

Course “An Introduction to SAT and SMT”

Chapter 0: Course Overview

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URL: http://disi.unitn.it/rseba/DIDATTICA/SAT_SMT2022/

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Motivations & Goals

- **Propositional Satisfiability (SAT)** and **Satisfiability Modulo Theories (SMT)** are of much interest in many domains, ranging from
 - (SAT) Theoretical interest, as main NP-complete problem
 - SAT solvers and, more recently, SMT solvers, are increasingly used as backend engines in a variety of applications
- This course provides an introduction to SAT and SMT
- Fields of interest:
automated reasoning, algorithms and combinatorics, artificial intelligence, bioinformatics, constraint programming, electronics, knowledge representation, formal verification of SW and HW, optimization, security, crypto-analysis, ...

General information

- Will take 20 hours and provide 3 credits
- Will be given in English.
- The course is intended for PhD students of Graduate School in ICT of University of Trento, but it is open to whoever may be interested, in particular to 1-st or 2-nd year M.S. students in computer science ("corso di laurea specialistica in informatica")
- Two parts
 - Propositional Satisfiability (SAT)
 - Satisfiability Modulo Theories (SMT)

General information (cont.)

- A basic background knowledge on the following topics is a prerequisite for the course:
 - **logic** (propositional logic & basic first-order logic)
 - basics on **algorithms and data structures**
- Exam: **written test**

Course Material

- **slides:** disi.unitn.it/rseba/DIDATTICA/SAT_SMT2022/
- **personal notes**
- **survey papers (SAT):**
 - [The Handbook of Satisfiability](#). 2009. ©IOS press.
 - Lintao Zhang and Sharad Malik, "[The Quest for Efficient Boolean Satisfiability Solvers.](#)" Proc. CAV'02, LNCS, number 2404, Springer, 2002.
- **survey papers (SMT):**
 - Roberto Sebastiani: "[Lazy Satisfiability Modulo Theories](#)".
Journal on Satisfiability, Boolean Modeling and Computation, JSAT. Vol. 3, 2007. Pag 141–224, ©IOS Press.
 - Clark Barrett, Roberto Sebastiani, Sanjit Seshia, Cesare Tinelli "[Satisfiability Modulo Theories](#)". Part II, Chapter 26, [The Handbook of Satisfiability](#). 2009. ©IOS press.
 - Leonardo de Moura, Nikolaj Bjorner: "[Satisfiability modulo theories: introduction and applications.](#)"
Communications of the ACM 54(9), 2011
- other more-specific papers, on demand

Timetable (provisional)

CLASSES:

- Monday-Friday, January 17th – 21th, 9.00-11.00am
- Monday-Friday, January 24th-28nd, 9.00-11.00am

EXAM: TBD