University of Twente

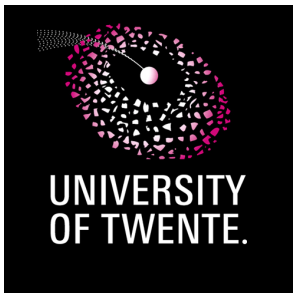
Project Proposal

Modelling of Pentago using GROOVE

Authors:
Theo Miltenburg - s0004944
Wim Florijn - s1503251
Henk Mulder - sxxxxxxx

Supervisor:
Prof. Dr. Arend Rensink

March 26, 2018



Contents

1 Introduction

Currently we are taking part in the Software Science course. In the Software Science course, a graph transformation tool called GROOVE is discussed. The course involves understanding the logic behind the graph transformation technique, and working with the tool itself. We have plenty of experience with modelling problems in GROOVE, and will discuss a more elaborate problem as subject of the course project. We have chosen to model a board game called Pentago. In this proposal we will discuss the structure and the rules of this game, possible extensions and how we plan to approach the modelling.

2 Topic

Pentago is a two-player abstract strategy game invented by Tomas Flodén. The American Company MindtwisterUSA [1] has the rights of developing and commercializing the product in North America.

The game is played on a 6×6 board divided into four 3×3 sub-boards (or quadrants). Taking turns, the two players place a marble of their color (either black or white) onto an unoccupied space on the board, and then rotate one of the sub-boards by 90 degrees either clockwise or anti-clockwise. This is optional in the beginning of the game, up until every sub-board no longer has rotational symmetry, at which point it becomes mandatory (this is because until then, a player could rotate an empty sub-board or one with just a marble in the middle, either of which has no real effect). A player wins by getting five of their marbles in a vertical, horizontal or diagonal row (either before or after the sub-board rotation in their move). If all 36 spaces on the board are occupied without a row of five being formed then the game is a draw.