COP4710 Fall 2017 Midterm Examination Materials

We will cover all the materials that I discussed in the classes. You need to study the class notes and homework. This is a close book examination. Calculator and hand held devises are not allowed. Following are the chapters and topics to be covered in the examination. Examination questions include but not limit to: explain the definitions, compare the differences between different terms or concepts, explain the processes, draw ER diagram, write queries using relational algebra, similar questions as homework, etc. You are strongly encouraged to come to examination earlier. We may start the examination earlier to give you more time to answer the questions.

1. Chapter 1: Databases and Database Users
   a. Basic Definitions
   b. Example of a Database
   c. Main Characteristics of Database Technology vs. File Processing
   d. Four Classes of Database Users
   e. Additional Characteristic of Database Technology
   f. When not to use a DBMS

2. Chapter 2: Database System Concepts and Architecture
   a. Data Models
   b. Schemas vs. Instances
   c. Three-Schema Architecture
   d. Data Independence
   e. DBMS Languages
   f. Types of DML
   g. DBMS Interfaces
   h. Database System Utilities
   i. Classification of DBMSs

3. Chapter 7: Data Modeling Using the Entity-Relationship (ER) Data Model
   a. Database Design Process
   b. Example COMPANY Database
   c. ER Model Concepts
      i. Entities and Attributes
      ii. Entity Types and Key Attributes
      iii. Relationships and Relationship Types
      iv. Structural Constrains and Roles
      v. Week Entity Types
   d. ER Diagram Notation
   e. Relationships of Higher Degree

4. Chapter 3: The Relational Data Model and Relational Database Constraints
   a. Relational Model Concepts
   b. Characteristics of Relations
   c. Relational Integrity Constraints
      i. Key Constraints
      ii. Entity Integrity
      iii. Referential Integrity
d. Update Operations on Relations

5. **Chapter 6: The Relational Algebra**
   a. SELECT and Project Operations
   b. Set Operations: Union, INTERSECTION, DIFFERENCE, CARTESIAN PRODUCT
   c. Join Operation
   d. Other Relational Operations: DIVISION, AGGREGATION FUNCTIONS, OUTER JOIN