CS249: Deductive Databases and Non-Monotonic Reasoning
Spring 97

C. Zaniolo, zaniolo@cs.ucla.edu

Outline

- Week 1: Relational Databases and Datalog systems.

  Introduction to the $\mathcal{LDL}$++ system. Several programming assignments—collected and graded.
- Week 2: Formal Semantics
  - Herbrand Models, Least Herbrand Model
  - Least Fixpoints
- Week 3: Declarative and Operational Semantics
  - SLD-resolution and Prolog
  - Bottom-up and Top-down methods.
  - Deductive Database Prototypes
- Week 4: Non-Monotonic Reasoning and Computation.
  - Negation by Failure and Clark's Completion
  - Well-Founded models and Stable models
  - Discrete Temporal Reasoning and Datalog_{1S}
  - XY-stratification
- Week 5: Non-Deterministic Reasoning.
  - Choice
  - Set aggregates

CS249: Deductive Databases and Non-Monotonic Reasoning Outline–cont.

- Week 6: Database Changes
  - Database Updates
  - Active Rules
  - Reasoning with time and actions in databases
- Week 7:
  - Midterm.
  - Application overview
- Week 8: Advanced Topics: e.g., spatio-temporal reasoning, reasoning with uncertainty (by instructor or students).
- Week 9: Advanced Topics—presentations by students.
- Week 10: Advanced Topics—presentations by students
- Week 11: Term Paper/Project Report due.

Grading

- 20%: Programming assignments.
- 30%: Midterm
- 20% Presentation
- 30% Final Project.

CS249: Deductive Databases: Spring 97.

Books: to supplement notes

C. Zaniolo et al., "Advanced Database Systems," Morgan Kaufmann, 1997.

J.W. Lloyd, "Foundations of Logic Programming," Springer Verlag, 1987.

J.D. Ullman., *Database and Knowledge Base Systems–Vol. I and Vol. II*, Computer Science Press.

S. K. Das, "*Deductive Databases and Logic Programming*," Addison-Wesley, 1992.

Naqvi, S. and Tsur,S., *A Logical Language for Data and Knowledge Bases*, Computer Science Press, 1989.

R. Ramakrishnam (ed.) *Applications of Logic Databases*, Kluwer Academic Publishers, 1995.

S. Abiteboul, R. Hull, V. Vianu, "Foundations of Databases,", Addison-Wesley, 1995.

CS249: Course Objectives

Course Objectives

- Introduction to technology of rule-based deduction and expert system programming on databases
- Foundations of query languages: data complexity and expressive power issues
- Formal models of non-monotonic reasoning and dynamic systems—with applications (e.g., active databases).
- Mulitimodal reasoning, time, actions, uncertainty—unified models and applications in next-generation information systems, mediators and agents.