Exam #1 Review Guide

- This Exam covers content from Lecture 1 to Lecture 8.
- This will be one-page open notes (both front and back pages can be used). If you print your notes, the font cannot be smaller than 10 pt.

Question Types May Include:

1. Multiple Choice
2. Explanation for Basic Concepts
3. Draw E/R Diagram based on Description
4. E/R Diagram -> Relation Schemes
5. SQL Operations on different Tables
6. Decompose Relations
7. Check BCNF and 3NF

Topics:

- Introduction to Database Systems
    - Concept of DBMS, Data Model, ACID Properties, etc.

- Relational Data Model
    - Basics of The Relational Model
        - Attribute and Tuple
        - Relation Scheme
        - Database
        - Database Scheme
        - Domain
        - Keys
    - Create/Modify Table (Relation) with SQL
    - Declare keys, default values for Tables
    - Common Data types in SQL and their difference

- Entity-Relationship (E/R) Model
    - E/R Diagrams
        - Entity Sets, Attribute, Keys
        - Relationship
            - Relationship Set
            - Multi-way Relationships
            - Many-Many Relationship, Many-One Relationship, One-One Relationship
            - Attributes on Relationship
    - Subclasses
    - Weak Entity-Set
    - Design E/R Diagrams

- E/R Diagrams to Relations
    - Entity Set -> Relation
    - Relationship -> Relation
    - Combining Relations
    - Handling Weak Entity Sets

- Design Theory for Relational Databases
  - Functional Dependency
  - Superkey
  - Boyce-Codd Normal Form (BCNF)
  - 3rd Normal Form (3NF)

- Relational Algebra and SQL
  - Query with SQL
    - SELECT-FROM-WHERE Statements
    - Renaming Attributes
    - Complex WHERE conditions, e.g., AND, OR, NOT, =,<>,<,>,<=,>=, Patterns, etc
    - Multi-relation Queries
    - Joining Two Relations
    - Sub-Queries
  - Database Modifications
    - Insertion
    - Update
    - Delete