

Table 1  
B&B nodes needed to solve each problem instance

Example	Random	Most inf.	Pscost	Full str.	Lookahead=4				Lookahead=8				PLE (SIP cuts)
					Reli(10)	Reli(1)	Reli(8)	Strong	Str/ps(10)	Reli(1)	Reli(8)	Strong	
aflow30a	> 1 248 221	> 1 025 389	276 002	46 649	<b>164 112</b>	203 544	181 397	44 455	210 127	<b>170 547</b>	171 909	55 478	105 204
cap6000	7454	6717	6791	3402	4957	5076	<b>4253</b>	3452	4957	5076	<b>4253</b>	3452	4982
gesa2-o	> 1 023 765	> 1 150 438	126 459	13 743	75 141	57 534	<b>53 881</b>	15 831	74 673	79 841	<b>50 078</b>	21 988	37 293
mas74	> 4 662 991	> 4 725 208	5 160 828	551 780	<b>5 163 685</b>	5 478 830	5 521 061	> 790 014	<b>4 886 438</b>	5 296 806	5 425 001	> 645 364	5 617 512
mas76	2 935 689	2 038 945	603 683	114 228	587 813	496 370	<b>482 122</b>	125 516	666 398	496 370	<b>336 826</b>	188 882	507 536
misc07	47 941	17 955	19 407	2713	49 822	<b>35 187</b>	54 932	5228	50 893	<b>41 902</b>	55 740	5394	86 825
pk1	1 064 666	850 198	437 758	56 546	<b>294 469</b>	367 763	331 339	128 299	<b>298 771</b>	367 763	311 611	143 206	366 340
pp08aCUTS	1877	1740	673	124	<b>355</b>	673	489	201	<b>318</b>	651	464	148	663
qtu	> 163 998	> 165 538	15 471	> 2974	25 180	<b>16 479</b>	18 405	6178	23 974	16 148	<b>14 847</b>	> 6416	9443
rou	> 714 812	> 702 392	309 779	2 836	45 457	44 232	<b>13 883</b>	4179	39 212	39 192	<b>19 743</b>	11 305	> 1 467 395
vpm2	92 880	40 258	22 568	1457	11 710	13 780	<b>9648</b>	1974	10 826	17 409	<b>10 054</b>	1812	4306
ran8 x 32	321 933	674 613	40 069	4902	29 957	26 360	<b>17 668</b>	6824	30 526	31 697	<b>21 092</b>	4249	45 143
ran10 x 26	> 1 637 058	> 1 500 171	128 327	8520	54 965	64 640	<b>48 065</b>	8279	56 448	68 237	<b>48 626</b>	11 112	56 548
ran12 x 21	> 1 667 430	> 1 471 340	234 915	13 420	<b>126 153</b>	172 161	135 037	12 185	135 165	159 383	<b>124 455</b>	18 577	196 478
ran13 x 13	907 443	758 186	149 239	9147	<b>86 648</b>	109 241	95 288	16 033	<b>86 566</b>	97 195	93 939	20 516	97 325
mas284	162 255	123 569	21 586	3226	<b>18 700</b>	24 383	21 179	4564	<b>17 799</b>	21 217	20 360	5580	21 472
prod1	> 2 854 213	2 317 393	89 293	10 644	72 890	<b>63 674</b>	64 186	14 670	69 992	65 679	<b>62 689</b>	15 609	106 369
bc1	33 631	34 127	40 781	2981	42 882	35 132	<b>25 196</b>	3666	40 212	35 132	<b>25 196</b>	3603	18 463
bienst1	66 099	58 841	19 418	3687	13 594	<b>10 427</b>	13 911	5274	13 602	<b>9248</b>	9951	5340	12 963
neos2	> 640 712	> 703 794	> 609 109	618	195 730	187 331	<b>22 742</b>	4405	244 292	83 146	<b>30 790</b>	2685	158 240
neos3	> 403 674	> 393 853	> 446 035	1402	> 505 184	> 737 254	<b>556 835</b>	13 215	> 536 938	> 736 396	<b>626 894</b>	15 306	606 168
neos7	> 471 073	> 339 479	390 910	> 44 061	> 546 623	535 586	<b>202 482</b>	> 55 369	> 598 209	498 573	<b>252 766</b>	> 55 799	422 264
swath1	33 021	81 309	19 924	8285	64 320	36 264	<b>35 161</b>	11 268	73 512	66 995	<b>10 615</b>	16 471	128 017
swath2	83 441	> 240 136	211 976	22 002	71 595	278 413	<b>28 808</b>	> 44 510	162 695	258 934	<b>85 510</b>	> 36 277	390 480
Total (24)	21 246 277	19 421 589	9 381 001	929 347	8 251 942	9 000 334	7 937 968	1 325 589	8 332 543	8 663 537	7 813 409	1 294 569	10 467 429
Geom. mean	275 789	262 369	88 707	7242	65 966	70 014	48 773	11 640	69 489	69 501	48 377	12 715	79 269

Table 4  
Summary of all considered strategies

Strategy	B&B nodes		Time (s)		Strong branchings		Fails
	Total	Geom.	Total	Geom.	Total	Geom.	
Random	21 246 277	275 789.4	46 202.2	923.6	0	0.0	11
Most infeasible	19 421 589	262 368.9	48 037.5	938.0	0	0.0	11
Pseudocost	9 381 001	88 706.8	19 945.8	283.4	0	0.0	2
Full strong	929 347	7241.7	26 397.2	504.4	15 569 652	146 784.2	2
<i>Lookahead=4</i>							
Strong/pscost (5)	9 698 397	79 535.5	19 487.8	249.3	5792	216.2	2
Strong/pscost (10)	8 251 942	65 966.3	16 499.4	229.6	74 812	2284.2	2
Strong/pscost (15)	7 982 847	57 976.8	17 855.3	258.8	523 377	8137.8	2
Strong/pscost (20)	7 890 374	47 958.5	19 175.6	293.5	2 825 100	17 780.2	2
Reliability (1)	9 000 334	70 013.6	17 199.6	216.4	39 126	374.8	1
Reliability (4)	6 906 698	53 522.9	13 402.9	178.2	110 628	1176.7	0
Reliability (8)	7 937 968	48 772.8	11 132.7	170.5	117 643	1 850.3	0
Reliability (16)	6 022 024	44 649.9	10 782.6	179.0	187 578	3 640.6	0
Reliability (32)	7 940 797	39 655.2	11 103.0	184.2	253 014	5 837.8	0
Strong branching	1 325 589	11 639.5	20 427.2	353.2	9 965 454	86 188.6	3
<i>Lookahead=8</i>							
Strong/pscost (5)	8 653 318	74 730.8	17 389.5	239.6	7397	268.6	1
Strong/pscost (10)	8 332 543	69 489.0	18 362.5	253.9	102 082	2523.8	2
Strong/pscost (15)	7 456 685	59 398.8	20 479.8	295.7	750 577	9 983.1	2
Strong/pscost (20)	7 551 419	48 736.5	22 388.8	343.1	3 695 577	20 837.9	3
Reliability (1)	8 663 537	69 501.0	16 753.8	217.2	53 557	429.0	1
Reliability (4)	8 338 386	54 937.7	12 497.2	179.2	74 906	1 104.6	0
Reliability (8)	7 813 409	48 377.3	12 380.2	170.2	133 545	1 998.0	0
Reliability (16)	7 579 400	43 311.9	11 946.7	171.3	185 136	3589.7	0
Reliability (32)	7 207 836	42 047.5	11 835.7	186.5	259 482	5913.2	0
Strong branching	1 294 569	12 714.7	25 619.4	468.0	12 651 504	119 799.1	4
<i>Lookahead=<math>\infty</math></i>							
Strong/pscost (5)	8 498 292	71 817.4	18 116.9	229.3	14 675	489.9	2
Strong/pscost (10)	9 247 636	70 125.8	20 472.1	276.2	154 458	3870.1	2
Strong/pscost (15)	6 670 440	56 926.6	19 907.4	312.2	890 187	13 127.2	3
Strong/pscost (20)	7 627 640	48 547.0	23 538.5	373.6	3 842 516	26 557.4	3
Reliability (1)	7 747 290	72 159.1	15 825.8	220.0	48 162	408.4	1
Reliability (4)	9 068 723	58 886.4	14 258.1	195.8	78 625	1096.6	2
Reliability (8)	8 551 045	54 118.3	13 563.0	189.6	135 541	2042.9	1
Reliability (16)	6 567 432	49 839.9	12 766.4	191.6	196 220	3601.0	0
Reliability (32)	7 502 942	41 636.1	12 393.6	192.5	281 822	6000.7	0
Strong branching	1 163 822	11 355.7	26 176.4	500.3	12 793 364	127 737.1	4
CPLEX/SIP cuts	10 467 429	79 269.0	18 617.4	215.8	—	—	1

infeasible after two variables are fixed. Since *hybrid strong/pseudocost branching* uses a fixed depth for deciding where to do *strong branching*, only very few strong branching evaluations are performed, as shown in Table 3.

The last column of Table 3 gives the average depth of all nodes generated when using *full strong branching*. If one compares this to the depth setting of *hybrid strong/pseudocost branching* and looks at the number of strong