MILA Wins Clobber Tournament

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1. THE GAME

Clobber is a partizan game, created in 2001 by M.H. Albert, J.P. Grossman and R.J. Nowakowski (Albert *et al.*, 2004). It is played on an $m \times n$ rectangular board, where black and white stones are originally placed in a checkerboard fashion. A move consists of moving one's stone to an adjacent cell, provided it is occupied by an opponent's stone, which is then removed from the board ("clobbered"). Black begins, the players move alternately and the one who can't move, loses (Willemson, 2005a). For this year's tournament, board sizes of $m = n = 8$ were used.

Since the creation of the game, there have been some attempts to organize computer Clobber tournaments (see (Grossman, 2004) and (Willemson, 2005a)). Still, there is very little known about Clobber strategies or position estimations (Albert *et al.*, 2004). Thus it has been rather difficult to judge the strength of the participants of these tournaments on absolute scale. Hope of getting some good reference players was the main motivation behind introducing Clobber to ICGA Computer Olympiad.

2. CLOBBER AT THE OLYMPIAD

Two players registered for the tournament. The first one, ClobberA, was created by Alexandre Grebennik and Jan Willemson as a part of the project to test Monte Carlo methods in combinatorial board games (Grebennik, 2005). As a result, ClobberA was an AI player using a pure Monte Carlo position estimation function and exact endgame reading. Such a position estimation turned out to be rather a reasonable middlegame heuristic. In our tests ClobberA was able to win 85% of the games played against the winner of the computer Clobber tournament held in 2004 at Tartu University (Willemson, 2005a).

The second player, MILA, was written by Mark Winands from Maastrict University. The program actually used the engine of MIA IV/4++ that won Lines of Action tournaments in 2003 and 2004 (Winands, 2003; Winands, 2004). Mark's original idea was to participate in LOA tournament in 2005 as well, but since the win was very convincing last two years, no-one dared to step up against MIA this year. Thus Mark wrote a Clobber plug-in to his engine to take part in the ICGA 2005 event. Clobber is is probably the game with the simplest rule set ever used in the Computer Olympiad, and this made Mark's work very easy. Therefore the authors of this report would like to encourage all the other members of the community to do the same with their own engines next year, since MILA's performance at the Olympiad was excellent – she won all the games against ClobberA.

Despite the overwhelming superiority of MILA the tournament was still very interesting and hence a great success. Looking at the games (see the end section of the report) it can be said that none of the programs had a very good position evaluation function and the winner was mostly determined by the ability to read better in the endgame (and ClobberA was no match in this respect to MILA). This is very well illustrated by the 7th game of the tournament.

Game 7: ClobberA vs MILA 1 c2xc3 c1xb1 2 d1xe1 a7xb7 3 e8xd8 h8xg8 4 f7xe7 h6xg6 5 h7xg7 h2xg2 6 g4xf4 g5xf5 7 e6xd6 g3xf3 8 f4xf3 e3xd3 9 b3xb4 a5xb5 10 a2xa3 d4xc4 11 c6xc5 c4xc5 12

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g7xg6 . . . (See Figure 1.)

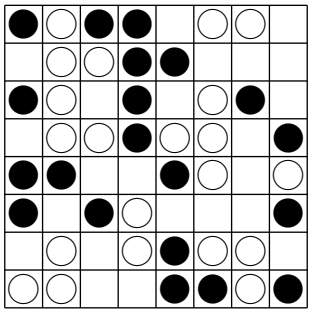

Figure 1: The position after 12 g7xg6

At this point, Black (ClobberA) succeeded in cutting off 5 White stones. There is nothing formally proven about how bad it actually is to have isolated "dead" groups, but intuitively it is clear that it is a bonus to have groups with many stones of your own and a few of your opponent's. If many of one's stones are cut off from the game, then on one hand we can see that there is no way of reconnecting them in Clobber, and on the other hand in this case there are less resources of forming good groups. Thus we may say that the position in Figure 1 favors Black.

12 . . . c7xc8 13 g6xf6 c5xd5 14 d8xc8 d5xd6 15 c3xd3 . . . (See Figure 2.)

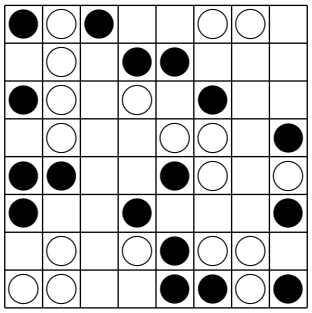

Figure 2: The position after 15 c3xd3

At this point, MILA was able to compute the game till the end and see that under perfect play, ClobberA would win. ClobberA, however, still played in middle game mode and used Monte Carlo heuristic to generate its next move.

15 . . . b5xb4 16 a8xb8 . . .

The last move by ClobberA was a mistake. Winning moves would have been e.g. 16 d3xd2 or 16 e2xf2. Now MILA saw her way to win and did not miss it anymore.

16 . . . g1xf1 17 e1xf1 b4xa4 18 b8xb7 d6xd7 19 f3xf2 g2xf2 20 d3xd2 f5xf6 21 a6xb6 f2xf1 22 e7xd7 e5xe4 23 h5xh4 a4xa3 **0:1**

For other game records, see Section 4.

3. CLOBBER AT THE COMPUTER OLYMPIAD 2006

Participants of this year's tournament have agreed upon the next year's tournament conditions. Two of the most prominent changes are that the board size will be increased to 10×10 and the games will be played automatically using a specially defined IP-based protocol. The tournament rules, protocol specifications and reference implementations can be found on webpage (Willemson, 2005b). The authors of the paper welcome everybody to join. Afterall, Clobber is just a simple game!

4. GAME RECORDS

Next we present the full records of the tournament games other than the 7th game.

Game 1: MILA vs ClobberA 1 c8xb8 g3xg2 2 b1xb2 a7xa6 3 g8xg7 h4xg4 4 e8xe7 e5xe4 5 d1xd2 h6xg6 6 f1xf2 a1xa2 7 b5xa5 g5xf5 8 c6xb6 a2xb2 9 b3xb4 c3xc4 10 d5xd4 e3xf3 11 d4xc4 a6xa5 12 h3xh2 g2xh2 13 g7xg6 c7xd7 14 g6xf6 a5xa4 15 c2xb2 f8xf7 16 f6xf7 d6xe6 17 e7xe6 h2xh1 18 h7xh8 c5xc4 19 b4xc4 e1xe2 20 f2xe2 **1:0**

Game 2: ClobberA vs MILA 1 f1xe1 h2xg2 2 a8xb8 b6xb7 3 d5xc5 h6xh7 4 d3xd4 a5xb5 5 g6xf6 h4xg4 6 f7xe7 c7xc6 7 e8xd8 a1xa2 8 h5xg5 b4xb3 9 c4xc3 e3xe4 10 c3xb3 b2xc2 11 f3xf2 d2xd1 12 d4xe4 e5xe6 13 f6xe6 d6xd7 14 e7xd7 f4xe4 15 b1xc1 g4xg5 16 c1xd1 g7xg8 17 a4xa3 a2xa3 18 f5xg5 a3xb3 19 c5xc6 g3xh3 20 a6xa7 b7xa7 21 h1xg1 g2xg1 **0:1**

Game 3: MILA vs ClobberA 1 h7xg7 c7xc6 2 a8xb8 h4xg4 3 g6xg5 c5xc4 4 g2xh2 g3xf3 5 f1xf2 g1xh1 6 a6xb6 e3xe4 7 d1xd2 e7xe6 8 f5xf4 d8xc8 9 f4xe4 f8xf7 10 a4xb4 d6xd5 11 b1xb2 c3xd3 12 d2xd3 a1xa2 13 b6xc6 c1xc2 14 d3xd4 d5xd4 15 e4xe5 h8xg8 16 e5xe6 g8xg7 17 b2xa2 h1xh2 18 e6xf6 a5xb5 19 f6xf7 a3xa2 20 b4xb5 c8xb8 21 f2xf3 b8xb7 22 g5xg4 g7xf7 23 h5xh6 h2xh3 24 e2xe1 **1:0**

Game 4: ClobberA vs MILA 1 d5xd6 h2xg2 2 g4xf4 b8xb7 3 d3xc3 d8xd7 4 c6xc5 g3xf3 5 a4xa5 e7xe6 6 e8xf8 b2xb1 7 h1xg1 a3xb3 8 e2xd2 h6xh5 9 f5xf6 g7xg8 10 e4xe5 e6xf6 11 d1xc1 d4xc4 12 c3xc4 f6xf7 13 g6xg5 b6xa6 14 a5xa6 b4xb5 15 f1xf2 b5xc5 16 f4xf3 d7xd6 17 g1xg2 e3xf3 18 h7xh8 g8xf8 19 c8xc7 f3xf2 20 a8xa7 b1xc1 21 c2xc1 b7xa7 22 a6xa7 h5xg5 23 c4xc5 f2xg2 24 h3xh4 a1xa2 **0:1**

Game 5: ClobberA vs MILA 1 a6xb6 b8xb7 2 g8xf8 c7xc6 3 f1xf2 h2xg2 4 b6xb7 g3xf3 5 e2xe3 f3xe3 6 c8xd8 b4xa4 7 e4xe5 c5xd5 8 h7xh6 c3xd3 9 e5xd5 b2xa2 10 b5xa5 c1xd1 11 c2xd2 f6xf7 12 g4xg5 f4xf5 13 h3xh4 d6xd7 14 b1xa1 f5xg5 15 e6xe7 d7xe7 16 f8xf7 g7xg6 17 h5xg5 d4xc4 18 h6xg6 e7xf7 19 a5xa4 a2xa1 20 a8xa7 a3xb3 21 f2xg2 g1xh1 22 d2xd3 e3xd3 **0:1**

Game 6: MILA vs ClobberA 1 c8xb8 c3xc2 2 h7xg7 a7xb7 3 b5xb6 e7xd7 4 e8xf8 f6xe6 5 a4xb4 h4xh3 6 g6xg5 f4xf5 7 a2xb2 c7xc6 8 h1xh2 g3xf3 9 f1xf2 h8xg8 10 d5xd6 d2xd3 11 d6xc6 b7xb6 12 c6xb6 a5xa6 13 b6xa6 h6xh5 14 e2xe3 d3xe3 15 g5xf5 e5xe4 16 f2xf3 a1xb1 17 c4xd4 b1xb2 18 b3xa3 g8xf8 19 f3xe3 e4xd4 20 d1xe1 h3xh2 21 g2xh2 f8xf7 22 g7xf7 **1:0**

Game 8: MILA vs ClobberA 1 a6xa7 b8xc8 2 b5xb4 e5xf5 3 c6xc7 g5xg6 4 d5xd4 h4xg4 5 g2xh2 f2xf3 6 f1xe1 c8xc7 7 d7xe7 c1xc2 8 a2xb2 e3xe4 9 g8xg7 d2xd3 10 d4xe4 g6xg7 11 e4xf4 g4xf4 12 b3xc3 d3xc3 13 f7xf6 g7xh7 14 h5xh6 g1xh1 15 f6xf5 d6xe6 16 h6xh7 g3xh3 17 f5xf4 c3xc4 18 b4xc4 d8xe8 19 e7xe6 h8xh7 20 b2xc2 b6xb7 21 a7xb7 c7xb7 22 c4xc5 a5xa4 23 f4xf3 h3xh2 24 b1xa1 **1:0**

5. REFERENCES

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