CS 306 Database Systems

2023-2024 Fall Syllabus
GENERAL INFORMATION

- Office : FENS 2081
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- Tel : 9576
- Web : http://people.sabanciuniv.edu/~ysaygin/
- Office Hours : will be announce later
- Use sucourse for discussions regarding the course. (Your TAs will check the messages regularly and inform me for any urgent matter)
TAs

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- Ahmmad Saleh
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DATABASE MANAGEMENT SYSTEMS
Third Edition

NEW material on Database Applications

Ramakrishnan · Gehrke
Grading Policy

- There will be 2 Midterms and a Final:
  - MT1 -25% (exact day and time TBA)
  - MT2 - 25% (exact day and time TBA)
  - FINAL - 30%

- Quizes - 10%

- DB Application Project: 10%
  - Group project (max 5 students).
  - Choose different projects, or variations.
  - You may use the MySQL or any other Database Management System to develop your database application.
Makeup Policy

- Final *may be* a makeup for one of MT1 or MT2
About quizzes

- I will try to do one quiz per week
- We will have 13 or 14 quizzes
- No makeup if you miss any quiz
- Quizes will be just simple exercises related to the lectures
- You may work with your friends to answer the questions
- You need to be physically present during the lecture during the quiz and submit it on your own.
Learning objectives

- Learning how to **design and implement** a database application
  - Conceptual design
  - Relational Model
  - Mapping ER to Relational Model
  - Schema refinement and normal forms
  - Querying

- Learning **database system** concepts
  - Concurrency Control and Transaction Management
  - Recovery
  - Storage and Indexing

- Learning **new generation data storage and querying** (and also understanding that the conventional SQL databases are not obsolete)
List of Topics

(Order of teaching may be slightly different)

- Introduction to Database Systems
- Entity Relationship Model
- Relational Model
- Relational Algebra
- SQL Queries
List of Topics (Contd.)

- Functional Dependencies
- Normal Forms
- Schema Decomposition into Normal Forms
List of Topics (Contd.)

- Data Storage and Indexing
- Transaction Management
- Concurrency Control
- Crash Recovery
List of Topics (Contd.)

- Document databases
- Key-value stores
PROJECT

• Form your group (Max 5 people)
• Think about a real-life database application project
• Step 1: Write a one page report describing what you want to do for this project. Write your report using any editor and submit the PDF through sucourse
• Report should list the group members but only one student should submit the report.
• If you submit you will get 0
• Otherwise you will get -1
An example database application

(Taken from the book “Fundamentals of Database Systems” by Elmasri and Navathe)

Company database keeps track of a company’s employees, departments and projects.

1. The company is organized into departments. Each department has a unique name, a unique number and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.

2. A department controls a number of projects, each of which has a unique name, a unique number and a single location.

3. We store each employee’s name, Social Security number, address, salary, sex and birth date. An employee is assigned to one department but may work on several projects, which are not necessarily controlled by the same department. We keep track of the number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee.

4. We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent’s first name, sex, birth date and relationship to the employee.
Learning objectives

- Learning how to design and implement a database application
  - Conceptual design (ER model)
  - Relational Model
  - Mapping ER to Relational Model
  - Schema refinement and normal forms
  - Querying (SQL)

- Learning database system concepts
  - Concurrency Control and Transaction Management
  - Recovery
  - Storage and Indexing
What you need to do:

- Attend the lectures if you want to interact with me
- Ask any question you like during the lectures (or during my office hours)
- Don’t be scared to ask questions or contribute with your comments
- Work harmoniously for the group project
- Pass this course with a good grade!
  - You need to collect min 50 out of 100 points
  - Quizes are for learning together and collecting points (even bonus points)!
  - Please take advantage of the midterms, final is a bit harder.