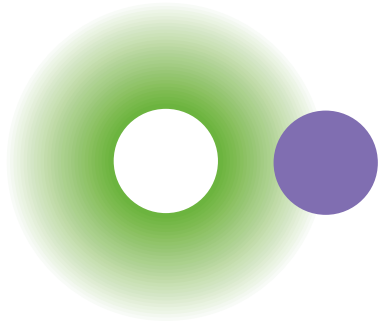

NICTA Course Module
Answer Set Programming: A Problem Solving Paradigm

Dr. Torsten Schaub

August, 2009

NICTA course modules build toward meeting the course requirement which is part of PhD expectations at certain partner universities, and which forms a part of a NICTA Enhanced PhD program.

- Modules are designed for short intensive delivery, usually over a few days.
- A module may be coordinated by a member of academic staff from a university, by a NICTA researcher, or by a visiting researcher to NICTA or an associated university.
- Modules are designed so that coordinators do not have to commit to regular lecture times spanning an entire session.
- A typical module requires a commitment of 50 hours of work, 15-20 contact hours, reading, assignments and assessment. Such a module meets approximately one-third of the requirements for a postgraduate masters (or higher) level course.
- With the approval of Heads of School modules may accumulate to satisfy coursework requirements. Postgraduate Coordinators can advise on the precise administrative processes by which this is achieved.

Answer Set Programming: A Problem Solving Paradigm

Background

Answer Set Programming combines an extremely high-level modeling language with the efficiency of high-performance Boolean constraint solvers. This makes it an attractive tool for knowledge representation and reasoning which are rapidly becoming more relevant for real-world applications.

This course is among the few comprehensive ones on the subject, carefully developed since 2001. The course has been delivered on a yearly basis at the University of Potsdam and in compact forms at other schools.

Coverage of Artificial Intelligence at an introductory level is suggested as prior knowledge.

Coordinator

Dr. Torsten Schaub (http://www.cs.uni-potsdam.de/ torsten/)

Course Description

Answer Set Programming (ASP) is a new (Boolean) constraint solving paradigm, combining an expressive declarative modeling language with high performance solving technology.

Formally, it is well-suited for solving problem in NP or NP$\hat{\text{N}}$P, respectively, like bounded model-checking and planning, classical combinatorial problems, among them time tabling and product configuration, as well as many problems in bio-informatics and knowledge representation in general.

The course will start from an informal short introduction to syntax, semantics, modeling, and algorithms.

These topics are then detailed in the remainder, while putting a particular emphasis an the theoretical foundations and practical implementation of modern ASP solving technology.

Brief Course Outline

1. Motivation
2. Introduction
3. Modeling
4. Language extensions
5. Complexity
6. s-models approach
7. Completion
8. Unfounded Sets
9. Solvers
10. Tableau calculi
11. Conflict learning
12. Distributed solving
13. Equivalence

14. Negation
15. Preferences
16. Applications

How to enrol Download a Registration Form from the Education web site http://www.nicta.com.au/education/advancedict and return it to:

Chrisanthy.Theodosakis@nicta.com.au

Please discuss your enrolment with your supervisor and postgraduate coordinator.

When

30 November - 3 December, 2009, 9.00 am - 5.00 pm each day

The course will be conducted in Sydney. You will be advised of the location, which will also be displayed on the web site.