

# Storing Knf Equations

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January 19, 2024

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 HSAT

**Grammar** Contains a general unformatted equation.

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

## 2 Human Readable CNF-SAT .hcnf

**Magic Bytes** The file starts with the bytes HCNF

**Grammar** Contains a general unformatted equation.

TODO

## 3 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.

The following magic byte specifies the size of a disjunction  $D_{\max}$  magic bytes.

**...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 if 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.