Advanced Database Systems

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Overview

• Study system issues of advanced DBMS
  ▲ XML DBMS, Stream Data Management,
  Pervasive Data Management, Peer-to-peer,
  Semantic Web
  ▲ both theories and implementation
• Read research papers
• Programming assignments on Unix using Java
• Research project: survey or original research
• Learn to search the literature, reading papers, writing critiques & technical reports

Teaching Staff

• Instructor: Prof. Weining Zhang
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  Office hour: W 11:00am - 12:00noon or by appointment

Communication

• Web page: http://www.cs.utsa.edu/~wzhang/cs6453/home
  ▲ Contains everything about the course: syllabus, announcement, assignments, project, lecture notes, etc.
  • You should check the pages frequently.
• Mailing list: 6453_001@cs.utsa.edu

Textbooks

• No required textbook. Mostly, read papers
• Recommended textbook:
  ▲ Data on the Web, by S. Abiteboul, et al
  ▲ Database Management systems, 2nd ed., by Ramakrishnan & Gehrke
  ▲ Database system Implementation, by Garcia-Molina, Ullman & Widom
  ▲ Database system concepts, 3rd ed., by Silberschatz, Korth & Sudarshan

Prerequisite

• CS5443 or equivalent.
  ▲ Familiar with DBMS internal structures and query evaluation & optimization techniques
• Familiar with UNIX
• Strong programming skills in Java (or C++)
• Data structure & algorithm
• Mathematics (logic, sets, algebra, ...)
Grading
- Research Project + Presentation 40%
- Programming assignments 30%
- Written Critiques 20%
- Class participation 10%

Class Format
- Read assigned papers before classes
- Hand in written critiques of assigned papers
- Discuss assigned papers in class
  - You may be asked to present concepts, examples, etc.
  - You may be asked to lead the discussion
  - You may be asked to explain your opinion presented in your written critiques.
  - You may be asked to answer questions from other students or from the instructor

Tools to be Used
- For programming assignments
  - Apache implementation of various XML APIs: Xerces and Xalan
  - Oracle relational DBMS
  - KweeX XML query processing system
- For literature search
  - The Web and the library
- For research project
  - LaTeX/BibTeX, LyX (a front-end of LaTeX), Microsoft Word

Programming Assignments
- XML application
  - Use XML APIs to process XML documents
- XML querying
  - Use RDBMS to store XML data
  - Write XML queries
  - Use KweeX
  - Translate XML queries into SQL queries

Research Project
- A comprehensive survey of research literature, or more preferable, an original research
  - Choose a topic
  - Survey related research literature
  - Perform research
  - Write a technical research paper
  - Give an oral presentation

Requirements
- Actively participate in class discussion
- Read assigned papers IN ADVANCE
- Be creative
- Be critical
- Be the center of the learning process
Topics

- XML Standards
  - XML, XSLT, Xpath, Xquery, XML Schema
- XML Query Languages
  - XQL, XML-QL, XML-QL, Quilt, ...
- XML Storage Schemes
  - XML-enabled Relational DB
  - Native XML DB

Topics (cont.)

- XML Indexes
  - Index for regular expressions
- XML Query Evaluation
  - Structural joins
  - Path query, Branching Path query, XQuery
- Query Optimization

Topics (cont.)

- XML Data Statistics and Cost Models
- XML Stream Processing
- Stream Data Management
- Pervasive & P2P Data Management
- Semantic Web