

---

**PROBLEM-SOLVING ABILITY TESTED**

**ICCA Communication  
by Göran Grotting**

It is well-known that chess computers are very good at solving problems, often finding the solution before a human being has had the time to become familiar with the problem. Even Grand Masters have had to bite the dust.

As far back as the era of Chess Challenger 10, its ability to solve mate-in-2 problems was impressive. Nowadays, of course, the best machines outperform Chess Challenger 10 by factors of many hundreds.

We have tested 18 chess programs on 16 arbitrarily chosen problems by Samuel Loyd. We found the following ranking for the top fourteen:

1. Conchess 4 MHz	914	8. Turbostar	115
2. Conchess 2 MHz	458	9. Mark V	99
3. Matebadix Intelligent	438	10. Constellation 2.0 MHz	98
4. Super Constellation	223	11. Mephisto Exclusive S	86
5. Constellation 3.6 MHz	177	12. Prestige	39
6. Elite A/S 3 MHz	151	13. Capablanca	30
6. Elegance 3.68 MHz	151	14. Mephisto III Exclusive	23

The number of points behind the ranking has been arrived at simply: the fastest program to solve any problem was given 1,000 points. Competitors were given points inversely proportional to their solution times. The results above are averages over the 16 problems. The ranking scheme may be challenged - your proposals are invited.

The table compares speed only for those computers which indeed were capable of solving all problems set. (Four failed and, while eliminated in the table above, still have such solutions as they did find recorded below.) Evidently Conchess outdoes all its competitors in problem solving. This may be related to their programming team Ulf Rathsman and Johan Enroth having a penchant for chess problems.

A few words are in order on Matebadix Intelligent. Ilka Blom, from Finland, programmed it (see ICCA Journal, Vol. 7, No. 1, pp. 56-57) and it is now commercially available on diskette and tape for the Commodore 64 and other computers, with Apples having a slight time advantage. Using accelerator cards, speeding up the processors by a factor of 3.5, would promote Matebadix Intelligent to the top of our list since the Commodore 64 is no faster than around 1 MHz.

In conclusion, we may state that there are vast time differences in problem-solving ability. For the 14 computers listed, they do not affect the quality of solutions, since all of them are up to Samuel Loyd. The time differences are mainly ascribable to processor rates and programming tactics. A 'Which?' ranking would dissuade intending customers from buying any of the programs not listed above and urge them to acquire programs by their stated ranking whenever problem-solving speed is of the essence.

MATE-IN-2 PROBLEMSProblem 1

White: Kh1 Qa8 Ra5 Rh5 Bb3 Bg7 Ne4 b6 d7 e6 f3 g3;  
Black: Kb4 Qg6 Rd3 Rf8 Bd8 Ne1 c2;  
Solution: 1. Rf5

Problem 2

White: Kh7 Qa3 Re3 Rf2 Bg2 Bh2 Nd1 Nd2 c2 e5 g6;  
Black: Kd4 Qc8 Rc1 Rf6 Bb1 Ng7 Ng8 c4 d6 g5 h4;  
Solution: 1. Rg3

Problem 3

White: Kf1 Qa4 Rb2 Rh1 Ba3 Bd3 Ng2 Nh3 e2 f3 g3 h4;  
Black: Kc1 Qh6 Rd8 Rh8 Bb7 Bg7 Ne1 a7 b6 c7 f7 h7;  
Solution: 1. Bf8

MATE-IN-3 PROBLEMSProblem 4

White: Kh3 Qc2 Rb2 Rf8 Ba1 Bf3 Nd1 Nf5 c5 h4;  
Black: Ke5 Qa2 Ra8 Rf4 Bb7 Bg3 Nc1 Nc6 d6 d5 e6;  
Solution: 1. Qh2

Problem 5

White: Kf1 Ra5 Rf6 Bb5 Bg7 Nb6 Ne4 b4 d2;  
Black: Ke5 Rc8 Rh2 Bg3 Bg8 Na2 Nh1 a6 b7 c3 e6 f2 h4;  
Solution: 1. Ke2

Problem 6

White: Kh7 Rd7 Re2 Ba6 Bc7 Nb5 a4 b3 g4;  
Black: Kc5 Rh2 Ba8 Nf3 Nh1 a5 a7 b4 c6 g5 g7 h4;  
Solution: 1. Bb7

Problem 7

White: Kg8 Rb3 Re3 Bd4 Bf1 Nd1 Nf7 c7 f2 g3;  
Black: Kg4 Qc1 Rh6 Ba5 Nh5 Na4 Na7 c5 d2 d5 e4 g6 h3 h7;  
Solution: 1. Rb6

MATE-IN-4 PROBLEMSProblem 8

White: Kel Qd4 Bg3 Na6 Nd6 e5;  
Black: Kc6 Ba2 Na8 b5 b6 d7 e6 f7 g6;  
Solution: 1. Qg1

Problem 9

White: Ka8 Qh8 Rg2 Be1 Bf1 Nh4 a5 b6 f4 g5 h6;  
Black: Kh3 Qc6 Na2 Nb1 a6 b7 d5 e4;  
Solution: 1. Bxa6

Problem 10

White: Ka3 Rd4 Rh1 Bc1 Bd1 Nc3 Nd3 b2 b6;  
Black: Kal Qb1 Rd7 Rd8 a4 b7 c6 d5;  
Solution: 1. Rdh4

Problem 11

White: Kh6 Ra1 Rd8 Bg8 Na5 Nc4 c2 d2 e6 f3 f4;  
Black: Kc5 Bb8 Nc7 a7 a6 e7;  
Solution: 1. Rc8

MATE-IN-5 PROBLEMSProblem 12

White: Kc1 Ra2 Rf1;  
Black: Kh1 Bh1 a5 h2;  
Solution: 1. Raf2

Problem 13

White: Ke7 Rh3 Bd4 g4;  
Black: Kg7 Rf6 Bg8 f7;  
Solution: 1. Rh6

Problem 14

White: Ke1 Bh6 c2 e2;  
Black: Kg1 Qh1 Rg3 Ba8 c3 g2 h2 h5;  
Solution: 1. Bc1

Problem 15

White: Kal Rf8 Nd3 Bb5 Bc5 d6;  
Black: Kd5 Rg7;  
Solution: 1. Re8

MATE-IN-6 PROBLEM

White: Kf2 Ne2 Nf5;  
Black: Kh1 Na6 Nb6 c5 e7 h7;  
Solution: Nh6

[Problem positions are presented algebraically for programmers' convenience;  
the Swedish equivalent of this contribution may be found in PLY, 1985, No.  
2.]

<u>Problem</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>
Conchess 4 MHz	2	2	2	16	14	5	20	112	66	498	20	602	786	56	3119	921
Conchess 2 MHz	4	4	3	33	27	11	41	227	133	1014	42	1222	1594	114	6240	1980
Matebadix Intell.	4	7	6	54	32	37	78	641	783	756	445	810	322	72	685	3347
Super Constellation	5	7	4	93	70	22	79	960	858	2550	499	1489	1730	111	10000	7710
Constellation 3.6	7	8	4	142	99	31	103	1340	1453	4004	993	2422	3047	155	13558	6192
Elite A/S 3 MHz	4	5	7	291	147	94	150	3423	3196	4800	2649	1951	10080	238	69900	6240
Elegance 3.68 MHz	4	5	7	251	119	87	144	2475	2465	3202	1947	2947	2654	323	151440	8938
Turbostar	15	16	10	292	92	73	178	1330	10705	6162	498	4555	5275	650	1502	17985
Mark V	11	22	20	156	134	101	235	2425	3801	4499	2694	2495	8782	254	4330	28243
Constellation 2.0	12	14	8	230	178	56	185	2528	2617	7209	1848	4342	5486	280	24402	11148
Mephisto Excl. S	19	29	26	250	202	279	379	2490	998	2101	1172	5035	3453	264	5765	81180
Prestige	24	84	29	4855	1726	317	2639	13865	53230	9440	13096	14550	17361	223	180734	25460
Capablanca	35	30	30	720	448	176	474	4781	4231	35964	4318	11112	21792	1949	356422	79267
Mephisto III Excl.	76	109	100	958	817	1103	890	9720	3900	8017	4642	18300	15130	928	29892	182220
Sensory 9 B	37	-	-	-	120	-	110	-	-	2220	730	1990	11640	310	3000	31920
Chess 2001	28	35	22	300	295	308	500	4725	10408	15437	6380	-	-	-	-	-
Morphy	60	87	35	2697	349	431	655	-	-	-	-	-	-	1505	-	-
Boris 2.5	138	177	130	5472	1302	1014	2303	-	-	-	-	-	-	-	-	-

The solution times have been given in seconds, counting to the instant when the computer declared its solution to be final. Dashes refer either to no solution being found or to 'solutions' involving too many moves.