

# Course “An Introduction to SAT and SMT”

## Chapter 0: Course Overview

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URL: [http://disi.unitn.it/rseba/DIDATTICA/SAT\\_SMT2020/](http://disi.unitn.it/rseba/DIDATTICA/SAT_SMT2020/)

Int. Graduate School on ICT, University of Trento,  
Academic year 2019-2020

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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, ...

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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\\_SMT2020/](http://disi.unitn.it/rseba/DIDATTICA/SAT_SMT2020/)
- **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, May 11<sup>th</sup> – 15<sup>th</sup>, 9.00-11.00am
- Monday-Friday, January 18<sup>th</sup>-February 22<sup>nd</sup>, 9.00-11.00am

EXAM: TBD