

Database Management Systems

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Course Information

Instructor: Roya Choupani

Office: L209

Tel. (312) 2331346

Email: roya@cankaya.edu.tr

Web: <http://academic.cankaya.edu.tr/~roya>

Teaching Assistants:

Emre Akkuş

Tel: (312) 2331348

Email: emreakkus@cankaya.edu.tr

Course Web Page: <http://ceng356.cankaya.edu.tr>

Course Objectives

- To provide the basis for data handling and management, and the related algorithms and techniques.
- To make students able to apply data management and storage optimization techniques to a given problem.
- To write queries to manipulate data

Data Management

- In File Organization we learned to optimize file access.
- The methods discussed were:
 - Sorting and searching files
 - Indexing
 - Hashing
- In this course we learn how to manage data

Data Management Example

- Assume a file is created to store the employee data of a company
- Data is:

Employee Name	Department	Location	Department Phone	Project	Project Start Date	Duration
Ali	Engineering	Cankaya	12345	Construction	2010	3
Hasan	Engineering	Cankaya	12345	Construction	2010	3
Mehmet	Engineering	Cankaya	12345	Construction	2010	3
Zeynep	Engineering	Cankaya	12345	Construction	2010	3
Tolga	Engineering	Cankaya	12345	Construction	2010	3

Problems in the Example File

- Some data items are repeated. (if the department has 10,000 employees, **location** and **department phone** will be repeated 10,000 times)
- If a data item changes (phone number for example), all records should be updated
- File access (input/output) becomes very slow

Optimizing Data Management

Employee Name	Department	Project
Ali	Engineering	Construction
Hasan	Engineering	Construction
Mehmet	Engineering	Construction
Zeynep	Engineering	Construction
Tolga	Engineering	Construction

Department	Location	Department Phone
Engineering	Cankaya	12345

Project	Project Start Date	Duration
Construction	2010	3

Database Management System

- A database management system (DBMS) is a program that enables
 - storing,
 - modifying,
 - extractinginformation from a *database*.
- It also provides tools to analyze data stored in a location
- Example DBMS: ORACLE, MS-SQL, MySQL,...

Course Outline

- Introduction
 - Data, Database, Database Management Systems
 - Data Models
 - Database Languages
- Relational Databases
 - Relations and Tables
 - Attributes
 - Integrity Constraints
- Relational Algebra
- SQL
 - Queries
 - Data Modifications
- Database Design
 - Entity Relationship Model (ER Model)
 - Normalization
- Transactions

Text Book

- Database Systems, Concepts, Languages and Architectures, By: Paolo Atzeni, Stefano Ceri, Stefano Paraboschi, and Riccardo Torlone, Published by McGraw-Hill, ISBN:0077095006
- Fundamentals of Database Systems, Fourth Edition, Elmasri and Navathe, Addison Wesley Press, ISBN:0-312-20448-4

Evaluation

- Homework
 - Lab assignments, you may use any DBMS
- Term Project 30%
 - Includes designing a database, creating tables, inserting data, writing queries.
 - Report
 - Presentation + Demo
- Midterm 30%
- Final 40%