Systems and Solving Techniques for Knowledge Representation and Reasoning

(Introduction)

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Topics covered

Solving algorithms for:

- Propositional Satisfiability (SAT)
- Answer Set Programming (ASP)
- Quantified SAT (QSAT)
- Satisfiability Modulo Theories

presented via the:

Abstract solvers methodology

What is?

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Goals:

- Study practicalities of some formalisms for KR&R
- Focus on ASP and SAT
- Focus on Systems and Solving techniques
- Focus on a (new) formal methodology for their specification

Course Goals (2)

What will you bring at home with you?

- a new formal methodology for designing solving procedures for a given reasoning task;

- a detailed analysis, employing such methodology, of a particular reasoning task in ASP, SAT, QSAT or SMT.

More on the research side: Why focus on ASP?

The ASP paper:

F. Calimeri, M. Gebser, M. Maratea, F. Ricca:
Design and results of the Fifth Answer Set Programming Competition.
Artificial Intellenge 231: 151-181 (2016)

is currently the **most cited** article published in the Artificial
Intelligence journal in the period 2016-2019.

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Abstract Solvers for Computing Cautious Consequences of ASP
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More on the personal (your) side: Why this course?

Erasmus+ 2014-2020 between University of Genova and TU Wien (Prof. Stefan Woltran) for mutual exchange of Master and PhD students.

Isabella Kammerhofer (Master student in Mathematics) has been in Genova Septmber-November 2018 and is now finishing his Master thesis (on abstract solvers and ASP :)

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More on the personal (your) side: Why this course? (2)

In Genova:

More on the personal (your) side: Why this course? (3)

In the Acquarium:

Available material (soon updated)

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http:
//www.star.dist.unige.it/~marco/SSTKR-2019/material.htm
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- Datalog (Introductory)
- ASP: Syntax and Semantics for basic ASP programs
- ASP: Extensions
- (Abstract) Solving techniques for SAT [**(Partly) done in class**]
- (Abstract) Solving techniques for normal ASP programs [**(Partly) done in class**]
- (Abstract) Solving techniques for disjunctive ASP programs

- Exercises

- Research papers

Course organization

3 ECTS = 75 Hours

- Introduction and topic assignment: 3h
- Lectures: 9h (including presentations)
- Additional reading and preparation for exam: 63h

Exam / Evaluation

- Oral presentation in class (with slides) on the assigned topic
- Done individually
- On November 13th (to be confirmed)

Course dates

See next slide for details

Office hour

- by email (marco@dibris.unige.it; mmaratea@dbai)

Course dates and Material

1. Mon 21 October 2019 h: 10-13
2. ...

All information and material available at

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http:
//www.star.dist.unige.it/~marco/SSKTR-2019/
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reachable also from TISS.