

Z3 API in Python

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Intro

- Z3 is a high performance theorem prover developed at Microsoft Research.
- It can be used to check the satisfiability of logical formulas over several theories
 - Uninterpreted Functions
 - Linear Arithmetic
 - Arrays
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Code

- <https://github.com/Z3Prover/z3>
- `pip install z3-solver`
- `sudo apt install z3`
- https://z3prover.github.io/api/html/z3py_8py_source.html

Example 1

- $(x + y < 1) \wedge (0 < x) \wedge (0 < y)$

e1.py

formula/expression simplifier

e2.py

Boolean Logic

- Z3 supports Boolean operators: *And*, *Or*, *Not*, *Implies* (implication), *If* (if-then-else).

e3.py

Solver, check, model

- Solver() class
- solver.check(), solver.model()

e4.py, e5.py, e6.py

All constraints

e7.py

push(), pop()

e8.py

All solutions

e9.py

function, sort

EUF: Equality and Uninterpreted Functions
e10.py

Solving LRA: Linear Real Arithmetic

e11.py

Quantifiers

e13.py

Array

e12.py

Useful Links

- Z3 API in Python Tutorial:
<https://ericpony.github.io/z3py-tutorial/guide-examples.htm>
- Z3Py Classes and Functions :
<https://z3prover.github.io/api/html/namespacez3py.html>
- z3 python examples:
<https://github.com/Z3Prover/z3/tree/master/examples/python>

