Course "An Introduction to SAT and SMT"
Chapter 0: Course Overview

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

Int. Graduate School on Information Engineering & Computer Science, DISI, University of Trento,
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last update: Tuesday 18th January, 2022

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, ...

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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 $17^{th} - 21^{th}$, 9.00-11.00am
- Monday-Friday, January 24th-28nd, 9.00-11.00am

EXAM: TBD