Course Outline

Professor’s details

- Dr. Herna L Viktor
  - Office: SITE 5-060
  - Office hours: Thursdays 09:30-11:00, or email me
  - Email: hlviktor@site.uottawa.ca

Formal course description- Database II

- Design and implementation of a database component in a team project.
- Prerequisite: CSI2132- Database I

Recall: What is a database?

- A very large, integrated collection of data.
- Models real-world enterprise.
  - Entities (e.g., DVDs, actors, directors)
  - Relationships (e.g., Lasse Hallstrom directed Chocolat)
- A Database Management System (DBMS) is the software package designed to store and manage databases.
CSI3130: What (1)?

- Study the “internal workings” of a Database Management System (DBMS), including
  - Transaction Management: Concurrency and Crash Recovery
  - Query processing
  - Security and privacy issues
- Look at alternatives to the “traditional” relational database
  - Object-oriented databases
  - Parallel databases
  - Distributed databases
  - Data warehouses and data mining

Recall: Structure of a DBMS

- A typical DBMS has a layered architecture.
- The figure does not show the concurrency control and recovery components.
- This is one of several possible architectures; each system has its own variations.

Functions provides by the DBMS

- Uniform data administration.
- Reduced application development time.
- Data independence
- Efficient access
- Data integrity and security
- Concurrent access, recovery from crashes.
- Others
  - Web-based access
  - Distribution

CSI3130: What (2)?

- Study the “internal workings” of a Database Management System
  - Transaction Management: Concurrency and Recovery
  - Security and privacy issues
- Look at alternatives to the “traditional” relational DBMS
  - Distributed databases
  - Data warehouses
  - Data mining; Deep web mining
  - Other “Advanced topics”: Data integration, IR and XML data, mobile DB, biological DB, etc.
CSI3130: Why?

- To be able to utilize the “POWER” of an existing DBMS better \( \rightarrow \) (E.g. faster queries, better indexes, ensure data is persistent, private, secure, etc.)
- To fine-tune a DBMS for specific applications
- To create a new generation DBMS?? (E.g. scalable for Petabytes of data, multimedia such as video and audio, “intuitive” interfaces, Bioinformatics, …)
- To know when to distribute, when to go for parallel queries, when to warehouse, when to go for main memory; and when not to…

CSI3130: How?

- Theoretical foundations
- Practical exercises:
  - Study the inner working of an Open Source DBMS, i.e. PostgreSQL
  - Extend PostgreSQL by replacing subset of the code with your own!

CSI3130 Course Administration

http://www.site.uottawa.ca/~hlviktor/csi3130/CSI3130.htm

Lecture times from next week

LEC Tuesday 13:00 - 14:30 TBT 0021
LEC Thursday 11:30 - 13:00 TBT 0021
**Mark Allocation**

You final grade will be determined as follows:
- Assignments (best 2/3)          10
- Team project                  25
- Mid Term                      20
- Final Examination             45

You are required to obtain a combined mark of at least 50% for the midterm and final examination, in order to pass this course.

The project will be done using PostgreSQL.

**Prescribed Book: Same as CSI2132**

Database Management Systems
R. Ramakrishnan and J. Gehrke
3rd Edition
McGraw Hill
2002

It has a great website with additional exercises, solutions and so on!

**In addition:**

To Learn to Program in C

The classic… from the 1970s

C Programming Language
by Brian W. Kernighan (Author) and Dennis Ritchie (Author)
(First Edition 1978)

**Course Outline**

http://www.site.uottawa.ca/~hlviktor/csi3130/CSI3130.htm

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>6 Sept</td>
<td>Introduction, Review and Course Outline</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>13 Sept</td>
<td>The RDBMS: Transaction management, Concurrency Control and Recovery</td>
<td>Chapters 16-18</td>
</tr>
<tr>
<td>20 Sept</td>
<td>The RDBMS: Transaction management, Concurrency Control and Recovery</td>
<td>Chapters 16-18</td>
</tr>
<tr>
<td>27 Sept</td>
<td>The RDBMS: Storage and Indexing (Revised)</td>
<td>Chapters 8-11</td>
</tr>
<tr>
<td>4 Oct</td>
<td>The RDBMS: Query evaluation</td>
<td>Chapters 12, 14 and 15</td>
</tr>
<tr>
<td>11 Oct</td>
<td>The RDBMS: Query evaluation</td>
<td>Chapters 12, 14 and 15</td>
</tr>
<tr>
<td>18 Oct</td>
<td>Midterm on Tuesday 21 October during lecture time in normal lecture venue</td>
<td>Everything up to now</td>
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</tbody>
</table>
**Course Outline**

Course Outline

http://www.site.uottawa.ca/~hlviktor/csi3130/CSI3130.htm

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>25 Oct</td>
<td>Study Week; No Lectures</td>
</tr>
<tr>
<td>1 Nov</td>
<td>Distributed Databases Chapter 25</td>
</tr>
<tr>
<td>8 Nov</td>
<td>Data Warehousing and Decision Support Lecture on Tuesday 11h30-14h30</td>
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<td></td>
<td>Tutorial on Thursday 11h30-13h30</td>
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<tr>
<td>15 Nov</td>
<td>Data Mining</td>
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<tr>
<td>22 Nov</td>
<td>The RDBMS: Security and Authorization Chapter 21</td>
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<tr>
<td>29 Nov</td>
<td>Advanced topics: Data integration, Information Retrieval and XML data, mobile databases, biological databases, multimedia databases, main memory databases, information visualization Chapters 27 and 29</td>
</tr>
<tr>
<td>6 Dec</td>
<td>Project demonstrations on Tuesday December 7, 2010</td>
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**The Lab and Tutorial Time**

- **First lab and First Tutorial** during the week of 20 September 2010
- Check the following two links, from the course website, for the exact schedules and topics:-
  - [http://www.site.uottawa.ca/~hlviktor/csi3130/LabsFall2010.htm](http://www.site.uottawa.ca/~hlviktor/csi3130/LabsFall2010.htm)
  - [http://www.site.uottawa.ca/~hlviktor/csi3130/Tut10.htm](http://www.site.uottawa.ca/~hlviktor/csi3130/Tut10.htm)

**Lab Schedule**

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
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<tbody>
<tr>
<td>20 Sept</td>
<td>Revisiting PostgreSQL from Java to C</td>
</tr>
<tr>
<td>27 Sept</td>
<td>The Unix environment, C programming (and using vi)</td>
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<tr>
<td>4 Oct</td>
<td>More C programming</td>
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<tr>
<td>11 Oct</td>
<td>Building PostgreSQL Server from Source Code</td>
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<tr>
<td>18 Oct</td>
<td>No lab; Midterm Exam</td>
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<tr>
<td>25 Oct</td>
<td>Study Week</td>
</tr>
<tr>
<td>1 Nov</td>
<td>Modifying Functionality in the Backend Server of PostgreSQL</td>
</tr>
<tr>
<td>8 Nov</td>
<td>ABOUT the Project/Environment Set Up</td>
</tr>
<tr>
<td>15 Nov</td>
<td>TA available to assist students</td>
</tr>
<tr>
<td>22 Nov</td>
<td>TA available to assist students</td>
</tr>
<tr>
<td>29 Nov</td>
<td>TA available to assist students</td>
</tr>
<tr>
<td>6 Dec</td>
<td>Demonstrate your project on Tuesday December 7, 2010</td>
</tr>
</tbody>
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**Details of the TA**

Fatemeh Nargesian
SITE Room 4-026
Email: FNARG012[at]uottawa.ca.

- Fatemeh will be available during tutorial hours, either in FTX 235 or in her office.
- She will also conduct the labs.
- Please check the Tutorial Schedule to see if we will have a formal scheduled tutorial (first one during the week of September 20).
Next…

Review your CSI2132 knowledge