Course Overview

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Database Management Systems (DBMS)

- Efficient
- ACID
- Standard

Databases

Schema elements (objects):
- relations (tables)
- views, indexes
- procedures and triggers

Database on CS3 Server

Oracle

Database Courses

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Database Development

Schema Design

- Data modeling
  - Entity-Relationship (ER) model
  - Relational model
  - Object-oriented model
- Conversion between models
  - ER diagram relational model
  - Object-Relational Mapping (ORM)
- Normalization

Data Modeling Example

Some Restaurant
- Terminal ID: NC2HEHY
- Merchant ID: 449241452566624
- VISA **********1234
- SALE inv:000032
  - Batch: 000244
  - Date: JUN 17, 06  Time: 18:44
  - AUTH:00559B
- Base: $36.70 Tip: Total: Chengyu Sun

Query Languages

- Relational Algebra
- Datalog
- Data Manipulation Language (DML)
  - SELECT ... FROM ... WHERE
  - Conditional queries
  - Subqueries
  - Transactions
  - ...

Database Implementation

- Data Definition Language (DDL)
  - CREATE, DROP, ALTER
- Authorization
  - GRANT, REVOKE
- PL/SQL and Java
  - Functions
  - Procedures
  - Triggers

Recursion Example

- Is there a path from C to E?
Application Development
- Embedded SQL
- JDBC
- Hibernate

Query Tuning
- Background knowledge
- Execution plan
  - View
  - Interpret
  - Control
- Common tips and techniques