COMP9311:
Database Systems

Term 3 2022

Week 10 – Closing

Disclaimer: the course materials are sourced from previous offerings of COMP9311 and COMP3311

What is “Database”?

Database

- ... a collection of **related** data ...
- Data items alone are relatively useless … We need the data to have some structure

Example:

- a student records database
  - Contains information identifying students, courses they are enrolled in, results from past courses, ...
- IMDb movie database
  - Contains information about the movies, actors, theatres showing the movies, other movies the director also directed in, …

Databases cover a range of topics …

The field of *databases* deals with:

- ***data*** ... representing application scenarios
- ***relationships*** ... amongst data items
- ***constraints*** ... on data and relationships
- *redundancy* ... one source for each data item
- ***data manipulation*** ... declarative, procedural
- effective storage and retrieval of data … indexing, query processing
- *transactions* ... multiple actions, atomic effect
- *concurrency* ... multiple users sharing data
- *scale* ... massive amounts of data

Overview: Database Systems

- Data models:
  - ER
  - Relational Data Model and their mapping
- Relational Algebra
- Database Programming Languages: SQL, PLpgSQL
- Relational Database Design: Functional Dependency, Normal Forms, Design Algorithms for 3rd normal form and BC normal form
- Database Systems:
  - Storage/Index (an overview)
  - Query Evaluation (an overview)
  - Transaction Management
- NoSQL databases/Graph database

Final Exam

Online exam via Moodle. **28th November Monday 2pm – 5pm**

Exam (out of 100) – a total 3-hour exam, carried out in two sessions:

- **Exam Part 1, 2pm-3pm**
  - (~30%) Design, SQL and PLpgSQL programming Q1-Q3
- **Exam Part 2, 3:10-5:00**
  - (~70%) Short and Long Answers
  - Covers all topics except SQL and PLpgSQL

Next Friday (25th) from 1pm onwards, there will be a mockup exam session, simulating the exact exam environment. You are encouraged to attend …. It is the last opportunity to get your computing environment sorted for carrying out the exam.

The link to the mockup exam will be open until the exam day morning.

Final Exam

Questions

- No MCQ on the final exam
- You are expected to write relational algebra, SQL code and PLpgSQL code
- Some questions will ask you to give a written answer (e.g., description of a concept) and explanation of how you derived the answer
- Some questions will ask you to give a short/straight answer (e.g., result of an algorithm) and show how you derived the answer

Final Exam

Revision strategy:

For the design part, understand the ER notations clearly and how they translate to SQL

For the SQL/PLpgSQL part, you have had lots of practice on it … Just go through the lecture examples and exercises

For the Design theory part, go through the lecture examples and exercises (Do them yourself)

For the transaction part, go through the lecture examples and exercises (Do them yourself)

For Storage/Indexing part, go through the lecture notes in detail. Make sure you understand the pros/cons of techniques and when/how to apply them

For Graph DB part, go through the lecture notes. Make sure you understand the data structures clearly and algorithms that work with them.