**CSC 453 Midterm Review Outline**

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(Though I have tried to make it complete, this may not be an exhaustive list of every detail of every topic we have discussed; it is meant as a guide to what I consider to be the most important concepts we have seen so far.)

Sections of the text covered: 1.1-1.9, 2.1, 7.1, 3.1-3.4, 4.1-4.4, 5.1, 5.3-5.4, 15.1-15.5, 16.1-16.4, [15.6, 16.5]

Introduction to Databases

Properties of databases and database models

Benefits and drawbacks of database systems

Three-schema architecture

Database design and implementation process

Relational Model

Relations/Tables

Tuples/Rows

Attributes/Columns

Domains

Relation schema vs Relation state

Characteristics of relations

Superkeys

Candidate keys

Primary keys

Foreign keys

Domain constraints

Entity integrity

Referential integrity

SQL DDL

CREATE TABLE

Domains

CHECK

Defining keys

INSERT INTO

DROP TABLE

ALTER

UPDATE  
DELETE

SQL Queries

SELECT

FROM

Renaming attributes

WHERE

Simple comparisons

Wildcard comparisons

ORDER BY

Aggregate functions

GROUP BY

HAVING

Cartesian product

Inner joins

Outer joins

Multi-table joins

Nested queries (subqueries)

Single-value vs table

= vs IN

EXISTS

NOT EXISTS

ANY

ALL

Correlated nested queries

Views

Relational Database Design

Top-down design (design by analysis,

normalization)

Bottom-up design (design by synthesis)

Redundancy

Update anomalies (modification, insertion, deletion)

Functional dependencies

Closures

Covers

Equivalence

Minimal covers

Full functional dependencies

Partial dependencies

Transitive dependencies

First Normal Form

Second Normal Form

Third Normal Form

Boyce-Codd Normal Form

3NF vs BCNF

Dependency preservation property

Nonadditive join property

Algorithms for relational synthesis

[Multivalued dependencies]

[Fourth Normal Form]