Storing CNF Equations

Anatoly Weinstein

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This document contains information, such as magic bytes and grammars, about how SAT equations will be stored in this program.

1 Human Readable SAT `.hsat`

Magic Bytes The file starts with the bytes `SAT`

Grammar Contains a general unformated equation.

```
 S → SAT( EQ )
EQ → BINOP( EQ, EQ ) | NOT( EQ )
EQ → NUM | T | F
BINOP → AND | OR | XOR | NOR
```

2 Compressed CNF-SAT `.cnf`

A compressed CNF-SAT equation consists of three blocks, the `Headers`, `Solution Strings` and the Equation String.

Magic Bytes The file starts with the bytes `CNF` followed by a whitespace.

Comments The next block includes comments. These are ignored by the parsers. Every comment fills one line starting with `#` and ending with line break.

Dimension Bytes The following two bytes specify the size of disjunctions and variable storage.

The first magic byte specifies the size of variables n in bytes. (Constraint: $n \in [1, 8]$. Note for parser: Reading the symbol `#` refers to *comments*. See above.)

The following magic byte specifies the size of a disjunction $D_{\max}$ magic bytes. (Constraint: $n \in [1, 8]$)

. . . Solutions The first block of the document provides some solutions to the logic equations given in the document.

Magic Byte Specifies the next state.

`00` There are no more solutions left.

`01` Next bytes is a solution.

`FF` There are further solutions which are not provided in the document.

. . . Solution n bits, rounded up to bytes, of positional interpretations. A bit at position n is 1, if and only of the variable n is truthy.

. . . Equation The rest of the document are iterations over disjunctions.

Disjunction Size Specifies how many variables will follow. Size of this magic byte is specified in the header.

Zero to indicate there are no more disjunctions.

. . . Variables Byte String of Variables, every variables size is specified in the headers. The first bit specifies if the variable is negated.

Grammar

```
 S → CNF  COMMENTS DIMENSION SOLUTION EQUATION
COMMENTS → # ... \n
DIMENSION → nD_max
SOLUTION → TODO
EQUATION → TODO
```