Appendix C

Experimental Data In Detail

Sequential *Chinook*

Game	Move	Depth	Score	Nodes	Time	N/S	Black	Turn	Pieces	Root BF
1	11–15	17	–14	4,147,002	594	6,981	Chinook	B	18	7
5	6–10	17	–16	1,721,679	231	7,453	Tinsley	B	20	8
7	28–24	15	1	1,697,552	249	6,817	Tinsley	W	20	10
8	12–16	17	13	2,990,826	417	7,172	Chinook	B	20	9
9	16–20	19	6	1,358,169	188	7,224	Chinook	B	20	6
13	14–17	15	–4	3,056,458	431	7,092	Chinook	B	18	11
14	22–18	15	7	3,224,856	462	6,980	Tinsley	W	18	11
15	9–13	17	–9	2,768,981	379	7,306	Tinsley	B	18	9
17	1–6	17	–5	3,635,672	487	7,465	Chinook	B	14	8
19	21–17	15	10	1,771,596	250	7,086	Tinsley	W	14	7
22	5–9	19	13	1,776,809	246	7,223	Tinsley	B	18	7
23	1–5	17	3	2,148,151	300	7,161	Tinsley	B	20	9
27	21–17	15	8	1,440,079	204	7,059	Tinsley	W	16	8
29	5–9	17	2	3,567,708	508	7,023	Chinook	B	18	10
30	22–18	17	–9	3,276,323	447	7,330	Tinsley	W	16	10
31	3–7	17	–12	3,610,286	489	7,383	Tinsley	B	18	12
33	11–15	15	–2	1,807,880	253	7,146	Chinook	B	18	11
36	10–14	19	8	3,331,558	511	6,520	Chinook	B	18	9
37	7–11	17	–8	1,689,039	231	7,312	Chinook	B	18	8
38	23–19	17	4	5,010,806	717	6,989	Tinsley	W	24	8

Table C.1 — Tinsley-*Chinook* 1992 Test Suite, Sequential Search Data
(time in seconds)

Referring to Table C.1, in the position from Game 5, the move played by Black (Dr. Tinsley) was 6-10. Sequential *Chinook* searched that position to a nominal depth of 17 plies and selected 6-10 as the best move with a score of -16 points, where a piece (i.e. checker) is worth 100 points and a king is worth an additional 30 points. Sequential *Chinook* searched 1,721,679 total nodes in 231 seconds (7,453 nodes/second). In that position, there were a total of 20 pieces remaining on the board, and there were 8 legal moves in the root position.

Principal Variation Splitting

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−14	4,128,252	388	1.53	−0.450	13.6	
5	−17*	1,657,770	156	1.48	−3.71	16.0	
7	1	1,932,830	183	1.36	13.9	15.5	
8	13	4,107,391	382	1.09	37.3	16.1	
9	6	1,046,004	100	1.88	−23.0	22.2	
13	−4	3,839,579	403	1.07	25.6	18.5	
14	7	3,310,092	331	1.40	2.64	21.7	
15	−9	3,042,091	327	1.16	9.86	29.9	
17	−5	4,184,049	369	1.32	15.1	16.6	
19	10	1,872,404	187	1.34	5.69	18.2	
22	8*	2,118,772	208	1.18	19.3	24.5	
23	4*	2,636,876	227	1.32	22.8	10.5	
27	8	1,629,378	146	1.40	13.2	11.2	
29	2	3,772,099	345	1.47	5.73	15.6	
30	−11*	5,369,202	479	0.933	63.9	14.0	Plays 31-27
31	−12	3,518,025	285	1.72	−2.56	8.92	
33	−6*	1,964,771	213	1.19	8.68	18.0	
36	3*	4,129,920	449	1.14	24.0	23.3	
37	−10*	1,498,570	138	1.67	−11.3	18.9	
38	7*	3,795,110	387	1.85	−24.3	24.1	
		Average:		1.38	10.1	17.9	
		Std. Deviation:		0.260	20.1	5.25	

Table C.2 — Principal Variation Splitting (PVSplit), 2 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	-14	4,863,334	383	1.55	17.3	47.2	
5	-13*	1,389,027	84	2.75	-19.3	39.5	
7	1	2,022,535	143	1.74	19.1	42.9	
8	13	3,724,304	267	1.56	24.5	44.8	
9	6	1,037,548	68	2.76	-23.6	42.9	
13	-4	3,635,724	288	1.50	19.0	42.1	
14	7	3,171,213	277	1.67	-1.66	54.9	
15	-9	3,006,452	267	1.42	8.58	57.3	
17	-5	3,883,726	263	1.85	6.82	44.5	
19	10	2,008,442	175	1.43	13.4	49.9	
22	21*	4,076,931	385	0.639	129	56.0	
23	4*	3,071,762	200	1.50	43.0	40.7	
27	8	1,758,767	114	1.79	22.1	37.4	
29	2	3,717,482	271	1.87	4.20	46.7	
30	-11*	5,795,981	381	1.17	76.9	40.0	Plays 31-27
31	-12	3,522,265	213	2.30	-2.44	38.5	
33	-2	2,322,067	190	1.33	28.4	43.7	
36	8	3,823,024	341	1.50	14.8	54.1	
37	-10*	1,477,428	85	2.72	-12.5	36.4	
38	11*	3,295,441	254	2.82	-34.2	49.7	
		Average:		1.79	16.7	45.5	
		Std. Deviation:		0.591	36.0	6.36	

Table C.3 — Principal Variation Splitting (PVSplit), 4 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	-14	5,069,863	369	1.61	22.3	70.8	
5	-13*	1,388,912	88	2.63	-19.3	71.1	
7	1	1,905,201	132	1.89	12.2	70.1	
8	13	4,182,553	284	1.47	39.9	70.4	
9	6	1,035,137	67	2.81	-23.8	71.0	
13	-4	3,974,516	285	1.51	30.0	64.7	
14	7	3,138,124	262	1.76	-2.69	76.0	
15	-6*	2,843,340	222	1.71	2.69	75.0	
17	-5	3,981,729	253	1.92	9.52	69.7	
19	10	2,081,931	165	1.52	17.5	70.8	
22	21*	4,277,504	406	0.606	141	77.4	
23	4*	2,941,137	173	1.73	36.9	67.0	
27	8	1,618,998	96	2.13	12.4	64.3	
29	2	3,741,091	263	1.93	4.86	71.9	
30	-9	4,262,943	279	1.60	30.1	66.4	
31	-12	3,562,958	198	2.47	-1.31	66.0	
33	-2	2,357,636	167	1.52	30.4	62.3	
36	8	3,735,377	329	1.55	12.1	76.3	
37	-9*	1,627,193	96	2.41	-3.66	67.9	
38	11*	3,373,991	245	2.93	-32.7	73.2	
		Average:		1.88	15.9	70.1	
		Std. Deviation:		0.548	35.4	4.20	

Table C.4 — Principal Variation Splitting (PVSplit), 8 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−14	5,107,005	367	1.62	23.2	85.1	
5	−13*	1,390,055	88	2.63	−19.3	85.0	
7	1	1,913,578	131	1.90	12.7	84.9	
8	13	4,181,648	283	1.47	39.8	85.1	
9	6	1,035,950	67	2.81	−23.7	85.3	
13	−4	3,279,630	214	2.01	7.30	83.3	
14	7	3,223,037	268	1.72	−0.0564	87.9	
15	−6*	2,873,485	224	1.69	3.77	87.7	
17	−5	4,322,582	250	1.95	18.9	83.5	
19	10	2,128,884	169	1.48	20.2	85.3	
22	21*	4,078,999	371	0.663	130	88.0	
23	4*	2,939,777	174	1.72	36.9	83.3	
27	8	1,641,243	98	2.08	14.0	81.3	
29	2	3,745,228	264	1.92	4.98	85.7	
30	−9	4,250,167	278	1.61	29.7	82.8	
31	−12	3,502,222	196	2.49	−2.99	83.3	
33	−2	2,617,044	187	1.35	44.8	80.4	
36	8	3,730,132	327	1.56	12.0	88.1	
37	−10*	1,458,777	81	2.85	−13.6	83.4	
38	11*	3,379,468	245	2.93	−32.6	86.7	
		Average:		1.92	15.3	84.8	
		Std. Deviation:		0.574	34.1	2.18	

Table C.5 — Principal Variation Splitting (PVSplit), 16 Searchers Results
(* = score is different from sequential search, time in seconds)

Principal Variation Frontier Splitting

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−14	4,759,074	423	1.40	14.8	7.85	
5	−16	1,494,056	120	1.93	−13.2	9.15	
7	1	1,889,738	170	1.46	11.3	11.44	
8	13	3,667,551	325	1.28	22.6	10.8	
9	6	946,151	82	2.29	−30.3	15.2	
13	−4	3,468,300	345	1.25	13.5	12.8	
14	7	3,291,823	316	1.46	2.08	19.2	
15	−9	3,916,876	381	0.995	41.5	20.7	
17	−5	3,937,807	311	1.57	8.31	7.91	
19	10	1,923,675	180	1.39	8.58	12.9	
22	13	2,013,199	174	1.41	13.3	14.1	
23	4*	2,657,557	216	1.39	23.7	5.23	
27	8	1,330,856	106	1.92	−7.58	4.74	
29	2	4,055,250	357	1.42	13.7	12.1	
30	−9	3,850,291	401	1.11	17.5	11.3	
31	−13*	4,361,494	365	1.34	20.8	12.3	
33	−6*	1,952,806	188	1.35	8.02	11.4	
36	8	4,426,706	483	1.06	32.9	23.6	
37	−9*	1,590,280	138	1.67	−5.85	15.1	
38	6*	3,995,994	373	1.92	−20.3	18.2	
		Average:		1.48	8.76	12.8	
		Std. Deviation:		0.325	17.4	4.90	

Table C.6 — Principal Variation Frontier Splitting (PVFSplit), 2 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−14	6,859,264	346	1.72	65.4	18.6	
5	−13*	1,365,501	71	3.25	−20.7	29.9	
7	1	2,143,513	122	2.04	26.3	30.2	
8	13	4,379,309	233	1.79	46.4	26.1	
9	6	1,095,126	65	2.89	−19.4	38.2	
13	−4	3,808,314	260	1.66	24.6	33.6	
14	7	3,850,317	255	1.81	19.4	40.6	
15	−9	3,754,925	256	1.48	35.6	43.0	
17	−7*	4,360,652	197	2.47	19.9	18.5	
19	10	2,476,755	142	1.76	39.8	28.8	
22	8*	2,654,269	181	1.36	49.4	36.7	
23	4*	3,676,823	175	1.71	71.2	15.7	
27	7*	2,018,256	127	1.61	40.2	32.6	
29	2	4,365,675	238	2.13	22.4	26.2	
30	−10*	4,269,145	259	1.73	30.3	30.9	Plays 31−27
31	−12	3,554,156	184	2.66	−1.55	26.3	
33	−3*	2,248,628	147	1.72	24.4	26.2	
36	6*	4,451,511	345	1.48	33.6	45.7	
37	−9*	1,309,180	81	2.85	−22.5	39.8	
38	4	5,061,730	288	2.49	1.02	29.1	
		Average:		2.03	24.3	30.8	
		Std. Deviation:		0.546	26.3	8.17	

Table C.7 — Principal Variation Frontier Splitting (PVFSplit), 4 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−13*	11,003,085	397	1.50	165	41.9	Plays 10−14
5	−13*	1,603,113	55	4.20	−6.89	46.2	
7	1	2,322,187	94	2.65	36.8	50.9	
8	4*	4,575,062	205	2.03	53.0	56.6	
9	6	1,246,268	50	3.76	−8.24	53.5	
13	−4	4,587,382	223	1.93	50.1	51.6	
14	7	4,771,712	173	2.67	48.0	46.9	
15	−5*	4,271,397	175	2.17	54.3	53.6	
17	−5	4,769,071	160	3.04	31.2	44.4	
19	10	3,250,465	113	2.21	83.5	40.6	
22	21*	3,109,622	130	1.89	75.0	54.4	
23	4*	5,069,033	143	2.10	136	31.1	
27	8	2,222,705	67	3.04	54.4	36.5	
29	2	5,600,403	199	2.55	57.0	45.9	
30	−10*	4,639,208	189	2.37	41.6	51.9	Plays 31−27
31	−12	3,909,546	147	3.33	8.29	51.6	
33	−3*	2,243,591	78	3.24	24.1	43.5	
36	5*	5,212,331	246	2.08	56.5	58.3	
37	−10*	1,558,696	81	2.85	−7.72	63.4	
38	11*	3,830,082	158	4.54	−23.6	53.4	
		Average:		2.71	46.4	48.8	
		Std. Deviation:		0.803	46.3	7.74	

Table C.8 — Principal Variation Frontier Splitting (PVFSplit), 8 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−13*	10,297,066	273	2.18	148	61.9	
5	−16	2,298,921	74	3.12	33.5	70.3	
7	1	2,432,525	92	2.71	43.3	74.1	
8	13	6,781,585	235	1.77	127	72.1	
9	6	1,667,907	41	4.59	22.8	62.7	
13	−4	3,597,422	122	3.53	17.7	71.0	
14	7	5,132,661	164	2.82	59.2	69.5	
15	−8*	6,087,879	259	1.46	120	78.1	Plays 11–15
17	−12*	6,824,302	173	2.82	87.7	62.5	
19	10	3,289,290	100	2.50	85.7	68.3	
22	18*	5,082,558	127	1.94	186	62.0	
23	4*	5,691,739	122	2.46	165	55.3	
27	7*	2,409,200	56	3.64	67.3	59.5	
29	3*	6,113,307	141	3.60	71.4	58.5	
30	−13*	6,471,126	202	2.21	97.5	69.7	
31	−12	5,136,121	128	3.82	42.3	62.5	
33	−3*	2,964,894	82	3.09	64.0	63.2	
36	3*	11,006,484	648	0.789	230	82.7	
37	−8	1,242,234	45	5.13	−26.5	74.0	
38	5*	6,434,754	174	4.12	28.4	64.6	
		Average:		2.91	83.5	67.1	
		Std. Deviation:		1.07	63.5	7.00	

Table C.9 — Principal Variation Frontier Splitting (PVFSplit), 16 Searchers Results
(* = score is different from sequential search, time in seconds)

Principal Variation Splitting with Load Balancing

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−14	4,153,624	382	1.56	0.160	11.3	
5	−17*	1,560,965	143	1.62	−9.33	14.3	
7	1	2,000,956	180	1.38	17.9	11.3	
8	13	4,167,069	378	1.10	39.3	13.3	
9	6	967,379	84	2.24	−28.8	15.3	
13	−4	3,946,809	412	1.05	29.1	15.7	
14	7	3,515,729	318	1.45	9.02	11.3	
15	−9	3,103,781	286	1.33	12.1	16.6	
17	−5	4,057,776	332	1.47	11.6	9.98	
19	7*	1,976,706	209	1.20	11.6	17.9	
22	8*	2,127,427	195	1.26	19.7	16.5	
23	4*	2,637,240	226	1.33	22.8	9.90	
27	8	1,637,130	146	1.40	13.7	11.5	
29	2	3,785,136	344	1.48	6.09	11.3	
30	−11*	5,716,446	523	0.855	74.5	12.9	Plays 31−27
31	−12	3,546,584	287	1.70	−1.76	8.36	
33	−6*	1,965,308	212	1.19	8.71	17.7	
36	3*	4,313,101	406	1.26	29.5	10.9	
37	−9*	1,291,749	105	2.20	−23.5	9.53	
38	6*	4,191,066	403	1.78	−16.4	14.0	
		Average:		1.44	11.3	13.0	
		Std. Deviation:		0.346	23.0	2.86	

Table C.10 — Principal Variation Splitting with Load Balancing (PVSplit-LB), 2 Searchers Results (* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−14	4,897,059	323	1.84	18.1	35.8	
5	−13*	1,410,455	82	2.82	−18.1	37.4	
7	1	2,117,522	145	1.72	24.7	39.4	
8	13	3,946,858	289	1.44	32.0	39.6	
9	6	1,068,764	63	2.98	−21.3	37.7	
13	−4	3,846,023	298	1.45	25.8	38.6	
14	7	3,539,065	242	1.91	9.74	39.3	
15	−6*	2,799,241	184	2.06	1.09	41.5	
17	−5	3,998,435	245	1.99	9.98	38.1	
19	10	2,008,948	160	1.56	13.4	44.6	
22	21*	3,883,701	276	0.891	119	39.8	
23	4*	2,764,950	159	1.89	28.7	32.4	
27	8	1,760,144	111	1.84	22.2	36.4	
29	2	3,875,373	256	1.98	8.62	36.0	
30	−13*	6,251,358	388	1.15	90.8	33.3	Plays 31−27
31	−12	3,733,258	203	2.41	3.41	30.5	
33	−2	2,408,405	196	1.29	33.2	40.6	
36	8	5,576,072	348	1.47	67.4	32.1	
37	−9*	1,838,554	110	2.10	8.85	33.3	
38	11*	3,435,448	245	2.93	−31.4	42.0	
		Average:		1.89	22.3	37.4	
		Std. Deviation:		0.567	35.7	3.69	

Table C.11 — Principal Variation Splitting with Load Balancing (PVSplit-LB), 4 Searchers Results (* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	-14	4,784,723	299	1.99	15.4	64.0	
5	-13*	1,418,156	85	2.72	-17.6	66.2	
7	1	2,196,787	133	1.87	29.4	64.3	
8	13	4,529,564	262	1.59	51.5	59.6	
9	6	1,072,509	62	3.03	-21.0	69.0	
13	-4	3,545,173	222	1.94	16.0	63.4	
14	7	3,639,907	235	1.97	12.9	65.7	
15	-6*	2,881,579	167	2.27	4.07	66.5	
17	-5	4,573,658	238	2.05	25.8	59.1	
19	10	2,174,969	159	1.57	22.8	67.7	
22	21*	4,255,805	275	0.895	140	65.0	
23	4*	2,971,705	161	1.86	38.3	63.4	
27	8	1,629,990	95	2.15	13.2	63.3	
29	2	4,033,818	239	2.13	13.1	62.3	
30	-9	4,305,663	268	1.67	31.4	64.5	
31	-12	3,721,975	171	2.86	3.09	55.7	
33	-2	2,653,464	185	1.37	46.8	60.2	
36	8	4,086,296	252	2.03	22.7	66.0	
37	-9*	1,775,127	105	2.20	5.10	60.2	
38	11*	3,698,824	239	3.00	-26.2	64.9	
		Average:		2.06	21.3	63.6	
		Std. Deviation:		0.539	34.6	3.23	

Table C.12 — Principal Variation Splitting with Load Balancing (PVSplit-LB), 8 Searchers Results (* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−14	5,190,807	310	1.92	25.2	80.9	
5	−13*	1,441,710	87	2.66	−16.3	82.3	
7	1	2,167,872	136	1.83	27.7	82.3	
8	13	4,578,935	265	1.57	53.1	79.3	
9	6	1,079,224	63	2.98	−20.5	85.2	
13	−4	4,434,180	305	1.41	45.1	79.7	
14	7	3,532,129	218	2.12	9.53	82.0	
15	−9	3,397,632	188	2.02	22.7	81.3	
17	−5	4,149,836	236	2.06	14.1	81.9	
19	10	2,177,327	158	1.58	22.9	83.3	
22	21*	4,231,845	276	0.891	138	82.3	
23	4*	2,824,026	151	1.99	31.5	81.8	
27	8	1,660,368	96	2.13	15.3	81.3	
29	2	4,039,350	250	2.03	13.2	81.8	
30	−9	4,313,981	268	1.67	31.7	82.1	
31	−12	3,922,302	186	2.63	8.64	78.5	
33	−2	2,727,977	190	1.33	50.9	79.1	
36	8	40,95,680	251	2.04	22.9	82.8	
37	−9*	1,914,082	106	2.18	13.3	78.7	
38	11*	3,733,014	241	2.98	−25.5	81.8	
		Average:		2.00	24.2	81.4	
		Std. Deviation:		0.530	34.1	1.66	

Table C.13 — Principal Variation Splitting with Load Balancing (PVSplit-LB), 16 Searchers Results (* = score is different from sequential search, time in seconds)

Principal Variation Frontier Splitting with Load Balancing

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	-14	4,734,395	418	1.42	14.2	7.27	
5	-16	1,493,974	119	1.94	-13.2	9.09	
7	1	1,909,130	176	1.41	12.5	11.9	
8	13	3,789,751	338	1.23	26.7	10.0	
9	6	954,879	81	2.32	-29.7	13.3	
13	-4	3,692,904	355	1.21	20.8	9.54	
14	7	3,365,953	296	1.56	4.38	9.56	
15	-9	3,962,077	332	1.14	43.1	8.07	
17	-5	3,974,399	305	1.60	9.32	4.95	
19	10	1,897,205	176	1.42	7.09	11.3	
22	13	1,950,335	162	1.52	9.77	8.24	
23	4*	2,668,012	215	1.40	24.2	4.63	
27	8	1,371,745	108	1.89	-4.75	4.15	
29	2	4,159,271	355	1.43	16.6	6.79	
30	-9	3,858,545	398	1.12	17.8	10.8	
31	-13*	4,352,534	341	1.43	20.6	6.47	
33	-6*	2,823,238	275	0.920	56.2	11.4	
36	8	4,883,847	433	1.18	46.6	5.74	
37	-9*	1,425,349	112	2.06	-15.6	7.18	
38	11*	3,466,980	297	2.41	-30.8	7.85	
		Average:		1.53	11.8	8.41	
		Std. Deviation:		0.402	23.0	2.57	

Table C.14 — Principal Variation Frontier Splitting with Load Balancing (PVFSplit-LB), 2 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	−14	6,959,056	335	1.77	67.8	14.9	
5	−13*	1,366,231	71	3.25	−20.7	29.2	
7	1	2,147,259	118	2.11	26.5	25.8	
8	13	3,745,386	222	1.88	25.2	30.7	
9	6	1,133,069	62	3.03	−16.6	32.4	
13	−4	4,181,356	273	1.58	36.8	29.5	
14	7	3,943,371	209	2.21	22.3	23.7	
15	−9	4,010,342	204	1.86	44.8	22.5	
17	−7*	4,453,223	197	2.47	22.5	16.9	
19	10	2,615,897	142	1.76	47.7	23.2	
22	13	2,530,979	146	1.68	42.5	31.5	
23	4*	3,694,767	167	1.80	72.0	15.0	
27	8	2,111,255	113	1.81	46.6	21.8	
29	2	4,460,449	220	2.31	25.0	17.3	
30	−10*	4,211,776	240	1.86	28.6	28.5	Plays 31−27
31	−12	3,684,349	173	2.83	2.05	19.3	
33	−3*	2,259,988	140	1.81	25.0	25.7	
36	6*	4,538,537	240	2.13	36.2	22.2	
37	−9*	1,620,708	89	2.60	−4.05	28.1	
38	4	5,466,451	260	2.76	9.09	18.0	
		Average:		2.18	27.0	23.8	
		Std. Deviation:		0.491	24.5	5.61	

Table C.15 — Principal Variation Frontier Splitting with Load Balancing (PVFSplit-LB), 4 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	-14	8,584,005	249	2.39	107	28.5	
5	-13*	1,449,089	52	4.44	-15.8	50.1	
7	1	2,347,731	90	2.77	38.3	45.9	
8	14*	6,264,522	224	1.86	109	38.1	
9	6	1,262,043	48	3.92	-7.08	51.6	
13	-4	6,406,134	250	1.72	110	42.0	
14	7	5,020,221	162	2.85	55.7	38.9	
15	-5*	4,146,170	134	2.83	49.7	41.1	
17	-5	5,911,433	188	2.59	62.6	36.3	
19	10	3,046,270	110	2.27	72.0	43.0	
22	13	2,831,192	112	2.20	59.3	51.9	
23	4*	4,985,740	133	2.26	132	28.2	
27	7*	2,315,199	69	2.96	60.8	36.1	
29	2	6,489,585	207	2.45	81.9	36.7	
30	-10*	4,500,069	169	2.65	37.4	47.7	Plays 31-27
31	-12	4,548,592	147	3.33	26.0	37.6	
33	-3*	2,289,609	76	3.33	26.7	41.0	
36	8	8,177,389	270	1.89	145	37.6	
37	-9*	2,560,705	84	2.75	51.6	39.2	
38	11*	4,637,311	160	4.48	-7.45	44.6	
		Average:		2.80	59.8	40.8	
		Std. Deviation:		0.779	45.0	6.58	

Table C.16 — Principal Variation Frontier Splitting with Load Balancing (PVFSplit-LB), 8 Searchers Results
(* = score is different from sequential search, time in seconds)

Game	Score	Nodes	Time	Speedup	% Search Overhead	% Idle Time	Notes
1	-14	9,080,241	196	3.03	119	53.4	
5	-16	2,380,504	77	3.00	38.3	69.1	
7	1	2,888,112	98	2.54	70.1	70.7	
8	14*	5,816,061	152	2.74	94.5	62.0	
9	6	1,384,075	36	5.22	1.91	64.3	
13	-4	3,852,231	121	3.56	26.0	68.3	
14	7	5,821,955	144	3.21	80.5	59.2	
15	-9	5,794,131	152	2.49	109	63.1	
17	-5	6,103,567	138	3.53	67.9	59.9	
19	10	3,070,579	95	2.63	73.3	67.7	
22	21*	4,483,369	106	2.32	152	59.5	
23	4*	4,540,195	90	3.33	111	51.6	
27	8	2,170,753	53	3.85	50.7	61.7	
29	2	6,633,872	154	3.30	85.9	57.5	
30	-10*	4,846,438	153	2.92	47.9	69.9	Plays 31-27
31	-12	6,005,205	135	3.62	66.3	58.4	
33	-3*	3,346,207	119	2.13	85.1	65.6	
36	3*	7,377,430	175	2.92	121	58.8	
37	-8	1,995,842	64	3.61	18.2	70.7	
38	12*	4,900,511	110	6.52	-2.20	57.9	
		Average:		3.32	70.9	62.5	
		Std. Deviation:		1.01	41.4	5.67	

Table C.17 — Principal Variation Frontier Splitting with Load Balancing (PVFSplit-LB), 16 Searchers Results
(* = score is different from sequential search, time in seconds)