Eternity II

FEUP / MIEIC
MPES 2010

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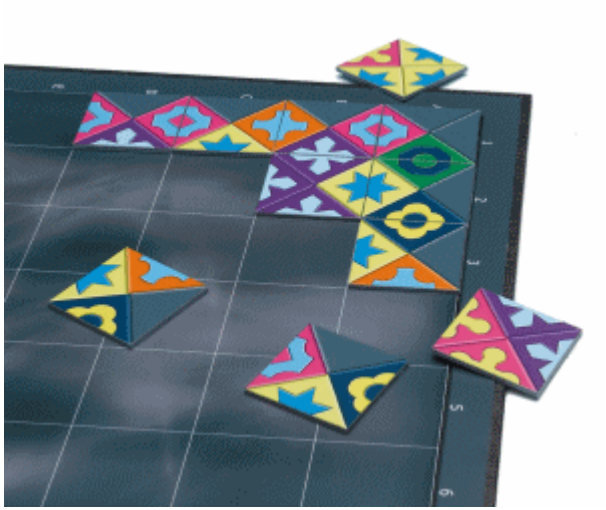
Summary

- Eternity II puzzle
- The project
  - Context
  - Current & future approach
  - Future work

Eternity II puzzle



Eternity II puzzle

- 16x16 board (256 pieces) 21 different patterns
- NP-Complete problem
- $256! * 4^{256} \approx 1.15x10^{661}$ solutions
  - Our approach will be directed to simpler versions of the puzzle

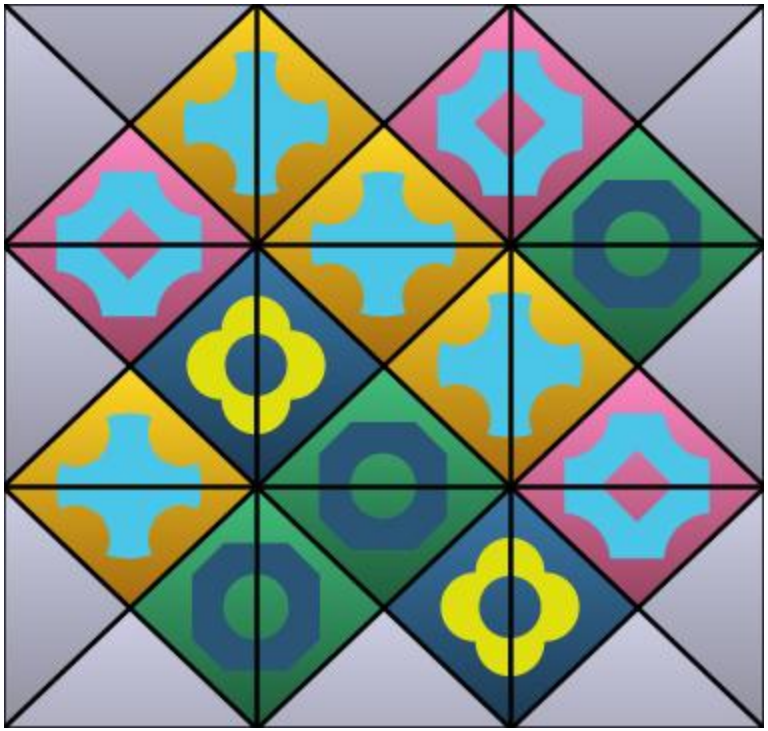
The problem

Context

- Continuation of the work developed in MPES 08/09, by Fábio Aguiar and Sara Carvalho
- Good experimental results, with some possible enhancements
- How can we improve these results?

The problem

Current approach



The problem

Current approach

The problem

Current approach

The problem
Current approach

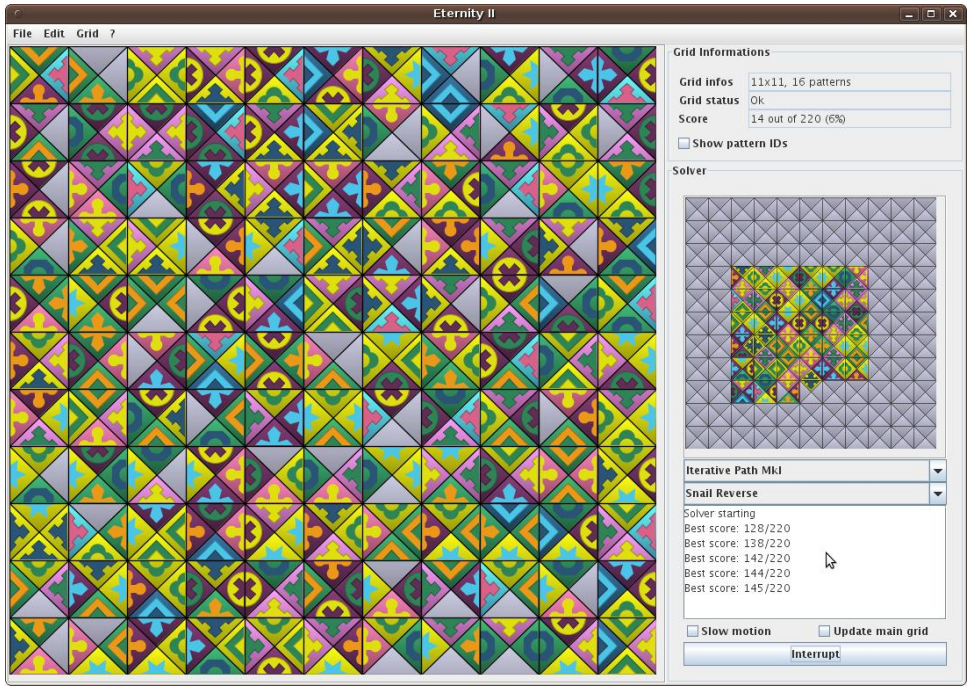
- A virtual diamond overlay is used on top of the board
- Pieces are placed in the lower layer, in order to match the diamonds placed in the upper layer
  - Less possible boards
  - Reduced search space (when compared to a traditional square board approach)
- Diamonds are **placed** using a linear iterative algorithm

The problem

Future approach

- Link this implementation with the open-source

  Eternity II Editor project



The problem
Future approach

- Try a **swapping** approach to placing pieces on the board, using different algorithms to decide which pieces to swap/rotate
  - Hill climbing, simulated annealing, tabu search...

The problem
Future approach

- Try different patterns for **placing** the pieces on the board
- Study heuristics to choose the pieces before placing them
  - Choosing a piece based on the number of remaining pieces with that pattern