Keen Puzzle Report

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1 Implementation

Keen Puzzle was developed by Simon Tatham, a British Computer Programmer. I have used Python-3 programming language and Z3, which is a theorem prover from Microsoft Research. It is licensed under the MIT license.

2 Programs Written

- ***keen_puzzle_solver_160010003.py*** - This program takes the variable number of keen boards from the input file *"input_160010003.json"* , and eventually outputs the solution of a satisfiable keen board as a string of values between 1-6 (eg:- [165342254163621534342615536421413256]) and as an empty string (eg:- []), incase of an unsatisfiable keen board, into the file *"output_160010003.txt"*.
- ***keen_puzzle_verifier_160010003.py*** - This program takes the input file containing the keen boards and also the output file containing the solutions of all those keen boards, and ultimately verifies if the given solutions in output file are consistent with the constraints of the keen boards given in input file. It prints **TRUE**, if either a board is **SAT** and corresponding solution is consistent with the constraints, OR a board is **UNSAT** and corresponding solution is empty string. In other cases, it prints **FALSE**.

3 How to Execute the Programme ?

Open up the terminal in the */.../z3-4.7.1-x64-osx-10.11.6/bin/python* directory which should have both the programs (*solver* and *verifier*) alongwith the input file. Follow the steps below:-

1. Firstly, the two necessary Z3 commands are to be executed which are given as comments in *keen_puzzle_solver_160010003.py*.
2. Execute the command : **time python3 keen_puzzle_solver_160010003.py**. The time shown in front of **user** is the *actual time* taken by the processor to execute the programme, where as time shown in front of **real** is the *Wall Clock Time*.
3. Execute the command : **time python3 keen_puzzle_verifier_160010003.py**