SAT Solving – Introduction

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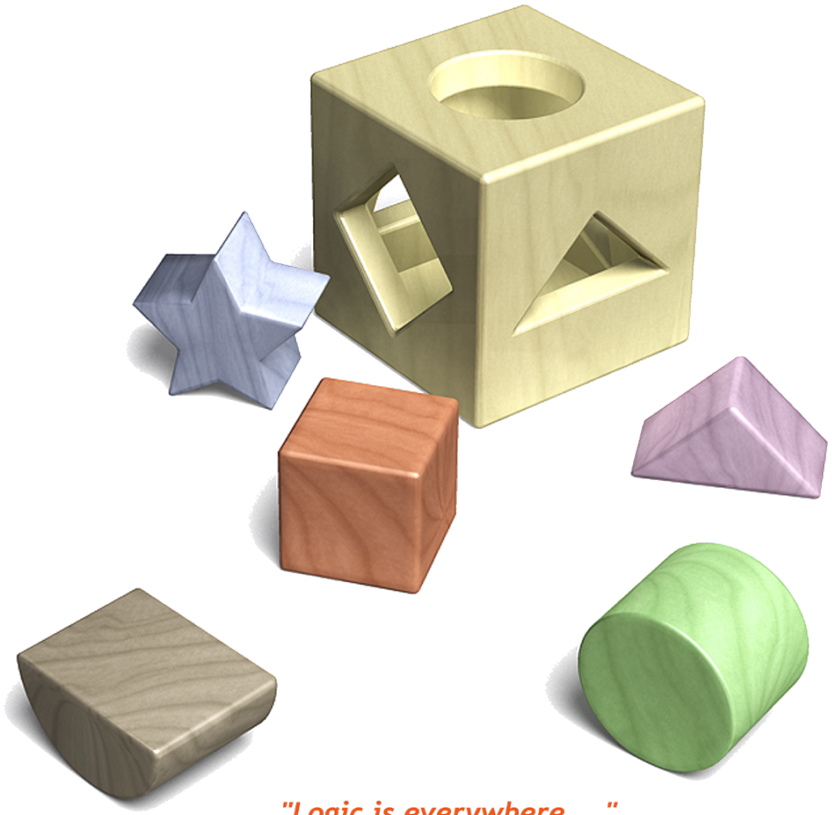
- Introduction
- SAT Problems
- Stochastic Search
- Systematic Search
- RISS
- Preprocessing
- Parallel SAT Solving



"Logic is everywhere ..."

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

Schedule

- 6. & 13.4. Lectures
- 20.4. Exercises
- 27.4. & 4.5. Lectures
- 11.5. Exercises
- 18.5. First assignment
- 25.5. Holiday
- 1.6. Talks & Exercises
- 8.6. Semester break
- 15.6. Lectures
- 22.6. Presentation & Second Assignment
- 29.6. Lectures & Exercises
- 6.7. Presentation & Second Assignment
- 13.7. Competition & Talks