COP4710 Fall 2017 Final Examination Materials

We will cover all the materials after the midterm examination that I discussed in the classes. You need to study the class notes, homework, and projects. This is a close book examination. Calculator and hand held devices are not allowed. Following are the chapters and topics to be covered in the examination. Examination questions include but not limit to: True/False questions, explain the definitions, compare the differences between different terms or concepts, write queries using Tuple Relational Calculus and Domain Relational Calculus, SQL queries, etc.

1. **Chapter 6: The TUPLE Relational Calculus and Domain Relational Calculus**
   a. Introduction to Relational Calculus
   b. Formal Specification of Tuple Relational Calculus
   c. Free and bound Tuple Variables
   d. Quantifiers in Formulas
   e. Transforming Universal and Existential Quantifiers
   f. Domain Relational Calculus

2. **Chapter 4: SQL – The Relational Database Standard**
   a. Data Definition in SQL
   b. Retrieval Queries in SQL
      i. Simple SQL Queries
      ii. Alias, * and DISTINCT, Unspecified WHERE-Clause
      iii. Set Operations, Nesting of Queries, Set Comparisons
      iv. The EXISTS function, NULLs, Explicit Sets
      v. Aggregate Functions and Grouping

3. **Chapter 15: Functional Dependencies and Normalization for Relational Databases**
   a. Informal Design Guidelines for Relational Databases
      i. Semantics of Relation Attributes
      ii. Redundant Information in Tuples and Update Anomalies
      iii. NULL Values in Tuples
   b. Functional Dependencies
      i. Functional Dependencies (FDs) definition
      ii. Inference Rules for FDs
   c. Normal Forms Based on Primary Keys
      i. Introduction to Normalization
      ii. First Normal Form (1NF)
      iii. Second Normal Form (2NF)
      iv. Third Normal Form (3NF)
      v. BCNF (Boyce-Codd Normal Form)