

Lectures for the course: Advanced Database Systems (IT 60113)

Week 1

Lecture 1 – 25/07/2007

- Introduction to the course
- Expectations
- Evaluation Guideline
- Term Paper and Term Project Guideline

Lecture 2 – 26/07/2007

- Introduction to ER Model
- Entity Sets, Relationship Sets, Attributes
- Multivalued Attributes, Derived Attributes, Composite Attributes

Lecture 3(A+B) – 27/07/2007

- ER Model contd.
- Weak entity vs. multivalued attribute
- Attributes vs. entities
- Relational Database design from ER Model

Week 2

Lecture 4 – 01/08/2007

- Basics of SQL
- Joins and Group By

Lecture 5 – 02/08/2007

- Class Test 1 was held here

Lecture 6(A+B) – 03/08/2007

- Class Test scripts were shown
- Functional Dependency
- Armstrong's axioms
- Closure of a set of FDs

Week 3

Lecture 7 – 08/08/2007

- Introduction to Active Databases
- ECA Paradigm
- STARBURST Syntax
- Ordering of rules

Lecture 8 – 09/08/2007

- Net effect and rule processing
- Rules triggering other rules
- Quiescent state

Lecture 9(A+B) – 10/08/2007

- ORACLE Triggers
- Row Level Triggers
- Statement Level Triggers
- Rule Processing Algorithm

Week 4

Lecture 10 – 16/08/2007

- Applications of Active Databases
- Integrity Maintenance
- Derived Data Maintenance
- Replication

Week 5

Lecture 11(A+B) – 20/08/2007 (Compensatory in lieu of 17/08/2007)

- Active Database Rule Design
- Termination
- Confluence
- Observable Determinism

Lecture 12 – 22/08/2007

- Introduction to Temporal Databases
- Deriving salary history

Lecture 13 – 23/08/2007

- Other means of deriving salary history
- Temporal SQL queries

Lecture 14(A+B) – 24/08/2007

- Temporal Data Models
- Transaction Time and Valid Time
- Bitemporal Conceptual Data Model
- Representation of bitemporal data

Week 6

Lecture 15 – 29/08/2007

- Other representations of bitemporal data
- Diagram representation
- Normalized representation
- Non First Normal Form Representation

Lecture 16 – 30/08/2007

- Temporal Database Design and Temporal SQL
- Create Table
- Valid State, Valid Event, Transaction Time in Table definition
- Basic TSQLs
- Restructuring

Lecture 17(A+B) – 31/08/2007

- Partitioning and use of PERIOD
- INSERT, UPDATE, DELETE

Week 7

Lecture 18 – 05/09/2007

- Use of Transaction time
- VALID time
- Group by

Lecture 19 – 06/09/2007

- Review of status of Term Paper

Lecture 20(A+B) – 07/09/2007

- Introduction to Deductive Databases
- Datalog
- Facts
- Rules
- Negation

Week 8

Lecture 21 – 12/09/2007

- More examples of negation
- Mapping between TRC and DRC with Datalog

Lecture 22 – 13/09/2007

- Safe Datalog
- Converting safe Datalog to Relational Algebra
- Recursive SQL query

Lecture 23(A+B) – 14/09/2007

- Recursive rules
- Predicate dependency graph
- Stratification

Mid Sem Exam held here

Week 9

Lecture 24 – 26/09/2007

- Mid Sem scripts shown and feedback given

Lecture 25 – 27/09/2007

- Introduction to concurrency control
- Transactions and Schedule

Week 10

Lecture 26(A+B) – 01/10/2007 (Compensatory in lieu of 28/09/2007)

- Serial Schedule
- Conflict Serializability
- View Serializability
- Recoverable and Cascadeless Schedule

Lecture 27 – 03/10/2007

- Two Phase Locking
- Deadlock
- S2PL, R2PL

Lecture 28 – 04/10/2007

- Graph based Protocol
- Timestamp based Protocol

Lecture 29(A+B) – 05/10/2007

- Validation based Protocol
- Multilevel Concurrency Control

Week 11

Lecture 30 – 10/10/2007

- Compatibility matrix in multilevel concurrency
- Intent locks
- Multilevel concurrency control

Lecture 31 – 11/10/2007

- Handling of insert and delete in concurrency control
- Phantom phenomenon

Lecture 32(A+B) – 12/10/2007

- Weak levels of concurrency
- Degree 2 concurrency
- Cursor stability
- Isolation levels – Read uncommitted, read committed, repeatable reads
- Introduction to Distributed database
- Homogeneous and heterogeneous
- Replication and Fragmentation

Week 12

Lecture 33 – 24/10/2007

- Two Phase Commit Protocol

Lecture 34(A+B) – 26/10/2007

- Two Phase Commit Protocol Continued
- Three Phase Commit

Week 13

Lecture 35 – 29/10/2007 (Compensatory Lecture)

- Distributed Join Processing
- Semijoin Processing

Lecture 36 – 31/10/2007

- R-Tree
- Searching in R-Tree

Lecture 37 – 01/11/2007

- Insert and Delete in R-Tree

Lecture 38(A+B) – 02/11/2007

- R* and R+ Trees
- Nearest neighbor search on R-Tree
- MINDIST

Week 14

Lecture 39 – 07/11/2007

- Class Test 2

Week 15

Lecture 40 – 14/11/2007

- NN Search in R-Tree Continued
- MinMaxDist

- Downward and Upward pruning

Lecture 41(A+B) – 16/11/2007

- Properties of High Dimensional Data
- Approximate Nearest Neighbor Search
- Summary and Feedback