Final Exam Review Outline
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CSC 355 Winter 2020

References:

- Slides for Lectures 1-17
- Ullman/Widom, Sections [1.1-1.3], 2.1-2.3, 3.1-3.5, 6.1-6.6, 7.1, [7.2-7.4], 7.5, 8.1-8.2, [8.5]
- Chapters 1 through 6 of Oracle's PL/SQL User's Guide and Reference (link on course web site)

(This is not 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.)

[Intro to Databases:]

[Properties of databases]
[Costs and benefits of databases]
[Types of database models]
[Components of a DBMS]

The Relational Model:

Relations/Tables
Records/Tuples
Attributes
Domains
Properties of relations
Schema vs instance
Candidate keys
Primary keys
Foreign keys
Domain constraints
Key constraints
Entity integrity
Referential integrity

SQL DDL:

CREATE TABLE
Domains (Numerical, String, Dates)
CHECK
Defining keys
INSERT INTO
DROP TABLE
ALTER TABLE
UPDATE
DELETE

SQL Queries:

SELECT
DISTINCT
AS
FROM
WHERE
Comparison operators (=, !=, <>, <, <=, >, >=)
LIKE and wildcards (_, %)
Logical operators (AND, OR, NOT)
NULLs
ORDER BY
ASC/DESC
Aggregate functions
GROUP BY
HAVING
Subqueries
Single-value vs table
= vs IN
EXISTS
NOT EXISTS
ANY
ALL
Correlated subqueries
[Set operations]
Inner join vs outer join
INNER JOIN
LEFT OUTER JOIN
RIGHT OUTER JOIN
[FULL OUTER JOIN]

SQL Transactions:

Transactions
ACID properties
COMMIT
ROLLBACK
Serializable
[Repeatable Read]
Read Committed
Read Uncommitted
[Phantoms]
[Non-repeatable reads]
[Dirty reads]

Relational Database Design:

Relational database design problem
Decomposition
Redundancy
Functional dependencies
[Inference rules]
Closure
Equivalence
Superkeys
Candidate keys
Prime attributes
BCNF
Projections
Dependency preservation
Restrictions
Lossless join
Chase/matrix test
Binary lossless join test
3NF
Minimal basis
Algorithms for relational database design

Database Programming:

PL/SQL
dbms_output.put_line
Variables
Assignments
Branching
Looping
Cursors
Records
Triggers
BEFORE/AFTER
INSERT/DELETE/UPDATE (OF Attribute)
Row-level triggers
Statement-level triggers

Views:

Defining views
Dynamic views
Updatable views
[Materialized views]
[INSTEAD OF]