and superkeys from attribute closure.

Understand which relations are in 2NF, 3NF and BCNF, decompose bad relations if necessary.
Relational Algebra
Understand the different relational algebra operators: $\sigma$, $\pi$, $\rho$ ...
Understand the different joins – Cartesian product, natural, equi, theta...
Evaluate the relationship between Set Union, Intersect, Difference vs Bag Union, Intersect, Difference
Write expressions and trees with relational algebra to answer queries

Relational Calculus
Understand Constants, Predicates, Boolean operations, Exists and For All qualifiers
How does Relational Calculus relate to Relational Algebra? How is it different?
How does Relational Calculus relate to SQL? How is it different?
Write expressions with relational calculus to answer queries

SQL
Know SQL syntax – MySQL shortcuts are allowed on the test (limit X, join Y on a=b...)
SELECT
FROM
WHERE
GROUP BY
HAVING
ORDER BY
LIMIT
Understand subqueries – in, any, all, exists
Table joins
Differences between subquery IN and join
null value logic
duplicate elimination
Aggregation and Aggregation operators
Write expressions in SQL to answer queries

INSERT, UPDATE, DELETE
Understand when and how to write these expressions to perform operations (and dangers)
Views – what are they, how do they work?
Constraints –
Primary key, Foreign key, check, assertion
Foreign key default actions, cascade, set null
When are foreign key actions triggered – what happens under different actions.
Understand why triggers are necessary in lieu of checks and global assertions