TCEC12: the 12th Top Chess Engine Championship

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TCEC12: the 12th Top Chess Engine Championship

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After the successes of TCEC Season 11 (Haworth and Hernandez, 2018a; TCEC, 2018), the Top Chess Engine Championship moved straight on to Season 12, starting April 18th 2018 with the same divisional structure if somewhat evolved.

Five divisions, each of eight engines, played two or more 'DRR' double round robin phases each, with promotions and relegations following. Classic tempi gradually lengthened and the Premier division's top two engines played a 100-game match to determine the Grand Champion. The strategy for the selection of mandated openings was finessed from division to division. The revised TCEC engine line-up is illustrated and listed in Fig. 1 and Table 1.

Fig. 1. Logos for the TCEC 12 engines as in their original divisions.

Besides using FIDE's 3x-repetition and 50-move drawing rules, TCEC terminated a game at move 40 or later if both engines had |eval| < 0.05 for ten consecutive plies in the current phase, i.e., since the last pawn-advance and/or capture. TCEC12 fell in line with most of the participating engines by adjudicating endgames using the Syzygy DTZ_{50}'' EGTs (de Man, 2018) rather than the Gaviota DTM EGTs which do not recognise the 50-move rule. 5-man EGTs were used for the divisions and 6-man EGTs were used for the Superfinal. Games which were apparently decisive were terminated by TCEC

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if both engines consistently agreed for the last eight plies that the evaluation is at least 6.5 or at most -6.5.

ELO ranged from 2714 to 3554, averaging 3143. Four new engines joined the fray this time:

LEELA CHESS ZERO, a new-architecture UCT/NN engine from a large community,
RODENT by the Polish chess programmer Pawel Koziol,
TUCANO by the Brazilian professional software developer/programmer Alcides Schulz, and
XIPHOS by the Serbian mathematician and computer scientist Milos Tatarevic.

The formidable 44-core server of TCEC11 was used unchanged in TCEC12.

Table 1. The TCEC12 engines (CPW, 2018), details, authors and progression.

#	ab	Engine Name	Version	ELO	Div.	thr.	proto-col	Hash Kb	EGTs	Authors	Country Codes	Final Div.
01	An	Andscacs	0.93070	3339	P	43	UCI	16,384	—	Daniel José Queraltó	AD	→ P
02	Ar	Arasan	TCEC12	3142	2	43	UCI	16,384	Syz.	Jon Dart	US	↘ 3
03	Bc	Bobcat	8	3072	3	43	UCI	16,384	—	Gunnar Harms	NL	→ 3
04	Bo	Booot	6.2	3273	1	16	UCI	8,192	—	Alex Morozov	UA	→ 1
05	Cb	ChessbrainVB	3.67	3024	3	43	xboard	1,200	—	Roger Zuehlsdorf	DE	↗ 2
06	Ch	Chiron	040318	3340	P	43	UCI	16,384	Syz.	Ubaldo Andrea Farina	IT	↘ 1
07	Et	Ethereal	9.60	2985	4	43	UCI	16,384	—	Andrew Grant	US	↗ 3
08	Fi	Fire	7	3393	P	43	UCI	16,384	Syz.	Norman Schmidt	US	→ P
09	Fz	Fizbo	2	3284	1	43	UCI	16,384	Syz.	Youri Matiounine	US	→ 1
10	Fr	Fritz	16.10	3165	2	43	UCI	16,384	Nal?	Vasik Rajlich	CZ/US	↗ 1
11	Ft	Fruit	2E+07	2934	4	16	UCI	8,192	Syz.	Daniel Mehrmann	DE	→ 4
12	Gi	Ginkgo	2.012	3267	1	43	UCI	16,384	—	Frank Schneider	DE	↗ P
13	Gu	Gull	3	3217	1	43	UCI	16,384	Syz.	Vadim Demichev	RU	↘ 2
14	Ha	Hannibal	121017	3193	2	16	UCI	8,192	—	Sam Hamilton, Edsel Apostol	US/PH	↘ 3
15	Ho	Houdini	6.03	3491	P	43	UCI	16,384	Syz.	Robert Houdart	BE	→ P
16	Jo	Jonny	8.1	3252	1	43	UCI	16,384	Syz.	Johannes Zwanzger	DE	↗↘ 1
17	Ko	Komodo	12	3466	P	43	UCI	16,384	Syz.	Don Dailey, Larry Kaufman, Mark Lefler	US	→ P
18	La	Laser	070518	3194	1	43	UCI	16,384	Syz.	Jeffrey An, Michael An	US	→ 1
19	Lc	Leela Chess Zero	0.7 ID125	2714	4	43	UCI	—	—	UCT/NN AI Community	—	↘ —
20	Ne	Nemorino	4.13	3104	3	43	UCI	16,384	Syz.	Christian Günther	US	→ 3
21	Ni	Nirvana	2.4	3168	2	16	UCI	8,192	—	Thomas Kolarik	US	→ 2
22	Pe	Pedone	1.8	3104	3	43	UCI	16,384	Syz.	Fabio Gobbato	IT	→ 3
23	Ro	Rodent III	0.244	3076	4	16	UCI	4,096	—	Pawel Koziol	PL	→ 4
24	Sc	Scorpio	2.82	2831	4	43	xboard	16,384	—	Daniel Shawul	ET	↘ —
25	Se	Senpai	2.0	3062	3	16	UCI	16,384	—	Fabien Letouzey	FR	↘ 4
26	St	Stockfish	160518	3554	P	43	UCI	16,384	Syz.	Tord Romstad, Marco Costalba, Joona Kiiski, Gary Linscott	NO/IT/ FI/CA	→ P
27	Te	Texel	1.08a11	3202	2	43	UCI	16,384	Syz.	Peter Österlund	SE	↗↘ 2
28	Th	The Baron	3.41	2840	4	43	UCI		Syz.	Richard Pijl	NL	→ 4
29	Tu	Tucano	7.00	2830	4	43	xboard	1,024	—	Alcides Schulz	BR	→ 4
30	Va	Vajolet2	2.5	3119	2	43	UCI	16,384	Syz.	Marco Belli	IT	→ 2
31	Wa	Wasp	180420	2964	3	43	UCI	8,192	—	John Stanback	US	↘ 4
32	Xi	Xiphos	0.2	2986	4	43	UCI	4096	—	Milos Tatarevic	RS	↗↗ 2

1 Division 4, two DRR phases, 28 rounds, 112 games, tempo 30′+10″/m

A principal focus was the participation of the exciting LEELA CHESS ZERO, a neural-network-architecture engine inspired by the innovations of Deep Mind's ALPHAZERO (Silver et al, 2017). The 14 most common two-move openings in the second author's CATOBASE (Hernandez, 2018) were allocated to rounds 1-7 and 15-21, and with colours reversed for rounds 8-14 and 22-28, see Table 2.

The results, as played, are as in Table 3 though a rule introduced in TCEC11 required that the participation of SCORPIO be scratched as it had three technical crashes. The seven connection breaks with the server were thought to be caused by deadlock conditions in the engine. These losses in fact made no difference to the final ranking on this occasion. LC0 did not in fact progress but will be greatly helped by GPU assistance in a future season. The generic statistical review of TCEC12 results and terminations is given for each phase of TCEC12 in Table 11.

Table 2. CATOBASE's most common two-move openings.

#	First four plies	Rounds	ECO	Opening	TCEC's ECO coding for the eight games	TCEC12.D4 results 1-0	½-½	0-1	ignored
01	1. e4 c5 2. Nf3 d6	01 & 08	B50	Sicilian Defence	B84, B52, B50, B52; B51, B54, B53, B90	3	2	2	1
02	1. e4 e5 2. Nf3 Nc6	02 & 09	C44	King's Pawn Game	C45, C68, C58, C84; C45, C61, C68, C67	5	1	1	1
03	1. d4 Nf6 2. c4 e6	03 & 10	E00	Queen's Pawn Game	D50, E40, D35, E20; D30, D50, D59, D41	4	0	4	0
04	1. e4 e6 2. d4 d5	04 & 11	C00	French Defence	C01, C06, C06, C01; C11, C14, C01, C01	4	1	3	0
05	1. e4 c5 2. Nf3 Nc6	05 & 12	B30	Sicilian Defence	B30, B30, B30, B30; B30, B30, B30, B31	2	4	2	0
06	1. e4 c6 2. d4 d5	06 & 13	B12	Caro-Kann Defence	B15, B15, C19, B15; B15, B12, B15, B12	2	4	2	0
07	1. d4 d5 2. c4 c6	07 & 14	D10	Queen's Gambit Declined	D12, D12, D11, D12; D10, D12, D94, D30	3	2	2	1
08	1. d4 Nf6 2. c4 g6	15 & 22	E60	King's Indian Defence	A56, D85, D94, D85; D93, D85, B38, E61	2	2	3	1
09	1. d4 Nf6 2. Nf3 d5	16 & 23	A46	Queen's Pawn game	D30, D37, D05, D11; D26, D94, D35, D24	3	2	2	1
10	1. d4 d5 2. c4 e6	17 & 24	D30	Queen's Gambit Declined	D50, D50, D35, E51; D30, D50, D30, D53	3	2	2	1
11	1. e4 c5 2. Nf3 e6	18 & 25	B40	Sicilian Defence	B33, B45, B45, B22; B40, B45, B45, B46	3	1	4	0
12	1. d4 Nf6 2. Nf3 e6	19 & 26	A46	Queen's Pawn game	E10, E10, D24, E05; D30, E12, D30, A46	4	1	3	0
13	1. c4 e5 2. Nc3 Nf6	20 & 27	A22	English Opening	A28, A28, A28, A22; A28, A22, A28, A28	4	1	2	1
14	1. Nf3 Nf6 2. c4 c5	21 & 28	A15	English Opening	B14, A35, A30, A33; D30, D27, A30, A30	1	6	1	0

For division 4, all rounds have four games so game *r.n* is game *4r-4+n* in the pgn files (Haworth and Hernandez, 2018b) and the colour-flipped pairings of engines are 28 games apart. This division had 10.8% of its wins below the diagonal of the eventual x-table. ETHEREAL alone was much improved, undefeated and a strong first while XIPHOS kept RODENT III in a distant third place, beating it 4-0.

Table 3. The TCEC12 Division 4 cross-table: two DRR phases, 28 rounds, 112 games.

#	Engine	ELO	Pts	DRR	SB	nSB	Et	Xi	Ro	Tu	Th	Ft	Sc	Lc	Move
1	Ethereal 9.60	2985	23.5	2	282.25	70.56		11==	==1=	1111	===1	11=1	1111	1111	↗
2	Xiphos 0.2	2986	22.0	2	253.75	63.44	00==		1111	=11=	111=	101=1	1111	1111	↗
3	Rodent III 0.244	3076	18.0	2	187.00	46.75	==0=	0000		1===	11=1	=11=	111=	1111	→
4	Tucano 7.00	2830	13.5	2	135.25	33.81	0000	=00=	0===		=111	1=01	==00	1111	→
5	The Baron 3.41	2840	11.5	2	123.00	30.75	===0	000=	00=0	=000		=1=1	1001	=111	→
6	Fruit 20180416	2934	11.0	2	118.25	29.56	00=0	010=	=00=	0=10	=0=0		=010	1111	→
7	Scorpio 2.82	2831	10.5	2	105.00	26.25	0000	0000	000=	==11	0110	=101		101=	↘
8	LCZero 0.7 ID125	2714	02.0	2	21.50	5.38	0000	0000	0000	0000	=000	0000	010=		↘

2 Division 3, two DRR phases, 28 rounds, 112 games, tempo 30′+10″/m

In this division, the same fourteen openings were mandated as for Division 4 and used in the same order. This time however, the colour-reversed game followed immediately rather than 28 games later, giving an earlier balanced view on the bilateral contests. Rounds were therefore of eight games rather than four and were numbered from 1 to 14, see Table 4.

Draws under the 50-move rule are very rare in TCEC, less than 1% of terminations. This is because most engines seem to monitor the ply-count, zero their evaluations as they see it reaching 100, and allow TCEC draw-adjudication to take its course. Game 13.1/97, CHESSBRAINVB-WASP, was however a 50m-rule draw: CHESSBRAINVB retained hopes of a win to the end, despite being a pawn down.

CHESSBRAINVB was a clear winner but the race for the second promotion-spot was close. XIPHOS pulled off its second promotion this season, despite having lost its head-to-head matches with fellow-candidates ETHEREAL and PEDONE. ETHEREAL more than justified its promotion to Division 3.

Table 4. The 14 two-move openings chosen for Division 3.

#	First four plies	Rounds	ECO	Opening	TCEC's ECO coding for the eight games	TCEC12.D3 results 1-0	½-½	0-1	ignored
01	1. e4 c5 2. Nf3 d6	01	B50	Sicilian Defence	B52, B52; B54, B90; B50, B53; B92, B52	1	6	1	0
02	1. e4 e5 2. Nf3 Nc6	02	C44	King's Pawn Game	C67, C67; C84, C69; C46, C69; C61, C69	2	2	4	0
03	1. d4 Nf6 2. c4 e6	03	E00	Queen's Pawn Game	E12, E12; E14, E10; E10, E10; E10, E00	3	5	0	0
04	1. e4 e6 2. d4 d5	04	C00	French Defence	C07, C02; C01, C01; C06, C01; C01, C05	4	2	1	1
05	1. e4 c5 2. Nf3 Nc6	05	B30	Sicilian Defence	B31, B30; B30, B30; B30, B30; B30, B31	1	5	2	0
06	1. e4 c6 2. d4 d5	06	B12	Caro-Kann Defence	B12, B15; B12, B15; B12, B12; B18, B15	3	3	2	0
07	1. d4 d5 2. c4 c6	07	D10	Queen's Gambit Declined	D10, D11; D11, D10; D12, D11; D11, D12	1	6	1	0
08	1. d4 Nf6 2. c4 g6	08	E60	King's Indian Defence	D85, E90; D85, D90; D83, D85; D86, E60	2	4	2	0
09	1. d4 Nf6 2. Nf3 d5	09	A46	Queen's Pawn game	A46, A46; A46, A46; A46, A46; A46, A46	3	5	0	0
10	1. d4 d5 2. c4 e6	10	D30	Queen's Gambit Declined	D30, D30; D31, D53; D30, D30; D30, D30	2	5	1	0
11	1. e4 c5 2. Nf3 e6	11	B40	Sicilian Defence	B40, B40; B40, B40; B40, B40; B40, B40	5	3	0	0
12	1. d4 Nf6 2. Nf3 e6	12	A46	Queen's Pawn game	A46, A46; A46, A46; A46, A46; A46, A46	1	4	3	0
13	1. c4 e5 2. Nc3 Nf6	13	A22	English Opening	A22, A22; A22, A22; A22, A22; A22, A22	0	6	2	0
14	1. Nf3 Nf6 2. c4 c5	14	A15	English Opening	A05, A05; A05, A05; A05, A05; A05, A05	3	5	0	0

Table 5. The TCEC12 Division 3 cross-table: two DRR phases, 28 rounds, 112 games.

#	Engine	Rtng	Pts	DRR	SB	nSB	Ch	Xi	Pe	Et	Bo	Ne	Se	Wa	Move
1	ChessBrainVB 3.67	3024	19.0	2	246.50	61.63		=1=0	====	1=1=	11=1	101=1	1==1	1==1	↗
2	Xiphos 0.2	3180	17.5	2	220.25	55.06	=0=1		===0	===0	==1=	111=1	=1=1	1=11	↗
3	Pedone 1.8	3104	16.0	2	217.50	54.38	====	===1		11==	0=10	==01	1===	1===	→
4	Ethereal 9.64	3243	15.5	2	196.75	49.19	0=0=	===1	00==		=1==	1===	=1==	111=	→
5	Bobcat 8	3072	14.5	2	183.50	45.88	00=0	==0=	1=01	=0==		==11	=1=1	10=1	→
6	Nemorino 4.13	3104	12.5	2	158.00	39.50	010=	000=	==10	0===	==00		11==	==11	→
7	Senpai 2.0	3062	9.0	2	126.75	31.69	0==0	=0=0	0===	=0==	=0=0	00==		====	↘
8	Wasp 180420	2964	8.0	2	111.75	27.94	0==0	0=00	0===	000=	01=0	==00	====		↘

3   Division 2, two DRR phases, 28 rounds, 112 games, tempo 30′+10″/m

Fourteen of the most frequent 100 two-move openings in CATOBASE were allocated to rounds 1-14 with, again, the colour-reversed games being played immediately.

Table 6. The 14 two-move openings chosen for Division 2.

#	First four plies	Rounds	ECO	Opening	TCEC's ECO coding for the eight games	TCEC12.D2 results 1-0	½-½	0-1	ignored
01	1. e4 e5 2. Bc4 Nf6	01	C24	Bishop's O.; Berlin Def.	C26, C26; C26, C26; C26, C26; C26, C26	4	0	1	3
02	1. Nf3 Nf6 2. g3 d5	02	A05	Reti Opening	A05, A05; A05, A05; A05, E09; A05, A05	1	4	3	0
03	1. e4 c5 2. Nc3 e6	03	B23	Sicilian, closed	B45, B45; B45, B23; B45, B45; B81, B23	3	4	0	1
04	1. Nf3 d5 2. c4 e6	04	A09	Reti Opening	D37, D38; D55, D37; D38, D32; A13, D26	1	4	2	1
05	1. c4 e5 2. Nc3 Nf6	05	A22	English Opening	A28, A28; A28, A28; A28, A28; A28, A28	0	6	2	0
06	1. d4 Nf6 2. Nf3 d5	06	A45	Queen's Pawn Game	D38, D38; D37, D38; D27, D02; D04, D55	3	5	0	0
07	1. e4 c6 2. Nc3 d5	07	B10	Caro-Kann defence	B15, B18; B18, B17; B15, B15; B15, B15	2	6	0	0
08	1. d4 d5 2. c4 e6	08	D30	Queen's Gambit Declined	D37, D30; D30, D31; D50, D50; D37, D53	2	3	2	1
09	1. e4 e5 2. Nf3 Nc6	09	C60	Ruy Lopez	C80, C69; C69, C58; C69, C58; C61, C58	1	7	0	0
10	1. e4 c5 2. Nf3 g6	10	B27	Sicilian, Hungarian Var.	B27, B27; B27, B27; B27, B27; B27, B27	2	4	2	0
11	1. d4 Nf6 2. c4 d6	11	A53	Old Indian Defence	A53, A55; A54, A53; A53, E90; E90, A53	4	2	1	1
12	1. d4 f5 2. g3 Nf6	12	A81	Dutch Defence	A81, A90; A92, A81; A92, A81; A81, A81	4	2	1	1
13	1. e4 d5 2. exd5 Nf6	13	B01	Scandinavian Defence	B01, B01; B01, B01; B01, B01; B01, B01	3	3	1	1
14	1. e4 Nf6 2. e5 Nd5	14	B02	Alekhine's Defence	B03, B04; B02, B02; B04, B04; B02, B03	4	3	1	0

This time, FRITZ and TEXEL won promotion but the newly promoted XIPHOS and CHESSBRAINVB took the next two places. There were 10 technical crashes in the division, and both ARASAN and HANNIBAL were disqualified and relegated for disconnecting from the server: a pity as they had both scored wins against FRITZ. VAJOLET no doubt counted itself lucky to survive.

Table 7. The TCEC12 Division 2 cross-table: two DRR phases, 28 rounds, 112 games.

#	Engine	ELO	Pts	DRR	SB	nSB	Fr	Te	Xi	Ch	Ni	Ha	Ar	Va	Move
1	Fritz 16.10	3165	18.0	2	242.75	60.69		1=01	=11=	1===	==1=	0=11	101=	==1=	↗
2	Texel 1.08a11	3202	17.5	2	227.50	56.88	0=10		===1	1==0	101=	==1=	=111	1011	↗
3	Xiphos 0.2.4	3193	15.5	2	206.00	51.50	=00=	===0		=11=	11=1	===1	==0=	1===	→
4	ChessBrainVB 3.68	3242	13.5	2	179.75	44.94	0===	0==1	=00=		10=0	100=	0=11	11=1	→
5	Nirvana 2.4	3168	13.5	2	177.25	44.31	==0=	010=	00=0	01=1		1=00	11==	==11	→
6	Hannibal 121017	3193	13.0	2	180.50	45.13	1=00	==0=	===0	011=	0=11		==0=	==10	→
7	Arasan TCEC12	3142	11.0	2	155.75	38.94	010=	=000	==1=	1=00	00==	==1=		=0==	↘
8	Vajolet2 2.5	3119	10.0	2	141.50	35.38	==0=	0100	0===	00=0	==00	==01	=1==		↘

4 Division 1, two DRR phases, 28 rounds, 112 games, tempo 60′+10″/m

The normalised Sonneborn-Berger scores suggest that this was the most closely-contested division of TCEC12. Eventually, GINKGO and JONNY triumphed though FIZBO and BOOOT kept the result in doubt until almost the end. Thankfully, we did not see another rash of engine-disconnect fails, the one ultimately irrelevant incident being g8.8/64, FRITZ–JONNY. FRITZ as Black had beaten JONNY in their first, g1.7/7, encounter and hung on to its recent promotion: TEXEL did not.

Table 8. The TCEC12 Division 1 cross-table: two DRR phases, 28 rounds, 112 games.

#	Engine	ELO	Pts	DRR	SB	nSB	Gi	Jo	Fi	Bo	La	Fr	Gu	Te	Move
1	Ginkgo 2.012	3267	17.0	2	226.75	56.69		==10	0111	==0=	=1==	===1	1===	11==	↗
2	Jonny 8.1	3252	17.0	2	225.25	56.31	==01		====	=110	====	0=11	11=1	===1	↗
3	Fizbo 2	3284	15.0	2	194.75	48.69	1000	====		=011	===0	==0=	=1==	1111	→
4	Booot 6.2	3273	14.5	2	199.50	49.88	==1=	=001	=100		=1==	1==0	01==	===1	→
5	Laser 070518	3194	14.5	2	198.25	49.56	=0==	====	===1	=0==		=1==	=01=	=101	→
6	Fritz 16.10	3294	13.5	2	185.75	46.44	===0	1=00	==1=	0==1	=0==		1===	=0=1	→
7	Gull 3	3217	11.0	2	153.75	38.44	0===	00=0	=0==	10==	=10=	0===		====	↘
8	Texel 1.08a11	3273	9.5	2	135.00	33.75	00==	===0	0000	===0	=010	=1=0	====		↘

5 Division P, four DRR phases, 56 rounds, 224 games, tempo 90′+10″/m

Table 9. The Premier Division cross-table: four DRR phases, 56 rounds, in fact 168 rather than 224 games.

#	Engine	ELO	Pts	DRR	SB	nSB	Ko	St	Ho	Fi	An	Gi	Jo	Ch	Move
1	Komodo 12	3466	31.0	4	670.00	57.00		==0=====	==01====	=1=====1	1=====11	1111====	1=111=11		↗
2	Stockfish 160518	3554	30.5	4	681.00	57.93	==1=====		========	1=1==1=	==11===1	=11===1=	1===1=1=	1	↗
3	Houdini 6.03	3491	29.5	4	650.50	55.34	==10====	========		==0=====	=11==1==	=1=1=1=1	=1=1=111		→
4	Fire 7	3393	22.0	4	525.50	44.70	=0=====0	0=0===0=	==1=====		=====01	1=1=====	==0=0===	=	→
5	Andscacs 0.93070	3339	20.5	4	469.00	39.90	0=====00	==00===0	==00===	======10		0=1=10==	1===1===		→
6	Ginkgo 2.014	3340	19.0	4	430.50	36.62	0000====	=00===0=	=0=0=0=0	0=0=====	1=0=01==		1=1=10=1	1	→
7	Jonny 8.1	3274	15.5	4	370.50	31.52	0=000=00	0===0=0=	=0=0=000	==1=1===	0===0===	0=0=01=0		0	↘
8	Chiron 040318	3340	0.0	4	0.00	0.00	0	0	=			0	1		↘

STOCKFISH was the only unbeaten engine but was still second with a Performance ELO of 3443, 121 down on its nominal 3554. KOMODO lost its eight-game match against STOCKFISH but had a better

harvest of wins against the bottom three engines. HOUDINI made up the three engines that stretched away from the others. CHIRON crashed three times in the first round and was pulled from the event.

6 The TCEC12 Superfinal match: 100 games, tempo 120′+15″/m

The Superfinal between STOCKFISH and KOMODO surprised in two ways. First, it was not close and secondly, the win-rate was high. STOCKFISH won 29-9, 23/6 as White and 6/3 as Black so White also dominated Black 29-9. In terms of the fifty two-game pairs, STOCKFISH won 22 pairs 1½-½ and the g71-72 pair 2-0: KOMODO won 4 pairs 1½-½. GM Thechesspuzzler (2018) created a Youtube stream for the TCEC12 Superfinal. Wool (2018) provided some useful chessic insight on TCEC12 as a whole.

Table 10. The Superfinal match of 100 games: (numbers of) games and game-pairs won, Black wins underlined.

Superfinal	ELO	Score	# of	games won (0-1 wins underlined) ...	# of	game-pairs won
STOCKFISH	3519	60	29	5, 9, 11, 17, 25, 27, 31, 35, 43, 46, 51, 55, 57, 59, 64, 66, 67, 70, 71, 72, 75, 77, 83, 88, 89, 93, 95, 97, 99	23	3, 5, 6, 9, 13, 14, 16, 18, 22, 29, 30, 32, 33, 34, 35, 36, 38, 39, 42, 44, 47, 48, 49, 50
KOMODO	3475	40	9	1, 29, 34, 38, 45, 52, 56, 90, 96	4	1, 15, 17, 19

7 Summary

We gather together some generic statistics for the Divisions and Superfinal in Tables 11 and 12. These will help aficionados and analysts of computer chess to identify the particular games of interest to them later. The pgn files and further data are included with the e-repository version of this note (Haworth and Hernandez, 2018). Our congratulations go once again to the TCEC audience who made for a lively discussion forum (Twitch, 2018), to all participants, particularly to those who gained promotion and to the TCEC12 Grand Champion, STOCKFISH and all its supporters.

Table 11. Generic statistics for each phase of TCEC12.

TCEC 12	Division 4		Division 3		Division 2		Division 1		Division P		Superfinal		Overall	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
# games	112		112		112		112		173		100		721	
Draw	29	25.9	61	54.5	53	47.3	65	58.0	109	63.0	62	62.0	379	52.6
Wins	83	74.1	51	45.5	59	52.7	47	42.0	64	37.0	38	38.0	342	47.4
1-0	48	42.9	31	27.7	35	31.3	32	28.6	48	27.7	29	29.0	223	30.9
0-1	35	31.1	20	17.9	24	21.4	15	13.4	16	9.2	9	9.0	119	16.5
White Perf.	62.5	55.8	61.5	54.9	61.5	54.9	64.5	57.6	102.5	59.2	60.0	60.0	412.5	57.2
Black Perf.	49.5	44.2	50.5	45.1	50.5	45.1	47.5	42.4	70.5	40.8	40.0	40.0	308.5	42.8
TCEC draw	13	11.6	32	28.6	30	26.8	38	33.9	58	33.5	35	35.0	206	28.6
3x repetition	6	5.4	10	8.9	11	9.8	14	12.5	25	14.5	10	10.0	76	10.5
50m rule	2	1.8	1	0.9	0	0.0	2	1.8	0	0.0	1	1.0	6	0.8
EGT adj.	11	9.8	20	17.9	16	14.3	13	11.6	26	15.0	16	16.0	102	14.1
TCEC win	71	63.4	48	42.9	45	40.2	44	39.3	61	35.3	38	38.0	307	42.6
Tech. default	7	6.3	1	0.9	10	8.9	1	0.9	3	1.7	0	0.0	22	3.1
Manual 'win'	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Mates	2	1.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.3

Table 12. The shortest and longest 1-0, drawn and 0-1 games in each phase of TCEC12.

Div.	1-0 Shortest			1-0 Longest			½-½ Shortest			½-½ Longest			0-1 Shortest			0-1 Longest		
	Game	mv	between	Game	mv	between	Game	mv	between	Game	mv	between	Game	mv	between	Game	mv	between
4	16.3/63	25	Xi-Ft	18.3/71	104	Et-Sc	21.4/84	37	Xi-Et	6.4/24	353	Ft-Sc	25.3/99	31	Sc-Et	27.3/107	128	Th-Tu
3	6.7/47	36	Pe-Et	11.4/84	158	Bo-Pe	13.7/103	20	Pe-Et	1.2/2	136	Se-Cb	12.2/90	30	Bo-Cb	12.4/92	95	Wa-Ne
2	1.5/5	47	Ni-Xi	7.1/49	108	Te-Cb	3.5/21	28	Va-Ar	9.6/70	159	Fr-Cb	3.3/19	34	Ha-Fr	5.6/38	117	Cb-Xi
1	1.5/13	34	Bo-Fr	5.5/37	115	Gu-Bo	11.6/86	17	Gi-Te	10.6/78	199	Jo-La	2.2/10	43	Te-Fi	4.3/27	159	Gu-Jo
P	1.1/1	31	St-Jo	24.3/95	99	Ho-Gi	40.4/160	34	Ho-Fi	42.3/167	185	Ko-Fi	52.1/189	51	Jo-Ho	2.1/5	136	Jo-Ch
SF	9.1/17	42	St-Ko	22.1/43	128	St-Ko	33.1/65	26	St-Ko	35.1/69	238	St-Ko	23.2/46	46	Ko-St	15.1/29	132	St-Ko

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