DarkKnight Wins Chinese Dark Chess Tournament

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The computer Chinese dark chess tournament was held as part of the 19th Computer Olympiad, which took place in Leiden, The Netherlands, from June 27th to July 3rd, 2016. Five teams participated in the Chinese dark chess tournament. Table 1 lists the participants.

Table 1

The participants

Programs	Abbr.	Author(s)	Operator	Country
DANCING	DAN	Yen-Chi Chen	Yen-Chi Chen	Taiwan
DARKKNIGHT	DKN	Chu-Hsuan Hsueh, Wen-Jie Tseng, I-Chen Wu	Chu-Hsuan Hsueh	Taiwan
NEWBIEDARKCHESS	NBD	Cheng Yueh	Cheng Yueh	Taiwan
OBSERVER	OBS	Ta-Kai Hsu, Shun-Shii Lin	Chi-Hung Chen	Taiwan
YAHARI	YAH	Jr-Chang Chen, You-Cheng Syu, Gang-Yu Fan, Ting-Yu Lin, Tsan-sheng Hsu	Gang-Yu Fan	Taiwan

The game of Chinese Dark Chess has evolved from and is played with the pieces and half board of Chinese Chess. The 32 pieces are all face-down and randomly put on the 4×8 board when the game starts. Two players alternately flip, move or capture a piece. The player who first captures all pieces of the opponent wins the game. The game draws when no flipping or capturing occurs within 180 plies, or when the same position occurs three times. More details of the rules of playing Chinese dark chess are described in (Chen et al., 2010; Yen et al., 2015).

Table 2

The cross-table

Program	DKN	YAH	NBD	OBS	DAN	Total Score	Rank
DKN	-	1.5	1	2	1	5.5	1
YAH	0.5	-	2	2	0	4.5	2
NBD	1	0	-	0.5	2	3.5	3
OBS	0	0	1.5	-	2	3.5	4
DAN	1	2	0	0	-	3	5

The tournament was organized as a round-robin with each program playing all other programs, once as first player and once as second player. Each game was played on a game-playing platform developed by Jr-Chang Chen (Tseng et al., 2013). In each round, each program connected to the platform through

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a network and played two games against its opponent automatically. When a game started, the platform randomized unrevealed pieces for the game. When a game ended, the platform judged the result of the game, and stored the game record. Throughout, each program had 15 minutes per game for its moves.

Table 3
The cross-table of the playoff

Program	NBD	OBS
NBD	-	1.5
OBS	0.5	-

For each game, the winner obtained 1 point while the loser obtained 0 and both obtained 0.5 for a draw. The cross table is listed in Table 2. DarkKnight and Yahari respectively won the gold and the silver medals of the 19th Computer Olympiad, with 5.5 and 4.5 points respectively. The design and implementation details of DarkKnight and Yahari are described in (Hsueh et al., 2016) and (Chen et al., 2015) respectively. The next two teams, NewbieDarkChess and Observer, tied on 3.5 points. After the playoff as in Table 3, NewbieDarkChess obtained 1.5 points and won the bronze medal.
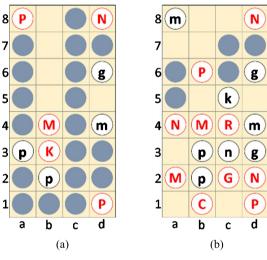

Fig. 1. DarkKnight (Black, win)
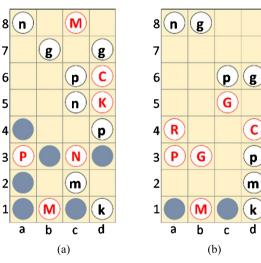vs. NewbieDarkChess (Red, loss),
(a) move 24, (b) moves 43-45.

Fig. 2. DarkKnight (Red, win)
vs. Observer (Black, loss),
(a) move 53, (b) move 84

Selected Games

Here are comments on two games, DarkKnight -v- NewbieDarkChess as in Fig. 1, and DarkKnight -v- Observer as in Fig. 2.[2]

Game 1: DarkKnight -v- NewbieDarkChess, 1-0.

At move 24, NewbieDarkChess (Red) revealed a red king on square b3 (probability of 1/19) and thus let DarkKnight (Black) benefit. However, Black was in no hurry to capture the red king and did not do so until Red revealed a red rook on a4. At move 43, Black revealed a black king on c5 and the piece was in danger of being captured by a red pawn. At move 45, Black revealed a red rook on c4, which resolved the crisis and ensured Black's advantage. However, for the move, there were a 1/6 probability of risks in revealing a red pawn on c4.

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[2] Uppercase (lowercase) letters represent red (black) pieces.

Game 2: DARKKNIGHT -v- OBSERVER, 1-0

Before move 53, the difference in the pieces of the two players was very small. However, DARKKNIGHT (Red) was in a bad position because red guards were both unrevealed and red pieces were all in bad places. At move 53, Red revealed a black pawn on d4 and stood worse with almost no chance to win. Afterwards, Red slowly controlled black pieces. At move 84, OBSERVER (Black) made a mistake in revealing a black minister on c1 which was captured by a red minister on b1 immediately. Red seized the opportunity and won the game.

Fig. 3. From left to right, Chih-Hung Chen (NEWBIEDARKCHESS), Hung Guei (DARKKNIGHT), Gang-Yu Fan (YAHARI) and H.J. van den Herik.

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