TABLE OF CONTENTS

FIVE NEW GAMES

This issue features five new games: Epaminondas, 2048, Box Off, Quantum Leap, and Joust. The games stimulated scientific research and generated publicity, with the latter garnering more attention than the former. In March 2014, the 19-year old Italian Web developer Gabriele Cirulli created the single-player puzzle game 2048. It belongs to the type of sliding block puzzles as we know from the 4x4 and 5x5 puzzles. Gabriele Cirulli (re)designed the game in a single weekend. It is based on 1024 as released by Veewo Studio. Moreover, it is conceptually similar to Threes as developed by Asher Vollmer. In fact, Cirulli took the ideas from Sami "Saming" Ramalhana's clone 2048 (from Veewo Studio) as he said himself. Gabriele was surprised that his design of 2048 became a viral hit. The *Wall Street Journal* and the *Business Insider* filled their pages with the new game. Under the publicity, Gabriele remained modest and stated that he refrained from making money for a game he did not invent. In this issue Cameron Browne discusses the game (pp. 161-165). Moreover, Kun-Hao Yeh, Chao-Chin Liang, Kuong-che Wu, and I-Chen Wu report on the 2048-bot tournament in Taiwan (pp. 186-187).

As stated above, scientific research was overshadowed by publicity. Yet, many compliments should be given to David King and Gilbert Peterson for their thorough description of the first computer implementation LEONIDAS of the relatively new game Epaminondas (pp. 131-143). The emphasis is on Exploring Combat Tactics. Epaminondas was invented by Robert Abbott in the early 1970s. In Sid Sackson's (1969) book *A Gamut of Games* it is described as Crossings. The game is played on a 12x14 checkered board. There are two sides that each try to occupy (here we refer to the precise rules) the back rank of the opponent. The state-space complexity is around 10^{61} and the game-tree complexity 10^{137}. The article describes four different approaches.

Cameron Browne's contribution has the title: *What Can Game AI Teach Us?* He focusses on new ideas that are adopted and adapted by human beings in other games, other techniques or other applications. Such an approach naturally brings in the description of new games. One new idea is contained in Néstor Romeral Andrés combinatorial board game Quantum Leap (2014). The game is played on a hexagonal board (5 cells per side). For a further description, we refer to pp. 161-165 of this issue.

The fourth new game is Box Off, also described by Cameron Browne. Steven Meyers designed this game in 2013. It deals with 16 pieces in each of three colours, randomly placed on a 6x8 square grid. The goal is to remove pairs of the same-coloured pieces following a given set of rules (see the article).

The fifth "new" game is Joust. It is an arcade game developed by John Newcomer (head of the development team). It is first released by Williams Electronics in 1982. Barry Oursler and Constantino Mitchell made a

pinball version in 1983, which resulted in a two-player competition. In its most rudimentary form, it is described as a game between two Knights on a chess board. The squares that are visited by one of the Knights cannot be visited again. So, the Knights cannot capture each other. The goal is to win by leaving the opponent without any move. On June 9, 2014, the University of Silesia organised a Computer Combinatorial Games Tournament in which 29 programs participated and played Joust. Jan Kozak, Arkadiusz Nowakowski, Rafal Skinderowicz, and Wojciech Wieczorek report on the tournament (pp. 188-191).

The rules of Joust will remind the reader of the contents of the Editorial in the June issue, viz. the proposal by Nigel Short to abandon the current Stalemate rule in Chess and count Stalemate as a win. The proposal is that winning should be about closeting rather than capturing the King (compare this outcome with Joust). This proposal has aroused chess aficionados and inspired the computer-chess researchers. What would change? To what extent would the intrinsic value of the game of chess be affected by this new rule? Guy Haworth has thoroughly investigated the consequences in his contribution Chess Endgame News (pp. 166-168). The outcome is breathtaking, and the research good for Science.

Moreover, three new findings are worth reporting. The first is by Christian Posthoff and Bernd Steinbach (pp. 169-178). They introduce Boolean models to generate new results for solving the Bishop-problem. The problems were launched by Schwarzkopf in 1990. The authors prove that some of his statements are correct, while others are to be seen as conjectures that are now proven to be false. Having read their note, your Editor is sure that this is not the end of Combinatorics: it is only the beginning. The second new finding is by Robert Hyatt. He describes *A Solution to Short PVS Caused by Exact Hash Matches*.

The last finding is contained in *The Impact of Safe Moves on Perfectly Solving Domineering Boards (Part 2)* by Jos Uiterwijk (pp. 144-160). The continuation of Part 1 brings the reader into the intricate world of knowing without searching, being only guided by knowledge. The article highlights many intermediate results and confirms what was known by search so far. Moreover, the newly developed techniques produced four new results for the Domineering Boards of size 6x19, 10x15, 14x15, and 18x15 (all a win for Vertical).

To balance the five new games with the three established games mentioned (Stalemate, Bishops, and Domineering), we touch upon Ndengrod (Cameron Browne, pp. 161-165) in *What Can Game AI Teach Us*? The answer is: Simplicity, since Ndengrod had much success without the *ko* rule, whereas other games needed that rule. All new games, simple or complex, are welcome at the Computer Olympiad in Leiden, the Netherlands, June 29-July 5, 2015. I look forward to seeing you in Leiden.

Jaap van den Herik

The credits of the photographs in this issue are to: Kun-Hao Yeh and Jan Kozak.