



Minetest

Google CTF Qualifier 2019

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Based on a writeup from Liveoverflow



Challenge

- Minetest (like Minecraft but completely Open Source)
- Mesecons Mod

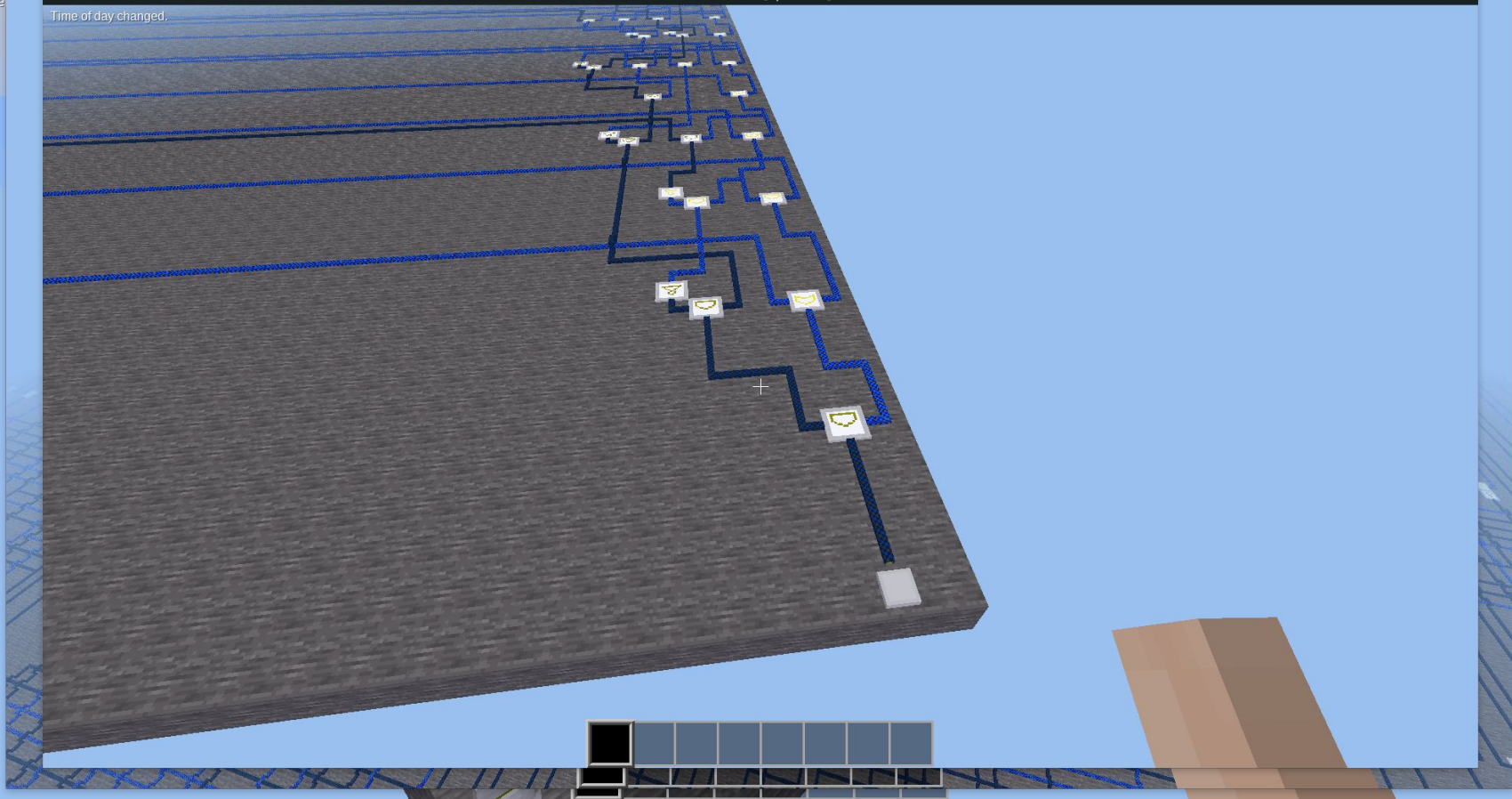
“... Mesecons adds everything digital, from advanced digital circuitry like logic gates and programmable blocks.”



Demo

Minetest 5.0.1 [OpenGL 3.0]
Minetest 5.0.1 [OpenGL 3.0]
Minetest 5.0.1 [OpenGL 3.0]

Time of day changed.



Task

- Finding satisfying assignment
- Idea?
 - Extract logical function
 - Solve it with a SAT or SMT solver

Parsing

- No existing parser for the required task
- Luckily documentation is not that bad from Minetest
- Hard to find things about Mesecon
- Representation as array (Map)



Demo

Solving

- Z3 - What else?
- Recursive backtracking till the beginning
- Get the Flag



Demo

Real World Relevance

- No security by obscurity
- Learned by solving the challenge
 - Don't write your own parser

Sources & Further Information

- Liveoverflow writeup: <https://liveoverflow.com/minetest/>
- Minetest format discription:
https://github.com/minetest/minetest/blob/master/doc/world_format.txt
- Z3 Python API doc: <https://z3prover.github.io/api/html/namespacez3py.html>
- Google Challenge creation script: https://github.com/google/minetest_pnr