

# HW1 Guide

## SAT4J

- Download SAT4J-core (version 2.3.5) from <http://www.sat4j.org/>
- Read the document “Getting started with SAT4J” (Nov 15, 2010 Version)  
This gives a comprehensive introduction to the satisfiability solver SAT4J

## DIMACS graph format

- Input file for SAT4J should be in DIMACS format
- Read the document “Satisfiability Suggested Format” (May 8, 1993 Version)

## Using SAT4J

- Given a propositional formula, first convert it to CNF.  
DIMACS format can be applied to CNF formulas only.
- Write the CNF formula in DIMACS format and save to a file say “cnffile”
- **Java -jar org.sat4j.core.jar cnffile**

## p FORMAT VARIABLES CLAUSES

- FORMAT is for programs to detect which format is to be expected. Which should always be “cnf”
- VARIABLES is number of unique variables in the expression
- CLAUSES is the number of clauses in the expression

**Example 1:**  $(A \vee \neg B \vee C) \wedge (B \vee D \vee E) \wedge (D \vee F)$

*c This is the cnffile*

*p cnf 6 3*

*1 -2 3 0*

*2 4 5 0*

*4 6 0*

**Example 2:**  $(P \wedge S \rightarrow Q) \wedge (Q \wedge R \rightarrow P) \wedge (P \rightarrow S)$

Convert this to CNF:  $(\neg P \vee \neg S \vee Q) \wedge (\neg Q \vee \neg R \vee P) \wedge (\neg P \vee S)$

*p cnf 4 3*

*-1 -4 2 0*

*-2 -3 1 0*

*-1 4 0*