

Z3 Tutorial

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Download Z3 from the Microsoft Research website. At the time of writing this tutorial, I found it on <https://www.microsoft.com/en-us/download/details.aspx?id=52270>.

Install it.

Write the following Z3 script which asks for assignments to x and y such that the constraints $(x + y = 7)$ and $(x - y = 1)$ are satisfied.

sample.txt

```
(set-logic QF_LIA)
(declare-fun x () Int )
(declare-fun y () Int )
(assert
  (and
    (= (+ x y) 7)
    (= (- x y) 1)
  )
)
(check-sat)
(get-model)
```

First line tells the solver to use Linear Arithmetic Theory. Lines 2 and 3 declare the variables x and y . Then, we define our assertions (constraints) as logical "and" constraints.

(check-sat) checks for satisfiability. (get-model) will output an interpretation if one exists and if z3 could find it.

Run this script on Z3 with the command: `z3 /smt2 sample.txt`

You should see the following output:

```
C:\Program Files (x86)\Microsoft Research\Z3-4.1\bin>z3 /smt2 sample.txt
sat
<model
  (define-fun x () Int
    4)
  (define-fun y () Int
    3)
>
```

For more information, visit <https://rise4fun.com/z3/tutorial>