

NCTU6 WINS CONNECT6 TOURNAMENT

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The computer Connect6 tournament, the first computer Connect6 tournament ever in the world, was held as part of the 11th Computer Olympiad, which took place from May 24th to June 1st in Turin, Italy. Three teams from Taiwan participated in the Connect6 tournament. Table 1 lists the information of the participants.

Program	Author	Operator	Hardware
EVG	Deryann Huang and Shun-Chin Hsu	Shun-Chin Hsu	AMD Turion 64 2.0 GHz
NCTU6	I-Chen Wu and Hsiu-Cheng Chang	I-Chen Wu	Pentium-M, 1.6 GHz
X6	Sih-Yuan Liou and Shi-Jim Yen	Sih-Yuan Liou	Pentium-M, 1.5 GHz

Table 1: The participants.

The game Connect6, a kind of six-in-a-row game, was first introduced by Wu and Huang (2005) and then described in more detail by Wu, Huang, and Chang (2005). The rules of Connect6 are very simple. Two players, henceforth represented as B (designated as the first player) and W, alternately place two stones, black and white respectively, on one empty intersection of an $m \times n$ board, except for that B places one stone initially, where m and n are designated by players. The player who first obtains six consecutive stones (horizontally, vertically or diagonally) of his own wins the game. No extra exhibited rules are imposed.

In the tournament, 19×19 boards were designated and the games were played according to a double round-robin system in which one program played four times against all the other programs. In each game, every program had to complete all of its moves in 30 minutes. In the tournament, most programs took less than 10 minutes to complete a game to prevent from running out of time. In Table 2, the final standings are given. NCTU6 won the tournament.

Rank	Program	NCTU6	X6	EVG	Points
1	NCTU6	-	3-1	4-0	7
2	X6	1-3	-	2-2	3
3	EVG	0-4	2-2	-	2

Table 2: The Results.

The following game records are commented by I-Chen Wu, who is one of the authors of NCTU6. Figure 1 shows a game record of X6 (B) vs. Connect6 (W). Move 3 could be weak. This move resulted in the subsequent attack from W. Starting from Move 8, the program NCTU6 (W) had indicated to tend towards winning according to the result of alpha-beta tree search. NCTU6 already found winning sequences at Move 14 in the threat-space search (TSS), defined in Wu, Huang and Chang (2005). Figure 2 shows a game record of Connect6 (B) vs. X6 (W). For the lower 20, it could have been better if W had played at the lower-right 21 to defend the subsequent attacking moves in the left hand side. Since Move 21, NCTU6 had indicated to tend towards winning according to the result of alpha-beta tree search. NCTU6 found winning sequences at Move 31 in the TSS. Figure 3 shows a game record of EVG (B) vs. Connect6 (W). For Moves 17 and 19, B should have tried to defend, e.g., at the lower 20 and the upper 28. NCTU6 found winning sequences at Move 20 in the TSS. Interestingly, the winning sequences include single-threat moves, as defined and described in Wu, Huang, and Change (2005). Figure 4 shows a game record of Connect6 (B) vs. EVG (W). For W12, W should have simply defended B. B started to initiate the attack at B13. NCTU6 found winning sequences at B15 in the TSS. This indicated that NCTU6 could search up to 17-pplies in the

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TSS accurately.

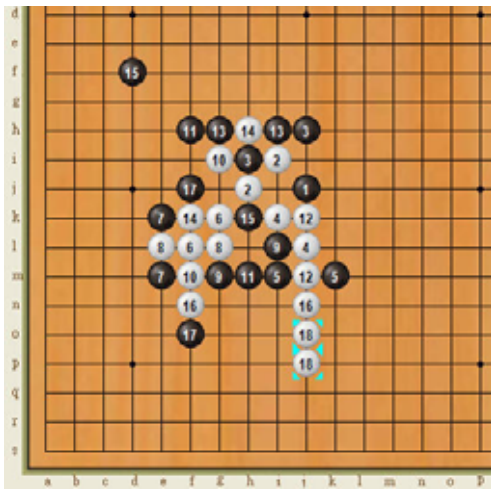


Figure 1: Black: X6, White: CONNECT6, Moves 1 – 18.



Figure 2: Black: CONNECT6, White: X6, Moves 1 – 45.

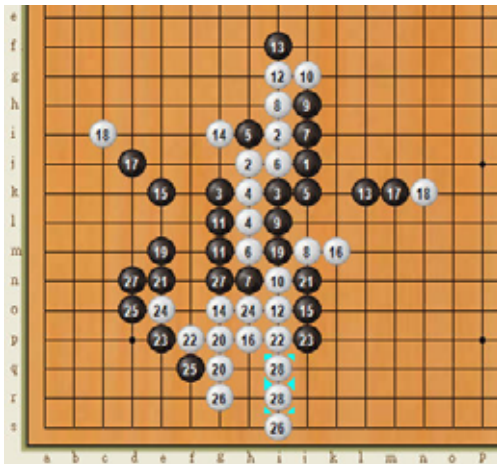


Figure 3: Black: EVG, White: CONNECT6, Moves 1 – 28.



Figure 4: Black: CONNECT6, White: EVG, Moves 1 – 31.

Photo by S-J Yen



F.l.t.r. S-C. Hsu and I-C. Wu.



F.l.t.r. I-C. Wu and S-Y. Liou.

References

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