MiniSat Tutorial

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Outline

- MiniSat Introduction
- Input Format
- Usage

MiniSat Introduction

- MiniSat
  - The state-of-the-art SAT solver
- Boolean satisfiability problem
  - Whether the variables of a given Boolean formula can be consistently replaced by the values TRUE or FALSE in such a way that the formula evaluates to TRUE
- Satisfiable
  - Exists an assignment where the formula evaluates to TRUE
- Version
  - MiniSat_v1.14_linux
- Download website
  - http://minisat.se/MiniSat.html

Input Format

- DIMACS CNF format
  - Product of sums
- Requirement
  - ‘c’ is for comment
  - In the line ‘p’, the first number is the variable number, and the second number is the clause number
  - The end of a clause must be ‘0’
- Example

```
c example
c (a + b + c)(a' + c')
p cnf 3 2
 1 2 3 0
 -1 -3 0
```

Usage

- Usage:
  - ./MiniSat_v1.14_linux <input.dimacs> <output>

- Example
  - The output of previous example is SATISFIABLE

```
jjwang@eda33 ~/LSV2017/hw2 $ ./MiniSat_v1.14_linux example.dimacs example.output
============================[MINISAT]===================================
| Conflicts |     ORIGINAL     |              LEARNT                | Progress |
|           | Clauses Literals |   Limit Clauses Literals  Lit/Cl |          |
========================================================================
|         0 |       2        5 |       0       0        0     nan |  0.000 % |
========================================================================
restarts              : 1
conflicts             : 0              (nan /sec)
decisions             : 3              (inf /sec)
propagations          : 3              (inf /sec)
conflict literals     : 0              ( nan % deleted)
Memory used           : 1.67 MB
CPU time              : 0 s

SATISFIABLE
```

Online Resources

- Minisat
  - http://minisat.se/MiniSat.html
  - https://willyc20.github.io/2016/12/18/sat-problem-2/
- Input Format
  - http://www.satcompetition.org/2009/format-benchmarks2009.html