h_p	h_f	Epsilon	h/C^*	GDRC	1	1.2		1.5		2		5		10		GBFS	
					Exp.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.
10+2	10B	1.00	**0.669**	0.799	**278,863**	**54,344**	**1.00**	4,239	**1.03**	1,266	1.25	434	1.50	442	1.51	441	1.51
		0.99	0.668	0.799	348,975	55,507	**1.00**	4,573	**1.02**	981	1.22	401	1.48	417	1.49	364	1.50
		0.90	0.665	0.799	348,975	55,043	**1.00**	4,573	**1.02**	981	1.22	393	1.49	389	1.49	364	1.50
		0.75	0.660	0.799	348,975	54,144	**1.00**	4,143	**1.02**	911	1.22	342	1.48	371	1.50	364	1.50
		0.50	0.651	0.809	377,851	64,516	**1.00**	**3,465**	**1.02**	544	1.21	263	1.47	270	1.48	270	1.48
		0.25	0.642	0.810	447,578	79,937	**1.00**	4,765	**1.02**	414	1.24	195	1.48	207	1.49	223	1.49
		0.10	0.636	0.810	447,578	91,229	**1.00**	6,495	**1.02**	1,039	1.21	165	1.48	195	1.48	223	1.49
		0.01	0.633	0.810	447,578	95,790	**1.00**	6,495	**1.02**	1,039	1.21	138	**1.23**	138	**1.23**	223	1.49
		0.00	0.632	**0.827**	447,578	95,790	**1.00**	6,394	**1.02**	**325**	**1.15**	143	1.24	143	1.24	**143**	**1.24**
8+4	8B	1.00	**0.482**	0.610	**1,942,876**	**1,062,882**	**1.00**	485,709	1.01	277,984	1.17	13,021	1.50	20,206	1.95	26,878	2.28
		0.99	0.481	0.618	2,264,370	1,080,913	**1.00**	487,127	1.01	250,332	1.14	11,778	1.52	19,282	1.96	23,579	2.25
		0.90	0.472	0.618	2,264,370	1,078,438	**1.00**	472,110	1.01	239,136	1.14	10,667	1.51	17,189	1.98	23,579	2.25
		0.75	0.458	0.631	2,537,326	1,146,454	**1.00**	**422,235**	1.01	202,869	1.13	8,016	1.51	12,467	1.91	18,619	2.23
		0.50	0.434	0.674	3,067,178	1,535,472	**1.00**	430,264	**1.00**	**167,255**	1.13	4,620	1.50	6,595	1.91	7,850	2.01
		0.25	0.410	0.696	3,816,270	2,052,430	**1.00**	667,650	**1.00**	203,903	1.10	2,263	1.50	2,781	1.88	3,363	2.03
		0.10	0.395	0.699	4,346,773	2,418,848	**1.00**	874,230	**1.00**	310,430	1.10	1,284	1.45	1,577	1.92	1,962	2.06
		0.01	0.387	0.699	4,346,773	2,651,314	**1.00**	990,223	**1.00**	368,302	1.10	1,161	1.43	922	1.43	1,962	2.06
		0.00	0.386	**0.731**	4,346,773	2,651,314	**1.00**	990,222	**1.00**	198,709	**1.04**	**1,127**	1.40	**913**	1.41	**913**	**1.41**
6+6	6B	1.00	**0.421**	0.395	**3,344,301**	2,784,245	**1.00**	1,845,511	1.01	1,392,716	1.07	862,799	1.51	331,110	1.88	516,108	2.53
		0.99	0.419	0.416	3,761,230	2,813,558	**1.00**	1,885,340	1.01	1,373,436	1.05	812,840	1.49	319,242	1.86	503,808	2.50
		0.90	0.399	0.416	4,109,446	**2,768,856**	**1.00**	1,858,078	1.01	1,328,081	1.05	727,655	1.48	286,530	1.85	503,808	2.50
		0.75	0.367	0.437	4,994,641	3,024,527	**1.00**	**1,795,545**	**1.00**	1,172,868	1.03	554,513	1.45	228,697	1.77	447,428	2.51
		0.50	0.314	0.494	6,712,673	4,722,959	**1.00**	2,367,580	**1.00**	**930,281**	1.02	254,698	1.39	126,214	1.71	242,305	2.50
		0.25	0.260	0.534	8,835,989	6,937,951	**1.00**	4,383,579	**1.00**	1,683,295	1.02	70,650	1.29	42,413	1.69	88,952	2.45
		0.10	0.228	0.565	10,010,015	8,383,484	**1.00**	5,962,715	**1.00**	2,987,590	1.02	**34,095**	1.23	15,084	1.64	38,058	2.47
		0.01	0.209	0.573	10,537,090	9,305,225	**1.00**	6,935,326	**1.00**	3,877,272	1.02	129,111	1.20	**8,809**	1.47	21,625	2.50
		0.00	0.207	**0.621**	10,537,090	9,305,450	**1.00**	6,935,323	**1.00**	3,715,484	**1.01**	104,020	**1.18**	10,023	1.41	**7,811**	**1.42**

Table 3: ToH node expansions and solution quality for A*, WA*, and GBFS—averaged over all instances

h_p	h_f	Epsilon	h/C^*	GDRC	1.2		1.5		2		5		10	
					Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.
10+2	10B	1.00	**0.669**	0.799	24,583	**1.01**	6,241	1.18	587	1.43	441	1.51	441	1.51
		0.99	0.668	0.799	24,651	**1.01**	4,988	1.17	550	1.43	416	1.49	417	1.49
		0.90	0.665	0.799	24,471	**1.01**	4,988	1.17	550	1.43	407	1.49	386	1.49
		0.75	0.660	0.799	**24,161**	**1.01**	4,703	1.17	563	1.43	366	1.50	364	1.50
		0.50	0.651	0.809	24,221	**1.01**	4,235	1.17	454	1.43	267	1.48	270	1.48
		0.25	0.642	0.810	27,427	**1.01**	4,308	1.19	176	1.25	207	1.48	220	1.49
		0.10	0.636	0.810	29,510	**1.01**	3,655	1.17	**144**	**1.23**	165	1.48	198	1.49
		0.01	0.633	0.810	31,301	**1.01**	3,655	1.17	**144**	**1.23**	138	**1.23**	**138**	**1.23**
		0.00	0.632	**0.827**	31,271	**1.01**	**1,417**	**1.12**	**144**	1.24	143	1.24	143	1.24
8+4	8B	1.00	**0.482**	0.610	838,685	**1.00**	365,385	1.14	31,105	1.27	19,415	1.90	23,798	2.24
		0.99	0.481	0.618	834,932	**1.00**	319,827	1.13	27,999	1.26	18,403	1.89	23,337	2.24
		0.90	0.472	0.618	813,955	**1.00**	306,148	1.13	26,995	1.27	16,327	1.87	20,587	2.21
		0.75	0.458	0.631	**786,255**	**1.00**	269,600	1.12	22,884	1.26	11,514	1.83	13,988	2.21
		0.50	0.434	0.674	919,930	**1.00**	229,375	1.12	15,991	1.24	6,268	1.85	7,523	2.01
		0.25	0.410	0.696	1,248,786	**1.00**	249,587	1.09	**9,565**	1.23	2,900	1.85	3,001	2.01
		0.10	0.395	0.699	1,507,532	**1.00**	352,130	1.09	10,119	1.20	1,380	1.72	1,325	2.04
		0.01	0.387	0.699	1,672,353	**1.00**	410,129	1.09	10,607	1.19	922	1.43	**896**	1.45
		0.00	0.386	**0.731**	1,672,349	**1.00**	**219,802**	**1.04**	13,717	**1.18**	**914**	**1.41**	913	**1.41**
6+6	6B	1.00	**0.421**	0.395	2,837,702	**1.01**	1,508,532	1.07	1,333,744	1.24	322,768	1.81	436,967	2.37
		0.99	0.419	0.416	2,871,009	**1.01**	1,465,248	1.04	1,100,828	1.20	314,701	1.79	433,157	2.38
		0.90	0.399	0.416	2,803,133	**1.00**	1,419,099	1.04	1,032,030	1.20	277,099	1.80	403,471	2.41
		0.75	0.367	0.437	**2,720,693**	**1.00**	1,251,498	1.03	866,982	1.18	219,851	1.71	324,269	2.39
		0.50	0.314	0.494	3,701,989	**1.00**	**1,002,503**	1.02	516,991	1.13	117,733	1.69	192,504	2.38
		0.25	0.260	0.534	5,838,412	**1.00**	1,746,180	1.01	**307,507**	1.07	40,634	1.68	73,710	2.18
		0.10	0.228	0.565	7,388,558	**1.00**	3,050,575	1.01	693,951	1.05	14,754	1.54	25,550	2.15
		0.01	0.209	0.573	8,383,863	**1.00**	3,940,538	1.01	1,124,338	**1.04**	**10,594**	1.45	**6,749**	1.46
		0.00	0.207	**0.621**	8,399,420	**1.00**	3,774,031	**1.00**	1,041,332	**1.04**	12,897	**1.41**	7,811	**1.42**

Table 4: ToH node expansions and solution quality for IOS—averaged over all instances

Table 5: STP node expansions and solution quality for A*, WA*, and GBFS—averaged over all instances

Epsilon	h/C*	GDRC	1	1.2		1.5		2		5		10		20		50		GBFS	
			Exp.	Exp.	Qual.	Exp.	Qual.	Exp.	Qual.	Exp.	Qual.	Exp.	Qual.	Exp.	Qual.	Exp.	Qual.	Exp.	Qual.
1.00	**0.850**	**0.736**	**25,323**	**3,875**	1.02	**572**	1.11	283	1.23	203	1.43	205	1.49	205	1.52	206	1.52	206	1.52
0.99	0.847	0.720	123,233	4,277	1.02	606	1.10	247	1.18	177	1.37	187	1.43	192	1.44	193	1.45	171	1.46
0.90	0.812	0.721	173,407	6,506	1.01	577	1.09	248	1.18	176	1.38	171	1.41	174	1.43	173	1.44	171	1.46
0.75	0.754	0.723	1,708,619	12,541	**1.00**	659	1.05	**237**	1.17	**155**	1.33	162	1.39	167	1.42	166	1.44	166	1.44
0.50	0.658	0.712	#60	640,738	**1.00**	2,521	1.02	259	1.15	**148**	1.31	**148**	1.35	154	1.38	157	1.41	157	1.43
0.25	0.561	0.663	#49	#95		488,913	**1.01**	5,661	1.10	151	1.31	**148**	1.35	**144**	1.39	140	1.42	142	1.43
0.10	0.503	0.622	#21	#62		#98		289,415	1.06	1,449	1.30	**148**	1.34	150	1.36	**137**	1.40	**138**	1.43
0.01	0.469	0.620	#15	#36		#91		1,865,941	**1.05**	17,952	**1.29**	8,417	**1.33**	5,221	**1.35**	1,429	**1.34**	**138**	1.43
0.00	0.465	0.602	#14	#36		#87		1,838,635	**1.05**	19,306	1.30	11,419	1.34	10,242	1.35	10,184	1.35	10,184	**1.35**

Table 6: STP node expansions and solution quality for IOS—averaged over all instances

| Epsilon	h/C*	GDRC	1.2		1.5		2		5		10		20		50	
			Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.
1.00	**0.850**	**0.736**	1,491	1.07	403	1.23	229	1.35	205	1.49	205	1.52	206	1.52	206	1.52
0.99	0.847	0.720	1,499	1.06	256	1.18	201	1.29	182	1.42	191	1.44	193	1.44	191	1.44
0.90	0.812	0.721	**1,111**	1.05	253	1.18	197	1.29	178	1.41	175	1.43	172	1.43	172	1.46
0.75	0.754	0.723	1,533	1.03	**239**	1.17	175	1.26	165	1.39	164	1.41	168	1.44	166	1.44
0.50	0.658	0.712	10,290	1.01	261	1.15	**155**	1.23	149	1.35	153	1.38	157	1.41	157	1.43
0.25	0.561	0.663	2,309,917	**1.00**	5,662	1.10	421	1.23	**145**	1.34	**138**	1.38	**138**	1.40	142	1.43
0.10	0.503	0.622	#96		289,416	1.06	7,620	1.22	222	**1.33**	147	**1.35**	143	1.39	**134**	1.41
0.01	0.469	0.620	#75		1,865,942	**1.05**	95,221	**1.21**	8,880	**1.33**	5,671	**1.35**	2,583	**1.35**	223	**1.34**
0.00	0.465	0.602	#78		1,838,636	**1.05**	79,588	**1.21**	11,658	**1.33**	10,194	**1.35**	10,184	**1.35**	10,184	1.35

Table 7: WSTP node expansions and solution quality for A*, WA*, and GBFS—averaged over all instances

Epsilon	h/C*	GDRC	1	1.2		1.5		2		5		10		20		50		GBFS	
			Exp.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.
1.00	**0.745**	0.530	#97	**2,823,168**	1.02	**336,388**	1.10	**114,986**	1.26	52,905	1.88	44,517	2.31	31,305	2.85	30,331	4.10	29,724	4.83
0.99	0.739	0.529	#96	3,050,591	1.02	342,062	1.09	118,436	1.24	57,024	1.87	43,068	2.31	29,889	2.84	30,555	4.10	28,561	5.15
0.90	0.680	0.529	#83	8,074,791	**1.01**	742,908	1.06	183,750	1.20	62,423	1.80	33,098	2.26	27,703	2.78	29,013	3.98	28,561	5.15
0.75	0.582	0.531	#43	#90		3,659,111	**1.01**	285,252	1.11	**46,047**	1.71	39,319	2.17	28,067	2.68	25,984	3.71	25,968	5.17
0.50	0.419	0.540	#8	#20		#65		6,051,831	**1.01**	46,552	1.48	36,673	1.97	23,817	2.40	23,408	3.38	19,207	4.86
0.25	0.255	0.543	#0	#0		#5		#22		164,057	**1.14**	**29,181**	1.60	18,018	2.10	9,793	2.86	8,001	4.55
0.10	0.157	0.568	#0	#0		#0		#0		#98		42,882	1.25	**12,971**	1.72	5,879	2.40	2,715	4.76
0.01	0.098	0.578	#0	#0		#0		#0		#20		2,343,181	**1.05**	18,929	1.39	4,888	2.00	**2,708**	4.64
0.00	0.092	**0.590**	#0	#0		#0		#0		#11		7,559,467	**1.05**	23,056	**1.34**	**4,722**	1.98	3,347	**2.78**

Table 8: WSTP node expansions and solution quality for IOS—averaged over all instances

| Epsilon	h/C*	GDRC	1.2		1.5		2		5		10		20		50	
			Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.	Exp.	Qua.
1.00	**0.745**	0.530	**736,735**	1.06	290,745	1.26	72,277	1.53	36,808	2.24	32,656	2.82	31,514	3.83	28,949	4.45
0.99	0.739	0.529	761,910	1.06	**134,183**	1.24	75,586	1.52	**33,724**	2.27	31,944	2.78	31,784	3.80	28,764	4.45
0.90	0.680	0.529	1,488,948	1.04	185,547	1.20	**64,701**	1.47	38,832	2.20	28,530	2.74	30,579	3.65	26,869	4.27
0.75	0.582	0.531	8,383,061	**1.01**	285,361	1.11	68,483	1.36	39,985	2.10	28,617	2.63	24,610	3.32	26,393	4.50
0.50	0.419	0.540	#48		6,051,839	**1.01**	213,986	**1.14**	37,133	1.86	24,942	2.36	15,754	3.00	19,100	3.97
0.25	0.255	0.543	#1		#24		#98		34,953	1.51	17,043	2.03	11,115	2.57	11,808	3.68
0.10	0.157	0.568	#0		#0		#17		64,112	1.19	15,650	1.67	8,222	2.20	4,569	2.88
0.01	0.098	0.578	#0		#0		#0		11,234,229	**1.04**	22,995	1.36	**5,942**	1.85	**4,008**	**2.34**
0.00	0.092	**0.590**	#0		#0		#0		#97		**22,713**	**1.30**	7,176	**1.80**	4,312	2.35

(a) Node expansions using 10+2 and 10B
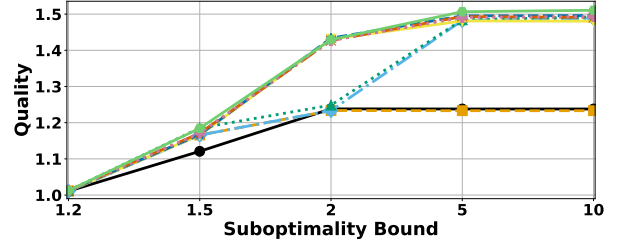
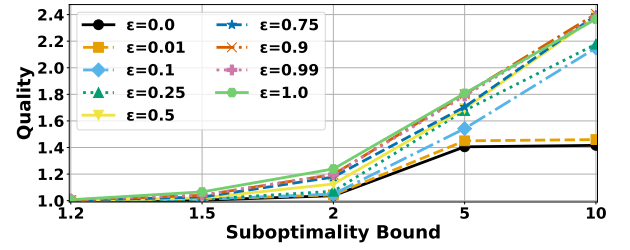(b) Solution quality using 10+2 and 10B
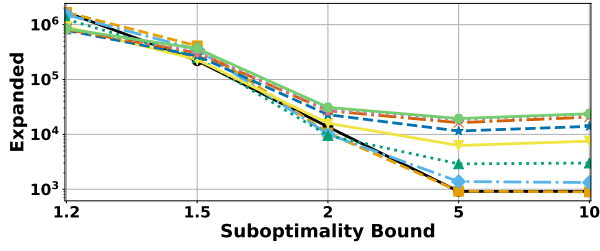
(c) Node expansions using 8+4 and 8B
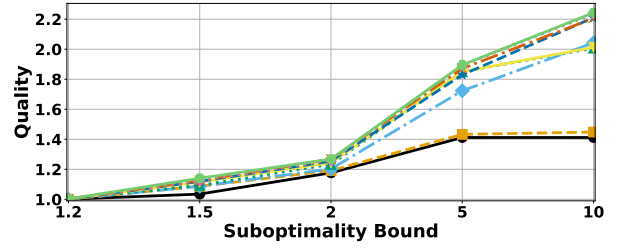
(d) Solution quality using 8+4 and 8B
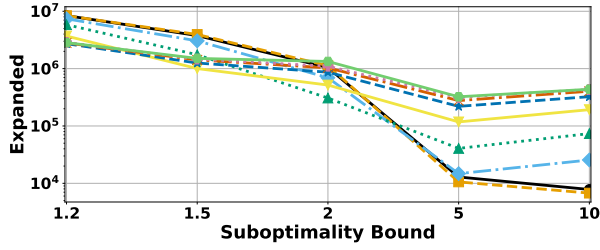
(e) Node expansions using 6+6 and 6B

(f) Solution quality using 6+6 and 6B

Figure 6: Results for IOS in ToH — averaged over all instances