

# SAT Solving – Introduction

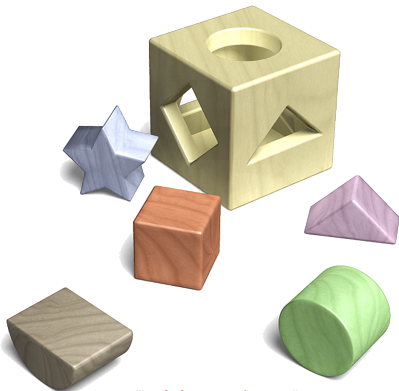
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- ▶ Introduction
- ▶ SAT Problems
- ▶ Stochastic Search
- ▶ Systematic Search
- ▶ RISS
- ▶ Preprocessing
- ▶ Parallel SAT Solving



## Introduction

- ▶ **SAT problems are well known problems and have been studied in Computer Science and Mathematical Logic for many years**
  - ▷ What is the oldest reference?
  - ▷ What other areas are concerned with SAT problems?
- ▶ **Complexity Theory was developed while studying SAT problems**
  - ▷ Cook: The Complexity of Theorem-Proving Procedures. In: Proceedings of the 3rd Annual ACM Symposium on Theory of Computing, 151-158: 1971
- ▶ **Many other combinatorial optimization problems can be reduced to SAT**
- ▶ **Modern SAT solvers can solve problems with up to  $10^7$  variables**
- ▶ **There are many real-world applications**
  - ▷ Can you name some?
- ▶ **There are still many open problems**



## Remarks

- ▶ **You may organize yourself in groups of up to three students**
- ▶ **We will ask the groups to do assignments**
  - ▷ **To present us some SAT-encodings of real world problems (talk)**
  - ▷ **To develop a SAT-encoding for a particular problem (competition & talk)**
- ▶ **Reading Assignment until next week:**
  - ▷ Cook: The Complexity of Theorem-Proving Procedures. In: Proceedings of the 3rd Annual ACM Symposium on Theory of Computing, 151-158: 1971



## Modules

- ▶ MCL-PI
- ▶ MCL-KR
- ▶ INF-VERT2
- ▶ INF-PM-FOR
- ▶ INF-E-3
- ▶ INF-BAS2 (applied for)
- ▶ INF-BAS3

