Database Systems

Background

When and where

Class Mondays 8am through 10:45pm in Hancock 1021
Lab Tuesdays at 8am in HC 0005

Suggested Text

Database Systems The Complete Book, second edition by Garcia-Molina, Ullman, and Widom. Published by Prentice Hall. ISBN 978-0-13-187325-4

Web

http://www.labouseur.com/courses/db

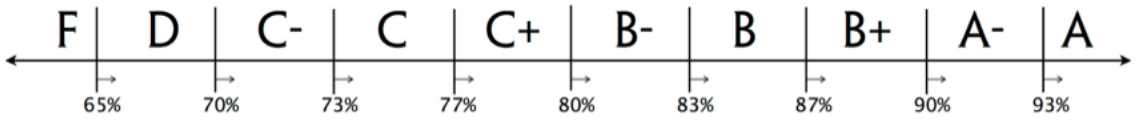
Instructor

Alan G. Labouseur
Hancock 3***007***
Office hours are posted.

Alan.Labouseur@Marist.edu
alan@Labouseur.com
845-575-3832 *Marist* / 845-440-1102 *home office*

Grading

Letter Grades



You can earn up to 1000 points over the course of the semester, broken down as follows: (These weights are subject to minor variation and Brownian motion.)

Labs	20.0%	200 points: 10 at 20 points each	[1, 2]
Big Data Paper Summary	10.0%	100 points	[1, 2]
Database Design Project	20.0%	200 points	[1, 2, 5]
Mid-term Exam	20.0%	200 points - study sheet permitted	[1, 2, 5]
Final Exam	25.0%	250 points - study sheet permitted	[5]
Attendance and Participation	2.5%	25 points for quality & quantity	[5]
Laziness and Whining	2.5%	25 points - for **not** (being lazy or whining)	[1] [1]

Themes, Objectives, and Assessment

Assessment methods include assignments, quizzes, exams, discussions, presentations, peer review, and projects.

[References] refer to Department of Computing Technology Goals available at http://www.labouseur.com/courses/goals.pdf

In this course, I hope that you will . . .

- come to understand that data has value, and **the** right answer is better than **a** fast answer. [1, 2]
- reach a solid knowledge of and appreciation for principles and foundations of relational and graph database systems. [1, 2]
- gain an understanding of relational database concepts, terminology, and their superiority over NoSQL garbage like document stores. [1, 2]
- attain in-depth knowledge of the relational data model and why it's superior to other data models in general, and will likely remain so. [1, 2]
- realize that no SQL is better than NoSQL. [1, 2, 5]
- realize that Lotus Notes and Ms-Access are not databases, but rather a type of pernicious virus. [1, 2]
- appreciate, understand, use, and bask in awe of SQL. [1, 2]
- appreciate, understand, and bask in awe of graphs. [1, 2, 5]
- design, implement, test, and present a BCNF relational database. [1, 2]
- discuss and use new database technology. [1, 2, 5]
- come to know some modern Big Data techniques and technologies [1, 2]
- develop continuing education skills. Capable problem solvers never stop learning. To the end, you will get practice in finding some answers for yourself. [1, 2]

Database Systems

Schedule

Date	#	Chapter	Due	Topics
28-Aug	1	1 9.1-2	—	Administrivia and The Plan · The many faces of data throughout history: Files, Hierarchies, Networks, Tables, Documents, Key-value stores, and Graphs
4-Sep	-	—	Lab 1 *Installing PostgreSQL*	*No class meeting: Labor Day*
11-Sep	2	2, 4.1, 5.1 6.1, 7.1	Lab 2 (partial) *Our beloved CAP database*	The Relational Model · Relational Algebra · Data types · Keys Beginning SQL · Simple SQL queries
18-Sep	3	2, 6.2-3 7.1-2, 9.3	Lab 3 *Getting started with SQL*	Keys · Entity/Relationship modeling · Referential Integrity · SQL create and subqueries · Check and Table constraints · Null and three-valued logic · Cursors
25-Sep	4	4.4, 6.4-5 7.1-2	—	Insert, update, and delete operations in SQL · RI constraints · Weak entities SQL: set operations, aggregations, GROUP BY and HAVING, the weirdness of NULL
2-Oct	5	6.1 - 6.5	Lab 4 *Subqueries SQL*	Joining relations · Inner joins and Outer joins · The System Catalog
9-Oct	6	8 14.1-3	Lab 5 *Joins Three-quel*	Views · Indexes and Index Structures
16-Oct	-	—	Lab 6 *Interesting and Painful Queries*	**Mid-term Exam in HC 1021** (for now). One-page study sheet permitted. Some restrictions apply.
23-Oct	7	3 4.1-6	—	Discuss the Mid-term Exam Introduction to Normalization, Functional dependencies, and Normal forms
30-Oct	8	3 4.1-6	Big Data Paper Summary	Normalization · Functional dependencies · Normal forms The normalization process · Lossless Joins · Normalization examples and exercises
6-Nov	9	3, 4.1-6, 4.1.11 9.4, 10.1	Lab 7 *Normalization 1*	Discuss Lab 7 · Database design and modeling · Entity subtypes · Data Quality Intro to Stored procedures and Triggers · DBA, Authorization, and Security
13-Nov	10	9.4	Lab 8 *Normalization 2*	Discuss Lab 8 · More Stored Procedures and Triggers · Catch-up
20-Nov	11	15.1-6	Lab 9 *Normalization 3*	Discuss Lab 9 · Inside the join process · Query plans Query implementation types
27-Nov	12	6.6 18.3-4 19.2, 17	Lab 10 *Stored Procs*	The ACID properties · Transactions, Locking, and the Log file
4-Dec	13	7.5, 17.2-4 10.6	Design Project	Triggers and the Log file · OLTP, OLAP, and EiTeL overview
14 Dec 8am in HC2023	-	all of the above	—	Comprehensive **Final Exam in HC 2023**. One-page study sheet permitted. Restrictions apply.