



The Rise of the Machines: Kramnik vs. Deep Fritz

Computer technology continues to advance and microchips are getting faster and more powerful, which in turn allows programmers to improve their chess playing software. There is no doubt that the machines will eventually surpass human players, but when will that day arrive?

COLUMNISTS

Susan Polgar on *Chess*

Susan Polgar



Breaking Through by Susan Polgar

The reigning World Champion, Vladimir Kramnik, is currently playing a six game match against the computer *Deep Fritz* in Bonn, Germany. In this match, Kramnik was given unprecedented conditions, among them:

- Mr. Kramnik shall have the right to adjourn any game after 56 moves even if six hours of play have not been completed.
- At the conclusion of each game the Arbiter will attempt to replicate the opening of the game on a computer which has the opening book and program as delivered to the Kramnik Team and the Arbiter.
- As long as *Deep Fritz* is “in book,” that is playing moves from memory and not calculating variations, Mr. Kramnik sees the display of the *Deep Fritz* opening book. For the current board position he sees all moves, including all statistics (number of games, ELO performance, score) from grandmaster games and the move weighting of *Deep Fritz*. To this purpose, Mr. Kramnik uses his own computer screen showing the screen of the *Deep Fritz* machine with book display activated.
- When *Deep Fritz* identifies the board position in a tablebase, it must inform the Arbiter, who will then stop the clocks. In the presence of the Arbiter, the Operator will inform Mr. Kramnik that the position has been located in the tablebase.
- If the position is evaluated by the tablebase as a draw, the Operator will inform Mr. Kramnik of that fact in the presence of the Arbiter. This will constitute an offer of a draw. The game will continue, unless the offer is accepted prior to the completion of Mr. Kramnik’s next move.
- If Mr. Kramnik feels that the position is clearly drawn, he may notify the Arbiter and the Operator that he is making a claim of “technical draw.”
- After the conclusion of each game, the *Deep Fritz* Team shall provide a printout of the computer analysis of the game to the Arbiter and the Kramnik Team. This printout includes evaluation, search depth, expected move and thinking time.
- By October 1, 2006, Mr. Kramnik and the arbiter will receive the final

match version of Deep Fritz.

- From October 1, 2006 on, the Deep Fritz team will be ready on the request of the Kramnik team to install the final match version on Mr. Kramnik's training machine.
- In cooperation with a possible hardware producer and Chessbase the organizer (UEP) will make their best endeavours to provide Mr. Kramnik a training machine similar to the machine during the WCC.
- At any stage in the match, the Kramnik team may copy the exact playing engine directly from the tournament machine under supervision of the arbiter.

Yet, even with all these favorable conditions, Kramnik could not make a dent against *Deep Fritz*. But this does not mean that humans have no chance against computers, it just requires plenty of preparation as well as physical and mental fitness. The computer is better at tactics, but it still does not understand strategic positions and therein lies Kramnik's only chance.

I was recently interviewed about the match by the German magazine *Spiegel* and here are some excerpts:

What do you think in general about the Man vs. Machine Contest in Chess?

In principle, I like it very much. I am very intrigued by this idea. However, I would like to see a true Man vs. Machine match, where the human has the same access to opening and endgame databases as the computer. Otherwise, it is very unfair for the human to have to memorize countless opening lines or endgame variations, while the computer just accesses the database in the hard drive. The format so far is not true Man vs. Machine.

I would also like to see a serious Woman vs. Machine match. I am one of few top female players with a positional style, which would be more suitable against computers. I issued a challenge to *Deep Blue* in 1996 when I was the reigning Women's World Champion. They politely declined. So far, no program has accepted that challenge from me.

What do you think about the influence of the computer in chess? Is it good or bad?

I think it is very good. Today's chess players are much stronger thanks to computer technology and software like [Fritz](#), [Rybka](#), [Junior](#), [Shredder](#), etc.

Have you benefited from computers in chess?

I think computer technology has helped me personally. I wish I had *Fritz 10* back when I started in chess.

Who do you think will win the match and why?

I think it will be a tie. *Fritz* will not lose the match, but I think Kramnik is solid enough to hold. Of course, it also depends on his physical condition, since this is so soon after his match in Elista. I would also like to congratulate Kramnik for unifying the world championship title.

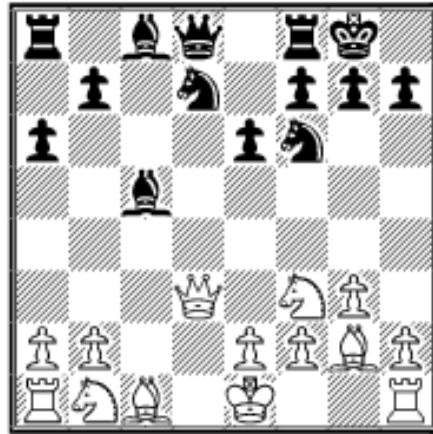
Kramnik - Deep Fritz

Bonn, Germany, 25.11.2006 (1) [E03]

1.d4 Nf6 2.c4 e6 3.g3 d5 4.Bg2 dxc4 5.Qa4+ Nbd7 6.Qxc4 a6 7.Qd3 c5
8.dxc5 Bxc5

We already have a symmetrical pawn structure. Once Black is able to develop the bishop on c8, White will not be able to do much.

9.Nf3 0-0



10.0-0 Qe7 11.Nc3 b6 12.Ne4 Nxe4
13.Qxe4 Nf6 14.Qh4

If 14.Qxa8 Bb7 15.Qxf8, White can get two rooks for a queen.

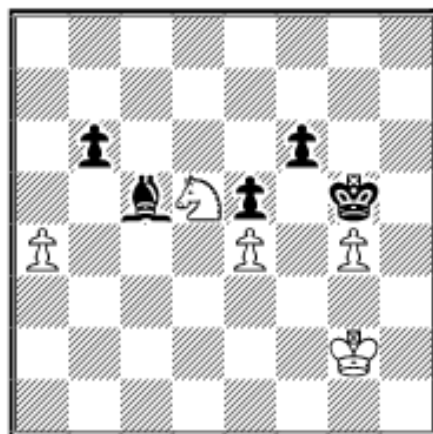
14...Bb7 15.Bg5 Rfd8 16.Bxf6 Qxf6
17.Qxf6 gxf6=

Black has double pawns, but also the bishop-pair and a more active rook on d8. Therefore, Black has enough compensation.

18.Rfd1 Kf8 19.Ne1 Bxg2 20.Kxg2 f5 21.Rxd8+ Rxd8 22.Nd3 Bd4 23.Rc1
e5 24.Rc2 Rd5 25.Nb4 Rb5 26.Nxa6 Rxb2

The rest of this game shows that *Fritz* is getting much better in endgames. Neither side is in danger of losing.

27.Rxb2 Bxb2 28.Nb4 Kg7 29.Nd5 Bd4 30.a4 Bc5 31.h3 f6 32.f3 Kg6 33.e4
h5 34.g4 hxg4 35.hxg4 fxe4 36.fxe4 Kg5



37.Kf3 Kg6 38.Ke2 Kg5 39.Kd3 Bg1
40.Kc4 Bf2 41.Kb5 Kxg4 42.Nxf6+ Kf3
43.Kc6 Bh4 44.Nd7 Kxe4 45.Kxb6 Be1
46.Kc6 Kf5 47.Nxe5 Kxe5 1/2-1/2

Deep Fritz - Kramnik (2750)

Bonn, Germany, 11.27.2006 (2) [D10]

1.d4 d5 2.c4 dxc4 3.e4 b5 4.a4 c6 5.Nc3 b4
6.Na2 Nf6 7.e5 Nd5 8.Bxc4 e6 9.Nf3 a5
10.Bg5 Qb6 11.Nc1 Ba6 12.Qe2 h6 13.Be3
Bxc4 14.Qxc4 Nd7 15.Nb3 Be7 16.Rc1
0-0 17.0-0 Rfc8 18.Qe2 c5 19.Nfd2 Qc6 20.Qh5 Qxa4 21.Nxc5 Nxc5
22.dxc5 Nxe3 23.fxe3 Bxc5 24.Qxf7+ Kh8 25.Qf3 Rf8 26.Qe4 Qd7 27.Nb3

Bb6 28.Rfd1 Qf7 29.Rf1 Qa7 30.Rxf8+ Rxf8 31.Nd4 a4 32.Nxe6 Bxe3+ 33.Kh1 Bxc1 34.Nxf8



34...Qe3??

This is one of the biggest blunders of all time by a world champion. After 34...Kg8 35.Ng6 Bxb2 36.Qd5+ Kh7 37.Nf8+ Kh8 38.Ng6+, White has nothing better than a draw.

35.Qh7# 1-0

Kramnik - Deep Fritz

Bonn, Germany, 11.29.2006 (3) [E03]

1.d4 Nf6 2.c4 e6 3.g3 d5 4.Bg2 dxc4 5.Qa4+ Nbd7 6.Qxc4 a6 7.Qc2 c5 8.Nf3 b6 9.Ne5 Nd5 10.Nc3 Bb7 11.Nxd5 Bxd5 12.Bxd5 exd5



Kramnik is off to a good start in this game. This is a position where he can play for two results without much risk. Kramnik is amazing with his opening choices, as he often gets good positions to squeeze his opponents.

13.0-0 Nxe5 14.dxe5 Qc8 15.Rd1 Qe6

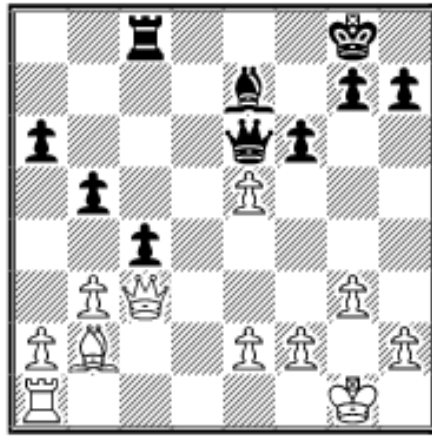
White is a little better here for several reasons: 1) he is more developed and has already castled 2) his pieces are more

coordinated 3) Black may potentially have a problem defending the queenside pawn structure, and 4) Black's bishop has little mobility. Again, this is the perfect type of position for Kramnik to have against *Deep Fritz*.

16.Qd3

Black is losing a pawn, but will get activity as compensation.

16...Be7 17.Qxd5 Rd8 18.Qb3 Rxd1+ 19.Qxd1 0-0 20.Qb3 c4 21.Qc3 f6 22.b3 Rc8 23.Bb2 b5



**24.Qe3 fxe5 25.bxc4 Rxc4 26.Bxe5 h6
27.Rd1 Rc2**

Black's active rook is helping *Fritz* a great deal. This is an important lesson for endgame play. Keep your pieces as active as possible!

28.Qb3

White chooses to give up the e2-pawn instead of the a2-pawn.

28...Qxb3 29.axb3 Rxe2 30.Bd6

This is heading for a draw, but I like Black a little better because of the smaller majority on the queenside.

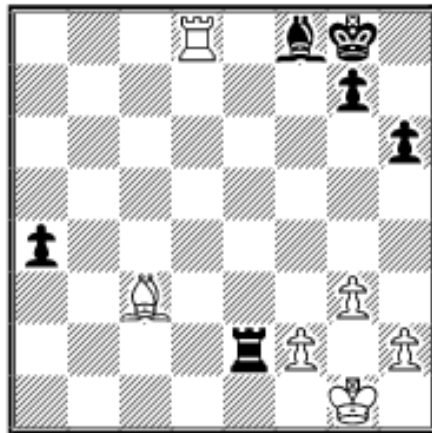
30...Bf6 31.Bc5 a5 32.Bd4 Be7

I am very impressed with the computer's decision to keep the bishop, as without it the game would be a much easier draw for Kramnik.

33.Bc3

The computer has done well so far.

33...a4 34.bxa4 bxa4 35.Rd7 Bf8 36.Rd8



This is a very difficult endgame to win as Black, but it is also very frustrating to defend as White.

36...Kf7 37.Ra8 a3

This is definitely a computer moment! *Fritz* does not understand that this will lead to an immediate draw.

38.Rxf8+!

And this is clearly a human moment! Kramnik clearly understands that he has secured a draw.

38... Kxf8 39.Bb4+

Kramnik should have no problem holding this position. If *Fritz* wanted to win, it had to prevent this sacrifice. Just about anything else would have been better.

39...Kf7 40.Bxa3

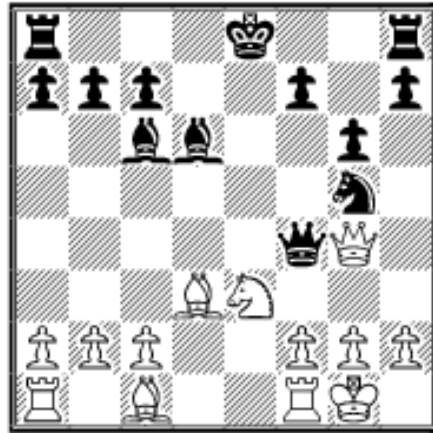
This is a drawn endgame. *Fritz* will just keep on making moves without understanding that the position has little play.

40...Ra2 41.Bc5 g6 42.h4 Kf6 43.Be3 h5 44.Kg2 1/2-1/2

Deep Fritz - Kramnik

Bonn, Germany, 12.01.2006 (4) [C43]

1.e4 e5 2.Nf3 Nf6 3.d4 Nxe4 4.Bd3 d5 5.Nxe5 Nd7 6.Nxd7 Bxd7 7.0-0 Bd6 8.Qh5 Qf6 9.Nc3 Qxd4 10.Nxd5 Bc6 11.Ne3 g6 12.Qh3 Ng5 13.Qg4 Qf4



14.Qxf4 Bxf4 15.Nc4 Ne6 16.Bxf4 Nxf4 17.Rfe1+ Kf8 18.Bf1 Bb5 19.a4 Ba6 20.b4 Bxc4 21.Bxc4 Rd8 22.Re4 Nh5 23.Rae1 Rd7 24.h3 Ng7 25.Re5 Nf5 26.Bb5 c6 27.Bd3 Nd6 28.g4 Kg7 29.f4 Rhd8

White is slightly better because of a space advantage, but Black should be able to hold the position. In fact, I would be uncomfortable if I were White, as Kramnik has such a deep understanding of the endgame.

30.Kg2 Nc8

Kramnik may not be the greatest player ever, but he is certainly one of the smartest. He knows how to maximize his game and repertoire to his advantage. In this game, *Fritz* got nothing from the opening. The Petroff and Berlin are perfect opening choices against the computer. Not many players can do what Kramnik does.

31.a5 Rd4 32.R5e4 Kf8

Black is in no danger.

33.Kf3 h6

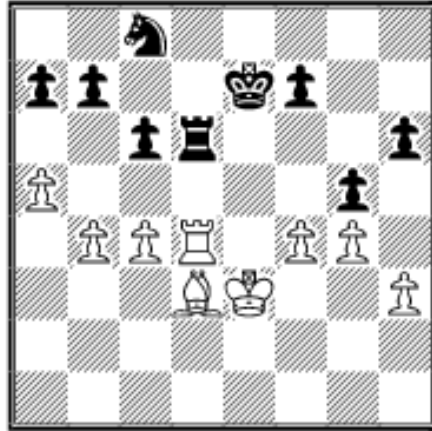
An interesting move. I was looking at 33...f5, when Black is more than OK. 33...h6 means that Kramnik is happy with the position of his pieces and is challenging the computer to make something happen. If White plays 34.Rxd4 Rxd4 35.Re4, this would lead to an easy draw.

34.Rxd4 Rxd4 35.Re4 Rd6 36.Ke3 g5

I am not sure if I like this move, as it gives the white bishop more mobility.

37.Rd4 Ke7

This still looks drawish, but I think Kramnik is making life more difficult for himself.

38.c4

White has a space advantage, but Black has no serious weaknesses.

**38...Rxd4 39.Kxd4 gxf4 40.Ke4 Kf6
41.Kxf4 Ne7 42.Be4**

This is one of those lengthy endgames where neither side will make much progress.

**42...b6 43.c5 bxc5 44.bxc5 Ng6+ 45.Ke3
Ne7 46.Kd4 Ke6 47.Bf3 f5 48.Bd1 Kf6**

I see no practical chances for either side to win; however, it is a little easier playing White in this position.

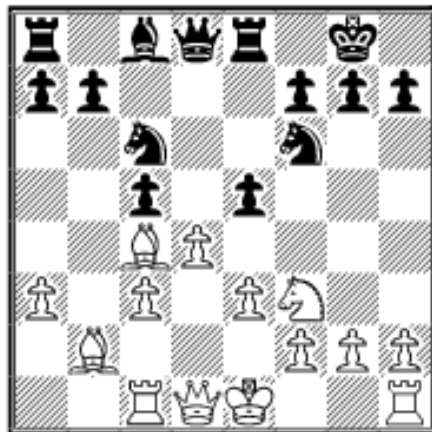
49.Bc2 fxg4 50.hxg4 Ke6 51.Bb1 Kf6 52.Bd4 Ke6 53.Bh1 Kf6 54.Bf3 Ke6 1/2-1/2

Once again, Kramnik held the draw with ease.

Kramnik - Deep Fritz

Bonn, Germany, 12.03.2006 (5) [E51]

**1.d4 Nf6 2.c4 e6 3.Nf3 d5 4.Nc3 Bb4 5.e3 0-0 6.a3 Bxc3+ 7.bxc3 c5 8.Bb2
Nc6 9.Rc1 Re8 10.Bd3 dxc4 11.Bxc4 e5**



**12.dxe5 Qxd1+ 13.Rxd1 Nxe5 14.Nxe5
Rxe5 15.Be2 Bd7 16.c4 Re7 17.h4 Ne4+=**

This is a good position for Kramnik, as he has the bishop-pair and control of the d-file. He has a good chance of grinding down the computer with a kingside attack. Kramnik is getting strategic positions, but the computer has responded well so far.

18.h5 Ba4

I do not sense any danger for *Fritz*. Yet I suspect that Kramnik will continue to exploit his bishop-pair by opening up the kingside.

19.Rd3

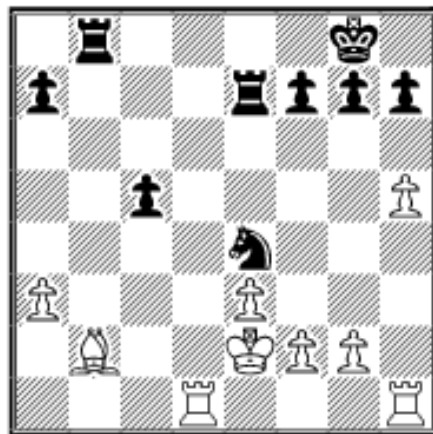
Fritz is playing well and I am not sure how Kramnik will make any dent in this position.

19...b5

Fritz has to open up the queenside for counterplay. Otherwise, White will just pound the kingside. Now, I think Kramnik has to play 20.Rd5 and try to maintain the bishop-pair.

20.cxb5 Bxb5 21.Rd1

It seems to me that Kramnik has no desire to play for a win in this game. Giving up one of the bishops is a sign that he is OK with a draw. Black should have an easy draw now.

21...Bxe2 22.Kxe2 Rb8**23.Ba1 f5**

This is a computer move. Logically speaking, if Black does not want White to play h6 then why not stop it with h6 first?

24.Rd5 Rb3

Black gives up the f-pawn for the a-pawn to exploit the white king. It is still somewhat equal, but certainly more exciting than a few moves earlier.

25.Rxf5 Rxa3 26.Rb1 Re8

The position is looking quite dangerous for Kramnik. The best equalizer for him would be to get one rook off the board with 27.Re5.

27.Rf4

This is a more defensive move. Black is now better and in control.

27...Ra2+ 28.Ke1

After 28...h6, Black can focus on squeezing White and march the a-pawn down the board. Kramnik will now have to earn his half-point.

28...h6 29.Rg4 g5 30.hxg6 Nxf2 31.Rh4 Rf8 32.Kf1 Nh3+

32...Ng4+ 33.Kg1 Ra4=.

33.Ke1 Nf2 34.Kf1 $\frac{1}{2}$ - $\frac{1}{2}$

Deep Fritz - Kramnik

Bonn, Germany, 12.05.2006 (6) [B86]

1.e4 c5 2.Nf3 d6 3.d4 cxd4 4.Nxd4 Nf6 5.Nc3 a6

Kramnik decided to play the super-sharp Najdorf. This means that he is at least trying to even the match.

6.Bc4

Fritz responded with Bobby Fischer's favorite Bc4 variation.

6...e6 7.0-0 Be7 8.Bb3 Qc7 9.Re1 Nc6 10.Re3!?

This is a computer move. GM Rustemov said: "Kramnik should be laughing at the board." I would love to have seen Kramnik's face after *Fritz* made this move.

10...O-O

A logical reply.

11.Rg3



This is *Fritz* being *Fritz*. Tactically speaking, there is nothing wrong with it. However, moves like these are simply *not* human. *Deep Fritz's* rook maneuver looks like something a human amateur would play.

11...Kh8

Another logical reply to get out of the pin.

12.Nxc6

Another surprising move, as 12.Be3 or 12.Bg5 are both playable.

12...bxc6

12...Qxc6 is also playable, but this is probably a little better.

13.Qe2

One possible idea is 13.Bf4, followed by e5. Black cannot allow White to push e5.

13...a5 14.Bg5

White is playing aggressively, but Black is not in any serious danger so far.

14...Ba6 15.Qf3

As long as Black is careful about a kingside attack or the e5 threat, he is doing OK by counterattacking on the queenside.

15...Rb8 16.Re1 c5

The threat is c4 to isolate the bishop on b3. White now has to defend the b2-pawn with Bc1 or Rb1.

17.Bf4

Other moves include: 17...c4 18.e5 dxe5 19.Bxe5 Qb7 20.Bxb8 Qxf3 21.Rxf3 Rxb8 22.Ba4 Rxb2 +=; or 17... Nd7 18.Qg4 Rg8 19.Bc1 Bf6 +=; or the simple 17...Qb7, as suggested by GM Kiriakov on ICC.

17...Qb7 18.Bc1

I evaluate this position as equal, but the computer seems to like White a bit better.

18...Ng8

The idea of this move is to improve the placement of the bishop by putting it on f6.

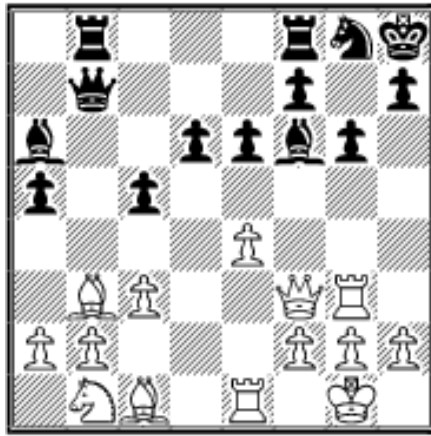
19.Nb1

The position is equal. The idea of this move is to play c3 to clear the c2-square for the b3-bishop.

19...Bf6

White has two main choices here: 20.c3 or 20.Na3. I like the more natural 20.c3.

20.c3 g6



This is a strategic mistake; Black was doing fine until now. The rule is never weaken your pawns unless you have to; this is especially true as Black in the Sicilian.

21.Na3

Now, White is better. All is not lost, but White has a more comfortable position with a potential attack on the kingside.

21...Qc6 22.Rh3 Bg7 23.Qg3

Black's position is quite unpleasant. Kramnik's only chance to win is for the machine to malfunction. 23...h5 24.Bc4 Nf6 25.Qd3 Bb7 26.Bb5 Qb6 27.Bf4 Rd8 28.Qc2 Kg8 29.Qa4 Qc7 30.Rf3 is one possible line given by the computer [Rybka](#).

23...a4

I would not want to be Black, with the two bishops, queen and rook all aiming for my kingside.

24.Bc2 Rb6

White's idea is to play Qh4 and then something like e5 to open up the diagonals for the bishop. 25.e5 is also fine.

25.e5 dxe5 26.Rxe5

26...Bxe5 27.Qxe5+ f6 28.Rxh7+ Kxh7 29.Qh5+ Kg7 30.Qxg6+ Kh8 31.Qh7#.

26...Nf6 27.Qh4 Qb7

Here, Kramnik had about eighteen minutes left to defend a very difficult position.

28.Re1

Black's problem is that there are no counterattacking chances on the queenside and White's pieces are in an excellent position to attack on the kingside.

28...h5 29.Rf3

Black's position is worsening. It would be a miracle for Kramnik to hold this position.

29...Nh7



Now it's over. Black will lose the a-pawn and the threats on the kingside are still there. This is an extremely difficult position for *any* human to defend, especially with little time left.

30.Qxa4 Qc6

Fritz can either trade queens or return to h4, I prefer the former.

31.Qxc6 Rxc6 32.Ba4 Rb3 33.b3 Kg8

34.c4 Rd8

Black has only about ten minutes for the last six moves.

35.Nb5 Bb7 36.Rfe3 Bh6

I do not understand this move. 36...Nf6 is preferable.

37.Re5 Bxc1 38.Rxc1 Rc6

Black is making White's position easier.

39.Nc3 Rc7 40.Bb5 Nf8+-

Black has a number of problems. One is the c5-pawn. The other is White's a-pawn.

41.Na4

Now Kramnik has to give up the d-file to protect the weak c5-pawn. Black has no counterplay.

41...Rdc8 42.Rd1 Kg7

One plan for White is a queenside pawn storm, while Black can only sit and wait.

43.Rd6 f6 44.Re2 e5

I prefer something more quiet like Kf7. 44...e5 will only help White open the position with a later f4.

45.Red2 g5 46.Nb6 Rb8

The easiest way for White to win is to trade pieces.

47.a4 1-0

Black cannot defend against the pawn advances on the queenside. Fritz wins the match 4-2!

The 2007 USCF Executive Board Election

With the potential for four open seats, the future of the USCF depends on the upcoming Executive Board election. Many members want a new and improved USCF and are fed up with politics as usual. The level of animosity between the chess politicians is incomprehensible.

The USCF is one of the most important chess organizations in the United States. It is supposed to be a role model for other groups. For positive change to happen, the members must vote in the best candidates with the highest level of professionalism. The USCF needs new talent. We need new energy, passion and dedication. We need honest people with integrity and high morals.

The new candidates must be able to:

- Restore the respectability and credibility of the USCF.
- Restore a balanced budget.
- Restore the strong cooperation between adult, collegiate, youth and scholastic chess. The USCF needs to support and promote *all* its membership categories.
- Recognize that the USCF is in need of Professional Marketing.

Drastic changes are in order for this federation to move in the right direction. We need strong leadership to rally the entire membership. It is up to us to take back control of the USCF. The members have the power to elect the best people to fix the problems. In the next few weeks, I will be discussing this issue on my [blog](#). I welcome open discussions, debates and suggestions.

Paul Truong assisted Susan Polgar in the preparation of this column. Susan Polgar is available for chess instruction. For more information, visit the Polgar Chess Center, 103-10 Queens Boulevard, Forest Hills, NY 11375 (Tel: 718-897-4600) or email: PolgarChessInc@aol.com



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