Package 'rpicosat'

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Type Package

Title R Bindings for the 'PicoSAT' SAT Solver

Version 1.0.1

Description Bindings for the 'PicoSAT' solver to solve Boolean satisfiability problems (SAT).
The boolean satisfiability problem asks the question if a given boolean formula can be TRUE; i.e. does there exist an assignment of TRUE/FALSE for each variable such that the whole formula is TRUE?
The package bundles 'PicoSAT' solver release 965 <http://www.fmv.jku.at/picosat/>.

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Encoding UTF-8

LazyData true

ByteCompile true

RoxygenNote 6.0.1

URL https://github.com/dirkschumacher/rpicosat

BugReports https://github.com/dirkschumacher/rpicosat/issues

NeedsCompilation yes

Depends R (>= 3.4.0)

Suggests testthat, covr

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Repository CRAN

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R topics documented:

`picosat_added_original_clauses` *The number of original clauses*

Description

The number of original clauses

Usage

```
picosat_added_original_clauses(x)
```

Arguments

`x`	a picosat solution object

Value

an integer vector of length 1

`picosat_decisions` *The number of decisions during a search*

Description

The number of decisions during a search

Usage

```
picosat_decisions(x)
```

Arguments

`x`	a picosat solution object

Value

an integer vector of length 1

picosat_propagations *The number of propagations during a search*

Description

The number of propagations during a search

Usage

```
picosat_propagations(x)
```

Arguments

x	a picosat solution object

Value

an integer vector of length 1

picosat_sat *Solve SAT problems with the 'PicoSAT' solver*

Description

The solver takes a formula in conjunctive normal form and finds a satisfiable assignment of the literals or returns that the formula is not satisfiable.

Usage

```
picosat_sat(formula, assumptions = integer(0L))
```

Arguments

formula	a list of integer vectors. Each vector is a clause. Each integer identifies a literal. No element must be 0. Negative integers are negated literals.
assumptions	an optional integer vector. Assumptions are fixed values for literals in your formula. Each element corresponds to a literal. Negative literals are FALSE, positive TRUE.

Value

a data.frame with two columns, variable and value. In case the solution status is not PICOSAT_SATISFIABLE the resulting data.frame has 0 rows. You can use 'picosat_solution_status' to decide if the problem is satisfiable.

References

PicoSAT version 965 by Armin Biere: http://fmv.jku.at/picosat/

A. Biere. PicoSAT Essentials. Journal on Satisfiability, Boolean Modeling and Computation, 4:75–97, 2008.

Examples

```
# solve a boolean formula
# (not a or b) and (not b or c)
# each variable is an integer
# negations are negative integers
formula <- list(
 c(-1L, 2L),
 c(-2L, 3L)
)
res <- picosat_sat(formula)
picosat_solution_status(res)

# set a variable to a fixed value
# e.g. a = TRUE and b = TRUE
res <- picosat_sat(formula, assumptions = c(1L, 2L))
picosat_solution_status(res)

# get further information about the solution process
picosat_variables(res)
picosat_added_original_clauses(res)
picosat_decisions(res)
picosat_propagations(res)
picosat_visits (res)
picosat_seconds(res)
```

`picosat_seconds` *Time spent in 'picosat_sat'*

Description

Time spent in 'picosat_sat'

Usage

```
picosat_seconds(x)
```

Arguments

x	a picosat solution object

Value

a numeric vector of length 1

picosat_solution_status *Get the solution status*

Description

Get the solution status

Usage

```
picosat_solution_status(x)

## S3 method for class 'picosat_solution'
picosat_solution_status(x)
```

Arguments

x	a solution from the solver

Value

character either PICOSAT_SATISFIABLE, PICOSAT_UNSATISFIABLE or PICOSAT_UNKNOWN

picosat_variables *The number of variables in a model*

Description

The number of variables in a model

Usage

```
picosat_variables(x)
```

Arguments

x	a picosat solution object

Value

an integer vector of length 1

`picosat_visits` *The number of visits during a search*

Description

The number of visits during a search

Usage

```
picosat_visits(x)
```

Arguments

`x`	a picosat solution object

Value

an integer vector of length 1

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