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ConSystLab

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Members only

Welcome to the Constraint Systems Laboratory (ConSystLab)

Department of Computer Science & Engineering
University of Nebraska-Lincoln

Founded and directed by [Berthe Y. Choueiry](#).

Our research is concerned with both theoretic and practical aspects of **Constraint Processing**, a sub-area of **Artificial Intelligence**. We believe that Constraint Processing provides the right tools for modeling and solving a wide variety of combinatorial problems spanning over many areas in Computer Science, Engineering, and Management.

Constraint Systems Laboratory

October 13, 2005

Four-Minute Madness

UNIVERSITY OF
Nebraska
Lincoln

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Motivating example

- **Context:** You are a senior in college, and need to register in 4 courses for the Spring semester
- **Possibilities:** Many courses offered in Math, CSE, EE, CBA, etc.
- **Constraints:** restrict the choices you can make
 - *Unary:* Courses have prerequisites you have/don't have, there a courses/instructors you like (or not), etc.
 - *Binary:* Courses are scheduled at the same time
 - *n-ary:* In CE: 4 courses from 5 tracks such as at least 3 tracks are covered
- **Problem:** You have choices, are restricted by constraints, and
You need to make the right decisions!!

Research issues

- Modeling the constraints
 - Hard/soft, binary/non-binary, finite/interval
- Solving the problem
 - Algorithms for constraint propagation
 - Search: backtrack & iterative repair
- Identifying islands of tractability based on
 - Topological properties of the constraint graph
 - Semantic properties of the constraints

Sample Projects

1. Graduate TA Assignment Project (GTAAP)
 - Modeling, search, GUI
2. Temporal Reasoning
 - Constraint propagation, search, graph theory
3. Symmetry detection
 - Search, databases (computational), graph theory
4. Structural decompositions
 - Databases (theory), tractability results

Courses

- Relevant CSE courses:
 - Introduction to AI (876)
 - Foundations of Constraint Processing (821)
 - Advanced AI (976)
 - Recent Advances in Constraint Processing (990)
- To conduct research, you also need:
 - CSE:
 - Solid knowledge of 235, 310
 - Useful courses: 423, 424, 914, 923
 - Also: Math852, Math832, Stat801, Stat802