Exercise 5

SAT-Solving

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Exercise 5.1

What is a semantic tree? Describe the ST calculus as presented in the lecture. List the rules in the calculus and explain the basic idea.

Exercise 5.2

Apply the ST calculus to the following formula:

 $< [2,\overline{3}], [1,\overline{2}], [2,3], [\overline{1},\overline{2},\overline{3}] >$

Draw the resulting semantic tree as noted in the lecture.

Exercise 5.3

Write a program that uses the ST calculus to solve a SAT problem. Use the DIMACS format as input as presented in the lecture. The program should answer with "s SATISFIABLE" and the corresponding model if the input formula is satisfiable and with "s UNSATISFIABLE" otherwise.

Try your program on different SAT problems. What is the largest amount of clauses / variables your program is capable to solve in a suitable amount of time?