

Online Appendix-The Generalized Driver-Aide Problem: Enhancing the Role of the Aide in Urban Last-Mile Delivery.

OA.1. Case Study Results on Larger Instances ($n_c = 100$)

We complement the main case study with a robustness study on larger instances with 100 customers ($n_c = 100$) per NYC. This appendix presents the instance setup, the algorithm’s performance, and the case-study figures.

OA.1.1. Instance Description

We generate ten NYC instances (NYC1–NYC10) with $n_c = 100$ customers each, following the same procedure as in Section 5.1. We consider four cluster sizes $n \in \{15, 20, 30, 40\}$ and seven aide capacities $K \in \{3, 4, 5, 6, 7, 10, +\infty\}$, subject to the feasibility constraint $K \geq CS = \lceil n_c/n \rceil$. The resulting grid contains 21 (n, K) configurations: $n = 15$ ($CS = \{6, 7\}$) with $K \in \{7, 10, +\infty\}$, $n = 20$ ($CS = 5$) with $K \in \{5, 6, 7, 10, +\infty\}$, $n = 30$ ($CS = \{3, 4\}$) with $K \in \{4, 5, 6, 7, 10, +\infty\}$ and $n = 40$ ($CS = \{2, 3\}$) with $K \in \{3, 4, 5, 6, 7, 10, +\infty\}$. For each configuration, we sweep four parking times $\tau \in \{0, 6, 9, 15\}$ minutes, yielding 680 finite- K GDAP instances in total. We additionally solve 40 instances per τ with unlimited aide capacity ($K = \infty$), one for each (n, τ) pair, giving 160 instances with $K = \infty$. Overall, we have 840 instances here.

OA.1.2. Performance of the Solution Approach

We solve the $n_c = 100$ instances with the exact BCP algorithm under a two-hour soft time limit, stopping early once the optimality gap falls below 3%. The $K = \infty$ instances are far harder, because removing the capacity cap enlarges the space of feasible helper-mode loops that the pricing problem must search, so a larger share of these runs terminate at the time limit rather than at the gap criterion. Table OA.1 summarizes the performance. Consistent with our observations for $n_c = 50$, running time increases with smaller cluster size and greater aide capacity.

On the finite- K instances, the BCP algorithm reaches a mean gap of 0.70% with a mean running time of 1,295 s. It solves every instance to within 2.61% and closes 89.9% of these instances within 1%. The $K = \infty$ instances are more demanding, with a mean gap of 1.82% and a mean running time of 5,120 s. But 81.9% are still within 3%. The difficulty concentrates at the largest parking times: only three instances exceed 5%, including NYC10 (5.67%) and NYC6 (5.65%) at $n = 20$, $\tau = 15$ min, and NYC8 (5.01%) at $n = 40$, $\tau = 9$ min. Over the full 840 instances, the mean optimality gap is 0.91%, and 79.0% and 96.5% of instances are within 1% and 3%, respectively.

We next discuss results in Figures OA.1–OA.8. Figure OA.1 shows the average savings in route time and cost of the GDAP compared with the TSP variant, at fixed $\tau = 0$, across 15 settings (11 GDAP settings plus 4 Jumper-variant settings). The four blocks preserve the layout of Figure 7: Jumper variant, $K = CS$,

Table OA.1 The performance of the BCP algorithm on the full $n_c = 100$ instances.

n	K	Gap $\leq 1\%$	Gap $\leq 3\%$	Mean gap	Max gap	Mean runtime
15	7	100%	100%	0.74%	1.00%	229 s
15	10	100%	100%	0.75%	1.00%	241 s
20	5	100%	100%	0.36%	0.98%	24 s
20	6	100%	100%	0.37%	0.98%	27 s
20	7	100%	100%	0.37%	0.97%	24 s
20	10	98%	100%	0.78%	1.12%	598 s
30	4	100%	100%	0.35%	0.99%	65 s
30	5	100%	100%	0.37%	0.99%	67 s
30	6	100%	100%	0.81%	1.00%	422 s
30	7	100%	100%	0.75%	1.00%	491 s
30	10	80%	100%	0.95%	2.02%	2,924 s
40	3	100%	100%	0.35%	1.00%	84 s
40	4	100%	100%	0.64%	0.94%	350 s
40	5	98%	100%	0.87%	1.07%	1,315 s
40	6	78%	100%	0.95%	1.26%	3,744 s
40	7	55%	100%	1.08%	1.95%	4,884 s
40	10	20%	100%	1.45%	2.61%	6,524 s
15	∞	80%	95%	0.73%	3.95%	1,382 s
20	∞	25%	88%	1.85%	5.67%	4,733 s
30	∞	15%	73%	2.28%	3.69%	7,178 s
40	∞	13%	73%	2.42%	5.01%	7,189 s
Finite K		89.9%	100.0%	0.70%	2.61%	1,295 s
$K = \infty$		33.1%	81.9%	1.82%	5.67%	5,120 s
All		79.0%	96.5%	0.91%	5.67%	2,023 s

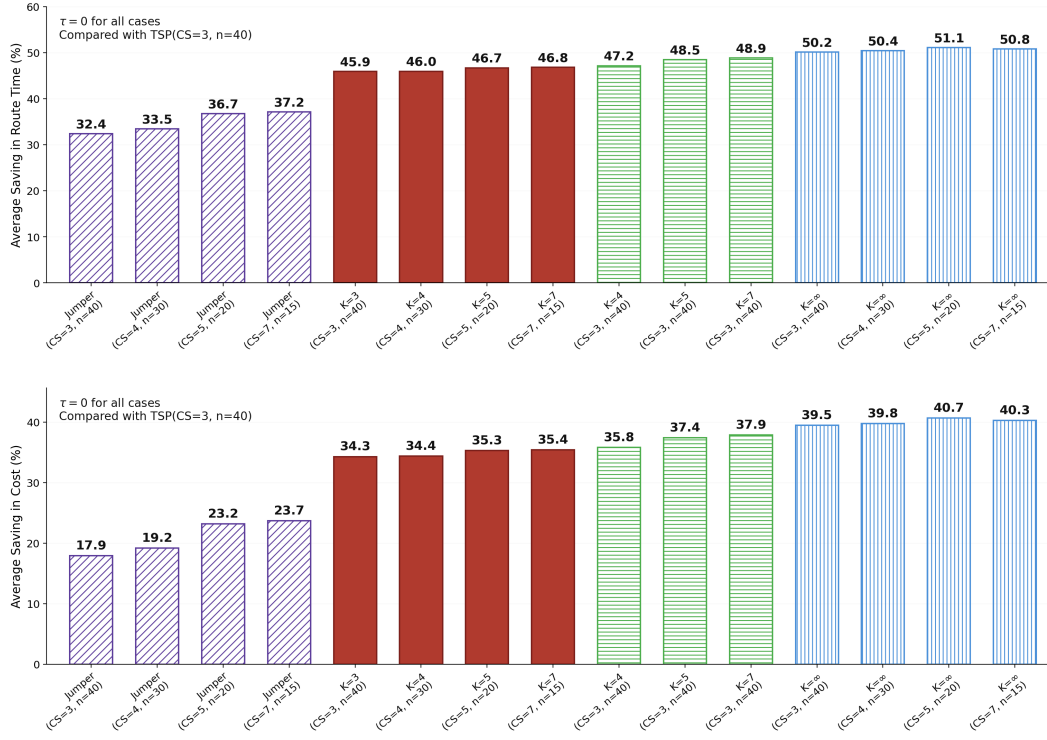


Figure OA.1 Average Savings in Route Time and Cost of the Jumper Variant and the GDAP Compared with the TSP Variant ($n_c = 100$).

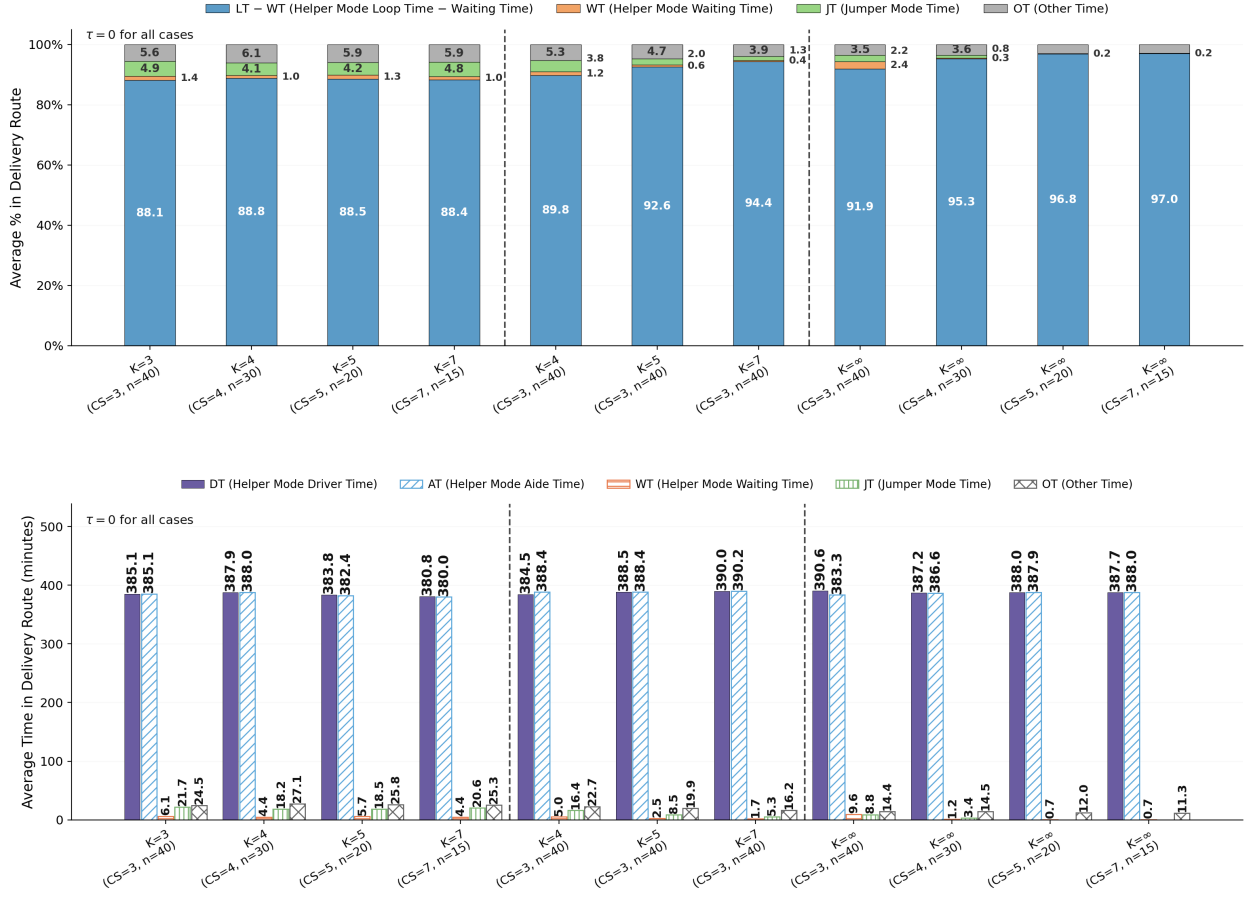


Figure OA.2 Percentage and Absolute Time (in Minutes) Breakdown of the GDAP Routes Across Different Components ($n_c = 100$).

$CS = 3$ varying K , and $K = \infty$. The savings follow the pattern in Figure 7: Jumper achieves 32–37% time savings; GDAP achieves 46–51% time savings and 34–41% cost savings, both monotone in K and CS .

Figure OA.2 decomposes the GDAP route times into their components across the 11 GDAP settings, mirroring Figure 8. The helper mode dominates the route time at every setting. The driver-mode time (DT) and aide-mode time (AT) track each other closely across all K , reflecting the decision on who serves the end node: the driver and the aide split the customer-service workload nearly evenly, with mean waiting time $WT \leq 10$ minutes in every instance. Jumper-mode time (JT) drops from 22 minutes at $K = 3$ to essentially zero at $K = \infty$, matching the main-body finding.

Figure OA.3 shows the average savings in carbon emissions of the GDAP compared with the TSP variant at $\tau = 0$ minutes, mirroring Figure 9. The pattern matches the findings in the main text: the $K = CS$ bars are negative (the driver must revisit clusters to pick up the aide, inflating total distance), while the varying- K and $K = \infty$ bars are positive. The GDAP at $K = \infty$, $CS = 5$ achieves 38.6% carbon emission savings, exceeding the 16% baseline achievable by electrifying the truck fleet.

Figure OA.4 shows the average route-time savings of the Jumper variant and the GDAP compared with the TSP variant at the corresponding τ , mirroring Figure 10. Consistent with the findings in the main text,



Figure OA.5 shows the absolute time breakdown of the GDAP routes across different components, mirroring Figure 11. Jumper-mode time drops to zero as soon as $\tau > 0$ at every K value, making the helper mode the only effective mode. The driver time DT and aide time AT track each other across all instances, with waiting time WT staying small (< 10 minutes) at $K = 4, 5$ and growing at $K = 3, \tau = 15$ min—the tight-capacity, high-parking corner.

Figure OA.6 shows the decomposition of the jumper mode time (top) and the helper mode driver time (bottom) in the GDAP, mirroring Figure 12. In the top panel, the jumper-mode time is nonzero only at $\tau = 0$ for all three K values, meaning the jumper mode is uniformly retired once parking becomes costly. In the bottom panel, the driver's parking time (DPT) grows monotonically with τ at every K (from 0 at $\tau = 0$ to

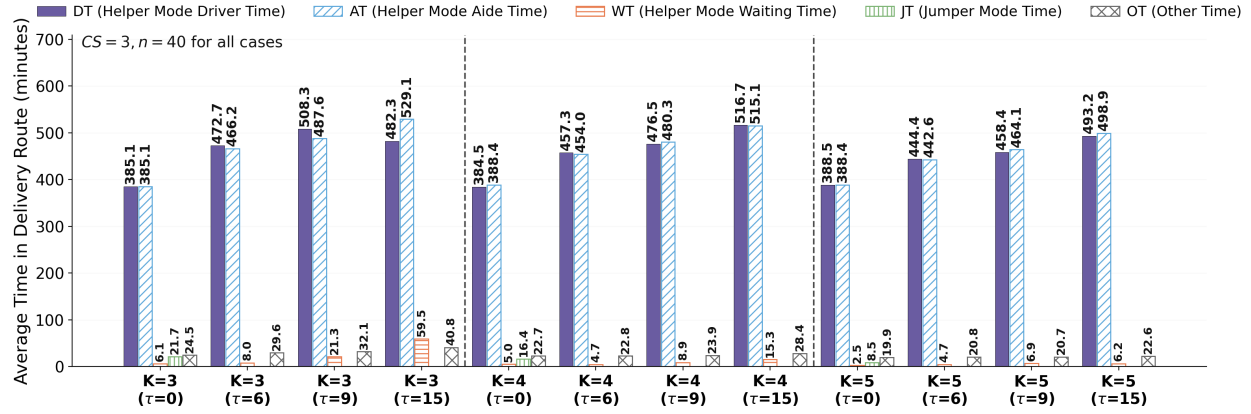


Figure OA.5 Absolute Time (in Minutes) Breakdown of the GDAP Routes Across Different Components on instances with $n_c = 100$ customers

195–228 minutes at $\tau = 15$), while the driver's service time (DST) decreases as more service work shifts to the aide.

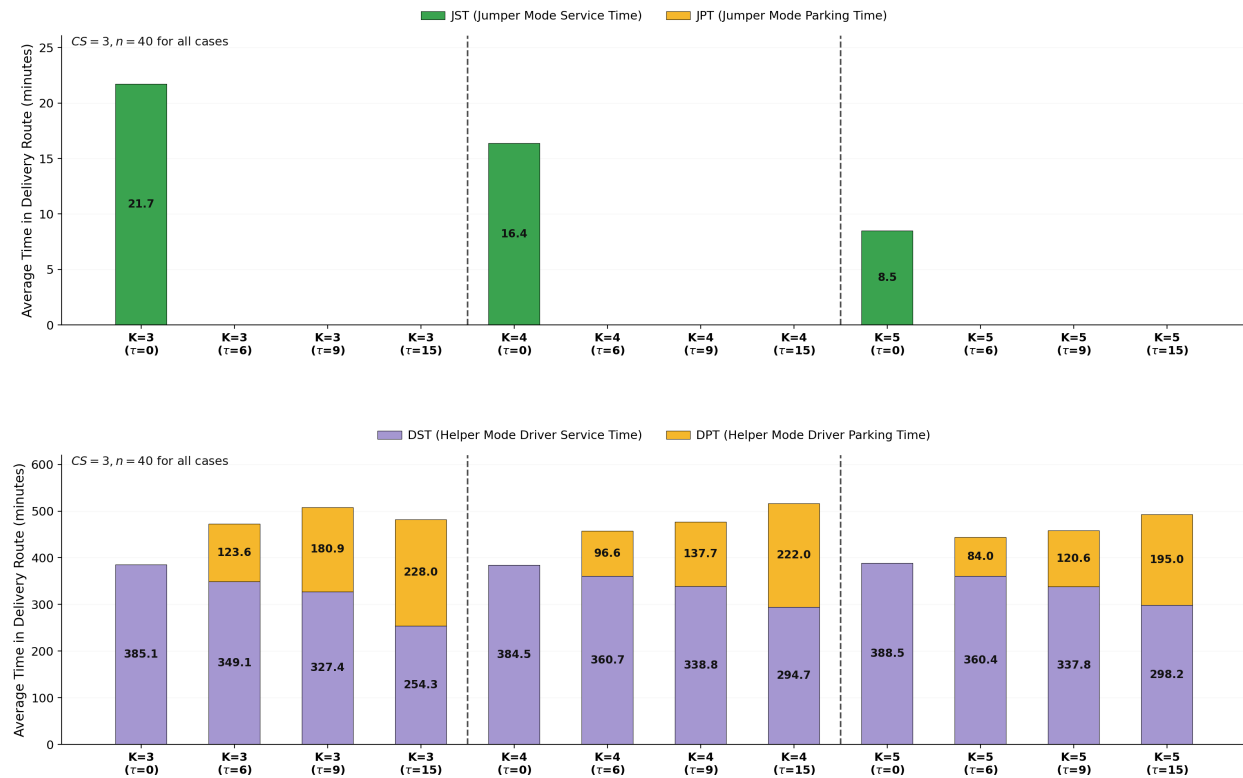


Figure OA.6 Decomposition of Jumper Mode Time and Helper Mode Driver Time in the GDAP (Time in Minutes) ($n_c = 100$).

Figure OA.7 presents the customer-service workload split (top) and the truck's parking-frequency ratio (bottom), mirroring Figure 13. The pattern agrees with the main text. The aide's parcel share rises with τ

at every K . It also rises with K at $\tau = 0, 6$ and 9 . The share sits below the 50/50 line at $\tau = 0$ for all four capacities, and moves above it at $\tau = 6$. The highest value is 64.1% at $K = 3, \tau = 15$. At that parking time the share no longer follows K in the same way, and the smallest capacity gives the largest share. The truck's parking ratio falls from 62.0% at $K = 3, \tau = 0$ to 38.0% at $K = 3, \tau = 15$, a reduction of about two fifths. It stays well below the TSP baseline over the whole range.

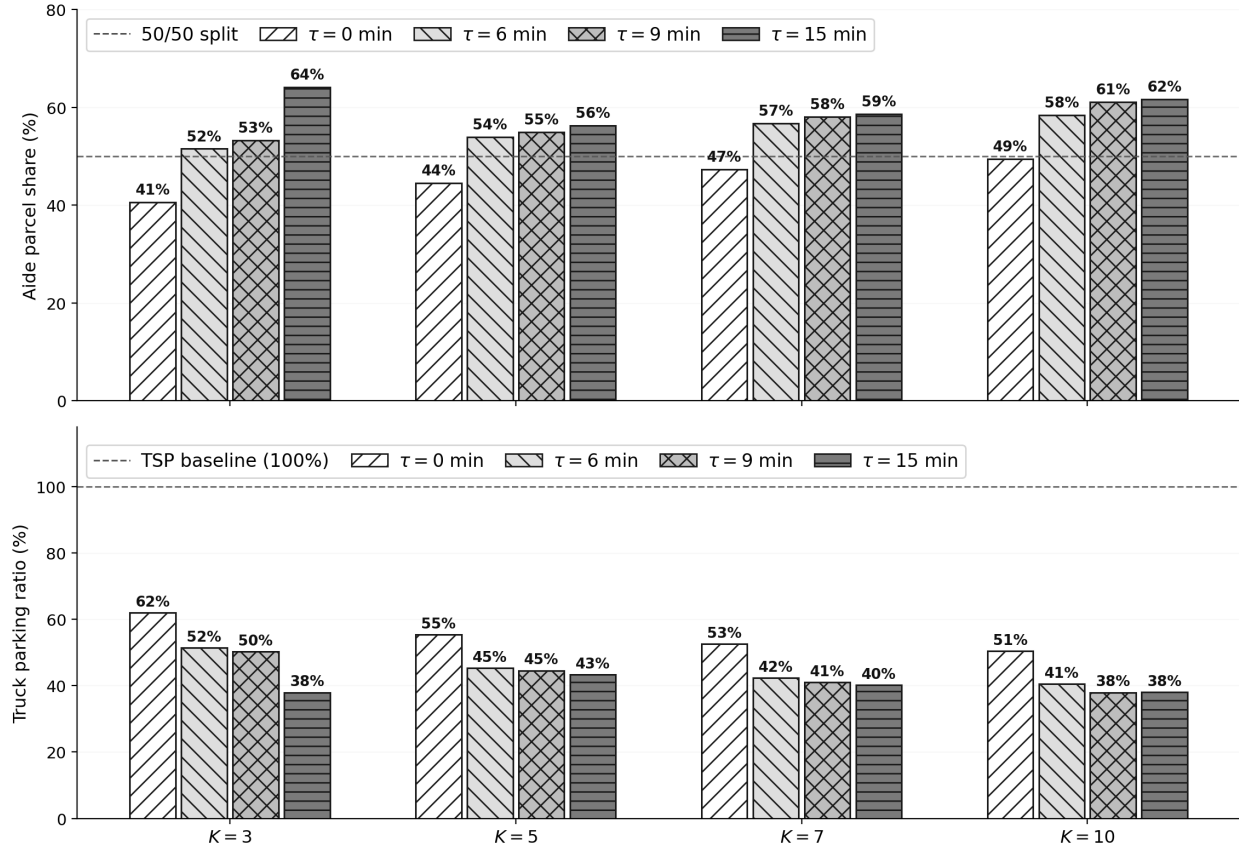


Figure OA.7 Operational impact of the GDAP on the customer-service workload split (top) and on truck curb occupancy (bottom) on instances with $n_c = 100$ customers

Figure OA.8 shows the driver-side and aide-side waiting-time components per route, mirroring Figure 14. The pattern agrees with the main text. Total waiting stays under an hour in every instance but one. The exception is the tight-capacity, high-parking corner at $K = 3, \tau = 15$ min, where total waiting reaches 179 minutes. Raising K from 3 to 10 brings the total at $\tau = 15$ down from 179 to 16 minutes. The split between the two parties varies with the setting. The aide bears the larger share at $K = 3$ and $K = 5$ for most values of τ , while the driver bears the larger share at $K = 10$. The driver also bears most of the wait at $K = 3$ with $\tau = 15$, where his share reaches 63%.

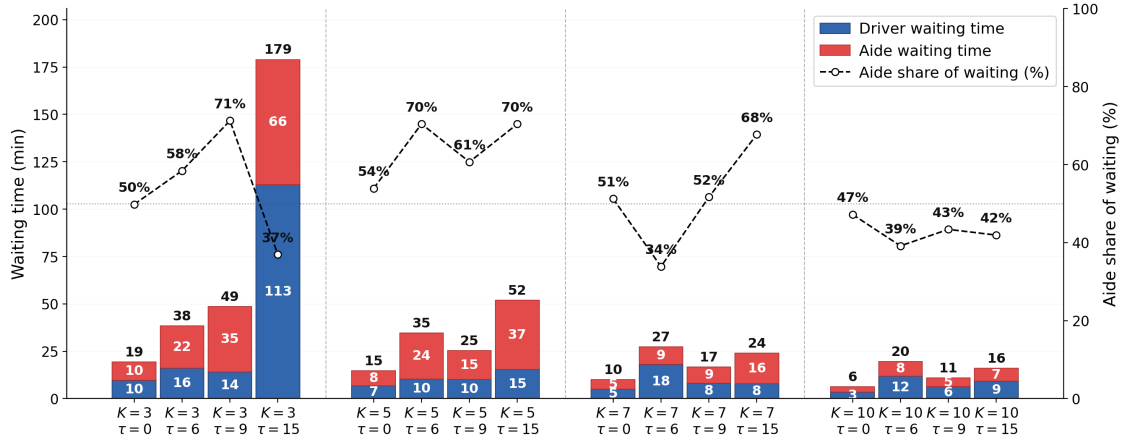


Figure OA.8 Driver vs. aide waiting time per route by K and τ (means over ten NYC instances $\times n \in \{15, 20, 30, 40\}$) on instances with $n_c = 100$ customers

OA.2. Results on Instances with $n_c = 50$ customers

This section reports the performance of the BCP algorithm on the instances with $n_c = 50$ customers. We first present the aggregate statistics per (n, K, τ) configuration, and then the detailed results on every instance.

OA.2.1. Aggregate Performance of the Exact BCP Algorithm on the $n_c = 50$ Instances

Table OA.2: Performance of the branch-cut-and-price algorithm per (n, K, τ) configuration on the $n_c = 50$ instances.

n	K	τ	#inst	Objective			Optimality gap (%)			Runtime (s)		
				Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
7	8	0	10	11314.7	13400.4	15883.2	0.000	0.355	0.688	0.4	0.8	2.4
7	8	6	10	12464.5	14310.8	16619.0	0.000	0.285	0.997	0.3	3.2	10.6
7	8	9	10	12871.6	14792.8	17023.1	0.000	0.590	0.973	0.4	4.0	11.7
7	8	15	10	13504.4	15821.5	18048.5	0.000	0.197	0.946	4.3	7.7	13.6
7	∞	0	10	10575.5	12462.5	14941.1	0.000	0.246	0.956	0.5	1.1	4.0
7	∞	6	10	11032.5	13017.9	15271.7	0.000	0.252	0.762	0.5	0.6	0.9
7	∞	9	10	11404.2	13294.4	15640.9	0.000	0.447	0.899	0.6	1.2	4.7
7	∞	15	10	11787.2	13781.0	15982.8	0.000	0.460	0.932	0.4	4.8	14.3
9	6	0	10	11697.7	13644.4	16201.9	0.188	0.593	0.956	0.5	1.2	3.6
9	6	6	10	12648.8	14718.1	17355.2	0.000	0.497	0.936	0.4	12.8	39.2
9	6	9	10	13339.9	15263.0	17828.0	0.188	0.586	0.914	0.8	10.9	32.0
9	6	15	10	14339.1	16391.6	19080.4	0.000	0.420	0.917	1.8	10.5	27.8
9	8	0	10	11697.7	13644.4	16201.9	0.188	0.593	0.956	0.5	1.3	4.3
9	8	6	10	12648.8	14718.1	17355.2	0.000	0.459	0.936	0.5	13.3	44.2
9	8	9	10	13339.9	15263.0	17828.0	0.260	0.594	0.914	0.9	10.7	31.0
9	8	15	10	14339.1	16391.6	19080.4	0.000	0.449	0.917	1.7	10.3	27.6
9	∞	0	10	10514.0	12418.6	14700.6	0.000	0.159	0.683	1.0	1.5	2.3
9	∞	6	10	11151.0	13061.1	15290.3	0.000	0.354	0.994	0.9	5.4	41.1
9	∞	9	10	11402.3	13343.8	15542.3	0.000	0.389	0.974	0.8	12.4	66.8
9	∞	15	10	11978.3	13793.8	15897.3	0.000	0.154	0.910	0.8	12.9	84.7
13	4	0	10	11738.0	13707.6	16572.1	0.438	0.724	0.848	2.2	13.3	44.7
13	4	6	10	13430.8	15374.8	18408.1	0.000	0.619	0.960	2.0	29.3	114.7
13	4	9	10	14262.9	16217.3	18982.6	0.320	0.689	0.976	1.9	46.6	248.4
13	4	15	10	16075.8	17788.7	20369.4	0.000	0.557	0.940	1.5	3.6	7.1
13	6	0	10	11516.4	13609.3	16393.3	0.000	0.623	0.940	1.8	12.6	70.4

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Table OA.2 (continued)

n	K	τ	#inst	Objective			Optimality gap (%)			Runtime (s)		
				Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
13	6	6	10	12814.2	15154.7	18188.3	0.000	0.551	0.857	1.6	17.0	62.8
13	6	9	10	13318.5	15865.7	18768.5	0.000	0.315	0.909	2.0	10.6	45.0
13	6	15	10	14848.3	17371.7	20137.2	0.000	0.287	0.958	1.6	3.7	11.2
13	8	0	10	10919.6	12901.9	15539.5	0.082	0.788	0.995	5.7	54.7	151.2
13	8	6	10	11730.1	13974.9	16605.7	0.265	0.697	0.977	4.9	17.8	50.3
13	8	9	10	12303.4	14379.1	16823.5	0.000	0.694	0.998	5.1	103.7	472.8
13	8	15	10	13132.1	15261.0	17742.8	0.650	0.918	0.976	13.3	466.6	1252.4
13	∞	0	10	10372.1	12352.8	14860.0	0.000	0.099	0.992	6.3	66.0	211.3
13	∞	6	10	11243.8	13284.2	15828.4	0.008	0.588	0.998	7.1	63.2	377.7
13	∞	9	10	11654.0	13534.7	15915.7	0.000	0.206	0.791	7.1	292.3	2453.7
13	∞	15	10	12164.1	14171.8	16795.2	0.000	0.323	0.865	6.2	372.2	2221.4
25	2	0	10	11842.6	13862.8	16325.7	0.000	0.643	0.916	25.6	915.5	7085.9
25	2	6	10	14827.7	16975.2	19528.9	0.192	0.642	0.954	18.4	77.7	242.7
25	2	9	10	16369.9	18445.6	20878.4	0.000	0.448	0.759	12.6	20.9	59.2
25	2	15	10	18795.6	21161.2	24143.0	0.000	0.177	0.611	10.3	15.7	22.9
25	4	0	10	10970.1	12993.5	15218.9	0.580	0.835	1.131	80.0	3131.2	7176.1
25	4	6	10	12715.1	14871.3	17183.9	0.230	0.792	0.966	46.0	558.6	1802.5
25	4	9	10	13370.4	15609.5	17907.8	0.587	0.848	1.002	47.5	849.0	7109.9
25	4	15	10	14855.8	17076.8	19656.9	0.676	0.834	0.984	43.0	255.5	1434.6
25	6	0	10	10730.8	12682.3	14827.9	0.440	0.751	0.999	84.0	2773.1	7083.3
25	6	6	10	12302.9	14302.2	16543.5	0.627	0.903	0.993	67.3	2366.2	7106.9
25	6	9	10	12869.5	14828.8	16962.3	0.085	0.784	1.282	92.4	2909.9	7126.7
25	6	15	10	13727.2	15792.2	18132.7	0.827	0.948	0.994	142.2	1353.7	7109.9
25	8	0	10	10762.1	12579.1	14809.2	0.040	0.915	2.009	1091.5	5117.9	7161.7
25	8	6	10	12119.6	14063.4	16269.3	0.314	1.043	1.979	1758.8	4853.9	7200.0
25	8	9	10	12516.0	14555.3	16713.5	0.295	0.802	1.230	1299.8	5376.7	7200.0
25	8	15	10	13196.5	15386.0	17758.9	0.501	0.972	1.410	212.0	4474.6	7110.1
25	∞	0	10	10602.8	12504.2	14861.0	0.000	0.910	1.633	1423.8	5499.4	7167.2
25	∞	6	10	12135.7	13999.4	16157.6	0.452	1.605	2.462	5804.4	6988.9	7158.0
25	∞	9	10	12478.0	14411.1	16766.4	0.000	1.142	2.304	1762.2	6153.7	7185.3
25	∞	15	10	13260.3	15338.5	17667.4	1.042	2.079	3.260	7096.3	7131.1	7200.0

We should note that some (n, K) configurations are structurally equivalent. Under unit demands the aide can serve $\lfloor K/\lambda \rfloor$ whole customer clusters in one loop, where λ is the cluster size. For instance, at $n_c = 50$ and $n = 9$, each cluster holds five or six customers, so the aide with capacity $K = 6$ and $K = 8$ both can serve only one customer cluster, while serving a second customer cluster requires a capacity of at least ten. These columns describe the same problem and report the same upper bounds. The same holds at $n_c = 100$ for $K = 7$ and $K = 10$ when $n = 15$, and for $K = 5, 6$ and 7 when $n = 20$. Such (n, K) configurations report the same objective when both close to optimality, but their bounds can differ slightly. The cause lies in the LS pricing algorithm. In each iteration, it solves $\text{Pricing}_{i,j}$ for all start nodes i in parallel, one start node per core, and stops once a fixed number of columns with negative reduced costs has been collected. The cores do not finish these tasks in the same order every time, so a different subset of start nodes contributes columns before the count is reached, and the columns added in an iteration vary from run to run. Every node bound is still exact, since each node ends with an exhaustive pricing pass. But the master LP often has several optimal solutions, and a different column set can return a different one. Our branching rule reads

that solution, so two runs may branch on different customers, explore different trees, and stop at different depths with different, equally valid, bounds.

OA.2.2. Per-Instance Results of the Exact BCP Algorithm on the $n_c = 50$ Instances

Table OA.3: Per-instance results of the exact BCP algorithm on the $n_c = 50$ instances with $\tau = 0$ minutes.

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
7	8	1	13745.1	13715.2	0.22	0.4	7	∞	1	12877.1	12877.1	0.00	0.5	9	6	1	14420.5	14311.8	0.75	0.8	9	8	1	14420.5	14311.8	0.75	0.9
		2	14503.5	14408.1	0.66	2.4			2	13156.2	13156.2	0.00	0.7			2	14194.2	14159.0	0.25	1.3			2	14194.2	14159.0	0.25	1.4
		3	13720.9	13656.0	0.47	0.4			3	13080.1	13017.3	0.48	4.0			3	14017.1	13983.4	0.24	0.5			3	14017.1	13983.4	0.24	0.5
		4	13717.7	13645.9	0.52	0.6			4	12582.1	12582.1	0.00	0.6			4	13936.6	13864.4	0.52	0.7			4	13936.6	13864.4	0.52	0.7
		5	12486.6	12486.6	0.00	1.4			5	11557.1	11479.4	0.67	0.8			5	13100.6	13005.4	0.73	3.6			5	13100.6	13005.4	0.73	4.3
		6	11314.7	11273.4	0.37	0.8			6	10575.5	10565.5	0.09	1.0			6	11697.7	11675.8	0.19	0.7			6	11697.7	11675.8	0.19	0.7
		7	13223.5	13223.5	0.00	0.8			7	12474.7	12474.7	0.00	0.8			7	13634.9	13504.6	0.96	1.7			7	13634.9	13504.6	0.96	1.5
		8	13287.1	13233.2	0.41	0.8			8	12218.4	12218.4	0.00	0.6			8	13419.7	13294.7	0.93	1.1			8	13419.7	13294.7	0.93	1.2
		9	12122.1	12095.1	0.22	0.4			9	11163.1	11133.9	0.26	0.7			9	11820.8	11743.4	0.65	0.9			9	11820.8	11743.4	0.65	0.9
		10	15883.2	15774.0	0.69	0.4			10	14941.1	14798.2	0.96	0.8			10	16201.9	16085.6	0.72	0.9			10	16201.9	16085.6	0.72	0.9
9	∞	1	13207.5	13207.5	0.00	1.2	13	4	1	14300.6	14238.0	0.44	2.2	13	6	1	14148.2	14148.2	0.00	2.8	13	8	1	13533.5	13421.8	0.83	97.5
		2	12887.0	12887.0	0.00	1.7			2	14150.1	14034.4	0.82	23.1			2	14040.7	13938.4	0.73	5.3			2	13332.8	13219.7	0.85	12.1
		3	13240.3	12540.3	0.36	1.2			3	13669.4	13601.5	0.50	35.0			3	13669.4	13541.0	0.94	20.2			3	13090.3	12964.3	0.96	28.5
		4	12729.7	12671.4	0.46	1.3			4	14482.6	14388.5	0.65	2.3			4	14353.2	14329.1	0.17	2.5			4	13309.3	13178.3	0.98	151.2
		5	11578.7	11578.7	0.00	1.3			5	12932.2	12822.6	0.85	6.2			5	12932.2	12815.7	0.90	6.7			5	12075.4	11955.2	1.00	56.6
		6	10514.0	10514.0	0.00	1.0			6	11738.0	11651.8	0.73	7.7			6	11516.4	11433.4	0.72	3.0			6	10919.6	10816.5	0.94	143.0
		7	12350.7	12350.7	0.00	2.3			7	13823.4	13714.5	0.79	44.7			7	13803.9	13707.6	0.70	70.4			7	13023.1	12934.5	0.68	5.7
		8	12287.0	12203.1	0.68	2.1			8	13209.6	13101.5	0.82	3.3			8	13209.6	13101.5	0.82	4.5			8	12726.2	12631.5	0.74	25.5
		9	10907.3	10907.3	0.00	1.2			9	12198.5	12100.3	0.81	2.9			9	12026.5	11979.9	0.39	1.8			9	11469.3	11459.9	0.08	6.5
		10	14700.6	14688.0	0.09	1.3			10	16572.1	16431.8	0.85	5.6			10	16393.3	16250.9	0.87	9.0			10	15539.5	15413.4	0.81	20.4
13	∞	1	12842.7	12842.7	0.00	14.1	25	2	1	14584.4	14523.5	0.42	25.6	25	4	1	13770.9	13644.3	0.92	1046.9	25	6	1	13399.5	13277.1	0.91	172.9
		2	12845.4	12845.4	0.00	18.5			2	14688.6	14595.8	0.63	49.6			2	13705.3	13587.3	0.86	7176.1			2	13329.6	13248.1	0.61	4567.4
		3	12540.3	12540.3	0.00	17.0			3	13781.6	13683.2	0.71	756.1			3	13210.2	13104.0	0.80	4721.8			3	12857.5	12773.2	0.66	84.0
		4	12639.8	12639.8	0.00	154.9			4	14709.8	14593.0	0.79	96.0			4	13561.0	13460.9	0.74	1334.6			4	13233.9	13101.7	1.00	583.4
		5	11711.2	11595.0	0.99	6.3			5	13312.6	13213.2	0.75	137.5			5	12079.6	11979.8	0.83	80.0			5	11776.3	11714.7	0.52	1512.2
		6	10372.1	10372.1	0.00	65.2			6	11842.6	11735.1	0.91	7085.9			6	10970.1	10846.0	1.13	7143.5			6	10730.8	10630.8	0.93	7083.3
		7	12503.9	12503.9	0.00	18.2			7	13899.7	13774.6	0.90	589.6			7	13219.1	13083.4	1.03	7096.3			7	12785.5	12707.9	0.61	6047.6
		8	12085.5	12085.5	0.00	24.5			8	13496.2	13442.1	0.40	151.7			8	12727.4	12653.6	0.58	762.4			8	12574.1	12456.8	0.93	2101.0
		9	11127.3	11127.3	0.00	130.4			9	11986.4	11986.4	0.00	33.4			9	11472.4	11399.4	0.64	1621.5			9	11308.4	11207.6	0.89	4397.5
		10	14860.0	14860.0	0.00	211.3			10	16325.7	16176.2	0.92	230.1			10	15218.9	15093.1	0.83	328.8			10	14827.9	14762.6	0.44	1181.6
25	8	1	13167.1	13109.8	0.43	1377.4	25	∞	1	13127.3	12998.2	0.98	4858.4														
		2	13262.9	13130.3	1.00	7106.9			2	13091.1	13016.4	0.57	2574.6														
		3	12637.5	12632.4	0.04	1091.5			3	12691.6	12619.7	0.57	4806.4														
		4	13037.7	12960.1	0.60	2715.7			4	13021.6	12907.4	0.88	1423.8														
		5	11728.4	11628.2	0.85	3266.9			5	11452.0	11452.0	0.00	7112.0														
		6	10762.1	10545.9	2.01	7107.5			6	10602.8	10435.9	1.57	7137.5														
		7	12700.2	12574.9	0.99	7114.7			7	12745.2	12549.7	1.53	7136.1														
		8	12457.9	12328.9	1.04	7161.7			8	12356.0	12226.0	1.05	7111.5														
		9	11228.2	11119.8	0.97	7100.6			9	11093.8	11059.4	0.31	5666.5														
		10	14809.2	14627.0	1.23	7136.0			10	14861.0	14618.4	1.63	7167.2														

Table OA.4: Per-instance results of the exact BCP algorithm on the $n_c = 50$ instances with $\tau = 6$ minutes.

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
7	8	1	14825.1	14825.1	0.00	0.3	7	∞	1	13542.5	13471.3	0.53	0.6	9	6	1	15333.6	15191.0	0.93	4.5	9	8	1	15333.6	15191.0	0.93	4.5
		2	15403.1	15388.9	0.09	10.6			2	13729.1	13729.1	0.00	0.6			2	15432.7	15289.4	0.93	26.7			2	15432.7	15289.4	0.93	28.2
		3	14711.0	14607.4	0.70	1.0			3	13505.0	13449.0	0.41	0.7			3	15297.8	15154.6	0.94	1.8			3	15297.8	15154.6	0.94	1.9
		4	14413.9	14369.7	0.31	0.6			4	13349.2	13282.4	0.50	0.9			4	14837.9	14837.9	0.00	0.4			4	14837.9	14837.9	0.00	0.5
		5	13292.6	13292.6	0.00	0.3			5	12028.1	11989.6	0.32	0.6			5	14375.3	14294.3	0.56	39.2			5	14375.3	14348.8	0.18	44.2
		6	12464.5	12370.3	0.76	9.3			6	11032.5	11032.5	0.00	0.5			6	12810.4	12789.6	0.16	16.7			6	12810.4	12789.6	0.16	17.6
		7	14129.9	14129.9	0.00	0.3			7	13082.3	12982.6	0.76	0.6			7	14712.9	14604.3	0.74	35.6			7	14712.9	14604.3	0.74	33.1
		8	14227.2	14227.2	0.00	0.7			8	12880.3	12880.3	0.00	0.5			8	14376.0	14333.3	0.30	0.6			8	14376.0	14333.3	0.30	0.7
		9	13022.0	13022.0	0.00	8.3			9	11758.4	11758.4	0.00	0.7			9	12648.8	12648.8	0.00	0.9			9	12648.8	12648.8	0.00	0.9
		10	16619.0	16453.3	1.00	1.1			10	15271.7	15271.7	0.00	0.5			10	17355.2	17283.1	0.42	1.3			10	17355.2	17283.1	0.42	1.3
9	∞	1	14034.4	13909.9	0.89	41.1	13	4	1	15823.2	15722.9	0.63	2.5	13	6	1	15786.2	15660.0	0.80	39.8	13	8	1	14408.8	14370.6	0.27	8.8
		2	13749.9	13649.6	0.73	1.8			2	15792.7	15792.7	0.00	3.2			2	15711.1	15669.9	0.26	2.5			2	14477.2	14335.8	0.98	6.5
		3	13346.5	13346.5	0.00	0.9			3	15207.4	15129.9	0.51	3.4			3	15209.4	15126.9	0.54	3.2			3	14318.2	14187.0	0.92	4.9
		4	13456.1	13322.4	0.99	1.6			4	15860.7	15741.0	0.75	6.7			4	15773.6	15638.4	0.86	31.1			4	14375.6	14301.0	0.52	50.3
		5	12291.2	12270.8	0.17	1.1			5	14635.0	14507.7	0.87	114.7			5	14368.5	14264.3	0.73	5.5			5	13016.9	12891.7	0.96	9.3
		6	11151.0	11106.2	0.40	1.7			6	13430.8	13308.2	0.91	90.2			6	12814.2	12708.1	0.83	2.1			6	11730.1	11646.2	0.71	7.7
		7	12954.1	12954.1	0.00	1.6			7	15430.1	15282.0	0.96	36.0			7	15006.0	15006.0	0.00	2.8			7	14169.4	14053.0	0.82	34.8
		8	12870.8	12824.3	0.36	1.6			8	15176.5	15135.1	0.27	2.0			8	14972.2	14876.8	0.64	18.6			8	13931.7	13806.9	0.90	14.0
		9	11466.9	11466.9	0.00	1.2			9	13983.3	13922.7	0.43	2.0			9	13718.0	13694.0	0.18	1.6			9	12715.0	12673.8	0.32	6.1
		10	15290.3	15290.3	0.00	1.1			10	18408.1	18253.5	0.84	31.9			10	18188.3	18063.4	0.69	62.8			10	16605.7	16510.6	0.57	35.2

Table OA.4 (continued)

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
13	∞	1	13808.3	13717.6	0.66	377.7	25	2	1	17748.5	17657.5	0.51	18.4	25	4	1	15640.6	15516.4	0.79	53.0	25	6	1	14991.1	14845.2	0.97	447.6
		2	13905.1	13838.8	0.48	10.5		2	2	17746.9	17613.3	0.75	27.6		2	2	15358.5	15323.2	0.23	649.5		2	2	14951.0	14802.5	0.99	1931.1
		3	13427.5	13301.1	0.94	7.1		3	3	16968.7	16893.3	0.44	19.4		3	3	15190.6	15052.6	0.91	76.1		3	3	14532.7	14408.9	0.85	4775.7
		4	13575.2	13544.9	0.22	8.1		4	4	17988.5	17819.2	0.94	24.6		4	4	15441.6	15317.9	0.80	48.7		4	4	14907.4	14769.6	0.92	7106.9
		5	12520.3	12424.1	0.77	10.6		5	5	16507.3	16349.8	0.95	242.7		5	5	14021.6	13928.5	0.66	646.1		5	5	13448.3	13331.9	0.87	203.9
		6	11243.8	11242.9	0.01	8.4		6	6	14827.7	14707.1	0.81	96.9		6	6	12715.1	12606.4	0.85	46.0		6	6	12302.9	12182.6	0.98	67.3
		7	13377.6	13291.1	0.65	11.1		7	7	16917.1	16762.2	0.92	240.5		7	7	14995.8	14855.9	0.93	1802.5		7	7	14485.5	14344.0	0.98	6229.0
		8	13113.7	12982.9	1.00	165.1		8	8	16310.0	16232.4	0.48	40.9		8	8	14687.0	14545.2	0.97	700.3		8	8	14095.8	13964.3	0.93	2501.9
		9	12042.6	12010.8	0.26	11.1		9	9	15208.0	15144.6	0.42	23.3		9	9	13478.6	13355.2	0.92	1433.0		9	9	12763.4	12683.4	0.63	175.3
		10	15828.4	15685.9	0.90	22.2		10	10	19528.9	19491.3	0.19	42.3		10	10	17183.9	17036.6	0.86	130.9		10	10	16543.5	16393.0	0.91	223.0
25	8	1	14708.8	14604.4	0.71	1758.8	25	∞	1	14690.8	14495.6	1.33	7116.7														
		2	14824.3	14565.6	1.75	7200.0		2	2	14712.1	14469.8	1.65	7134.3														
		3	14130.4	14012.0	0.84	2044.4		3	3	14176.7	13827.7	2.46	7158.0														
		4	14684.4	14486.3	1.35	7091.2		4	4	14610.7	14327.6	1.94	7145.9														
		5	13138.2	13087.7	0.38	7102.8		5	5	13220.1	13020.2	1.51	7087.9														
		6	12119.6	11999.1	0.99	3332.4		6	6	12135.7	11866.0	2.22	7116.7														
		7	14346.7	14062.8	1.98	7121.3		7	7	14166.9	13934.3	1.64	7099.3														
		8	13879.0	13722.0	1.13	7102.2		8	8	13730.8	13509.4	1.61	7116.5														
		9	12532.9	12493.6	0.31	3977.3		9	9	12392.6	12336.6	0.45	5804.4														
		10	16269.3	16109.0	0.98	1809.0		10	10	16157.6	15959.0	1.23	7109.3														

Table OA.5: Per-instance results of the exact BCP algorithm on the $n_c = 50$ instances with $\tau = 9$ minutes.

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
7	8	1	15460.5	15316.4	0.93	0.4	7	∞	1	13651.1	13651.1	0.00	0.6	9	6	1	15934.6	15789.1	0.91	10.5	9	8	1	15934.6	15789.1	0.91	10.3
		2	15829.4	15803.6	0.16	10.5		2	2	14089.1	14089.1	0.00	0.6		2	2	15840.6	15698.6	0.90	16.0		2	2	15840.6	15698.6	0.90	15.4
		3	15275.8	15127.2	0.97	3.3		3	3	13689.1	13589.6	0.73	0.7		3	3	15837.8	15794.1	0.28	0.9		3	3	15837.8	15794.1	0.28	0.9
		4	15027.1	14891.6	0.90	1.2		4	4	13608.5	13496.0	0.83	0.8		4	4	15482.1	15381.8	0.65	5.8		4	4	15482.1	15381.8	0.65	5.7
		5	13652.6	13585.2	0.49	0.4		5	5	12331.3	12228.2	0.84	1.8		5	5	14835.5	14797.0	0.19	20.3		5	5	14835.5	14797.0	0.26	20.0
		6	12871.6	12776.4	0.74	8.2		6	6	11404.2	11301.7	0.90	0.7		6	6	13394.7	13272.3	0.91	16.1		6	6	13394.7	13272.3	0.91	16.3
		7	14542.5	14508.6	0.23	0.6		7	7	13406.0	13293.0	0.84	4.7		7	7	15102.8	15052.6	0.33	32.0		7	7	15102.8	15052.5	0.33	31.0
		8	14843.8	14751.1	0.62	0.8		8	8	13130.3	13109.8	0.16	0.8		8	8	15033.9	14956.0	0.52	5.3		8	8	15033.9	14956.0	0.52	5.3
		9	13401.8	13401.8	0.00	11.7		9	9	11993.0	11993.0	0.00	0.6		9	9	13339.9	13283.2	0.42	0.8		9	9	13339.9	13283.2	0.42	0.9
		10	17023.1	16879.6	0.84	2.9		10	10	15640.9	15613.0	0.18	0.6		10	10	17828.0	17693.6	0.75	1.3		10	10	17828.0	17693.6	0.75	1.3
9	∞	1	14242.4	14103.7	0.97	3.7	13	4	1	16607.4	16554.2	0.32	1.9	13	6	1	16386.0	16381.8	0.03	2.0	13	8	1	14927.2	14785.1	0.95	7.7
		2	13936.4	13897.9	0.28	2.1		2	2	16482.0	16406.3	0.46	7.1		2	2	16349.0	16318.0	0.19	2.2		2	2	14745.2	14745.2	0.00	9.5
		3	13673.0	13673.0	0.00	1.0		3	3	16127.5	16011.4	0.72	17.5		3	3	16127.5	15981.0	0.91	45.0		3	3	14649.1	14539.9	0.75	5.1
		4	13522.3	13522.3	0.00	0.9		4	4	16865.7	16712.8	0.91	23.9		4	4	16673.6	16532.2	0.85	14.5		4	4	14823.6	14676.8	0.99	15.8
		5	12790.2	12679.8	0.86	66.8		5	5	15627.1	15518.5	0.69	248.4		5	5	15035.5	14995.1	0.27	3.2		5	5	13550.6	13456.2	0.70	361.6
		6	11402.3	11345.5	0.50	1.7		6	6	14262.9	14123.8	0.98	25.1		6	6	13318.5	13318.5	0.00	2.1		6	6	12303.4	12180.8	1.00	140.5
		7	13410.6	13360.5	0.37	42.1		7	7	15838.4	15756.2	0.52	3.2		7	7	15496.7	15489.8	0.04	2.4		7	7	14580.8	14474.7	0.73	472.8
		8	12920.7	12920.7	0.00	0.8		8	8	16340.2	16198.6	0.87	5.2		8	8	15692.2	15682.7	0.06	3.7		8	8	14181.4	14069.3	0.79	7.3
		9	11997.5	11888.5	0.91	3.6		9	9	15039.0	14952.9	0.57	130.7		9	9	14809.5	14692.8	0.79	28.7		9	9	13205.9	13074.1	1.00	5.3
		10	15542.3	15542.3	0.00	1.1		10	10	18982.6	18820.5	0.85	2.5		10	10	18768.5	18765.8	0.01	2.0		10	10	16823.5	16815.6	0.05	11.5
13	∞	1	14026.4	14026.4	0.00	13.4	25	2	1	19229.6	19185.7	0.23	15.3	25	4	1	16352.8	16203.7	0.91	47.5	25	6	1	15498.6	15346.4	0.98	1538.1
		2	14113.4	14113.4	0.00	24.9		2	2	18878.7	18748.2	0.69	18.4		2	2	16211.8	16096.5	0.71	63.8		2	2	15472.8	15371.1	0.66	190.4
		3	13588.2	13588.2	0.00	364.2		3	3	18250.7	18250.7	0.00	12.6		3	3	16010.8	15875.3	0.85	48.1		3	3	15111.2	14971.6	0.92	7116.4
		4	13925.8	13886.3	0.28	10.5		4	4	19391.6	19285.7	0.55	59.2		4	4	16122.9	15981.6	0.88	48.4		4	4	15371.2	15278.7	0.60	1839.7
		5	12775.0	12727.4	0.37	9.2		5	5	17847.6	17836.8	0.06	16.5		5	5	14671.6	14526.8	0.99	593.0		5	5	14018.8	13886.0	0.95	1464.5
		6	11654.0	11582.1	0.62	10.6		6	6	16369.9	16312.1	0.35	12.9		6	6	13370.4	13291.9	0.59	65.9		6	6	12869.5	12760.9	0.84	7100.4
		7	13591.9	13591.9	0.00	11.5		7	7	18552.2	18411.5	0.76	17.7		7	7	15693.4	15563.0	0.83	120.3		7	7	14924.5	14830.8	0.63	2342.8
		8	13190.9	13190.9	0.00	18.3		8	8	18171.6	18060.6	0.61	26.3		8	8	15428.9	15275.9	0.99	321.6		8	8	14634.8	14447.1	1.28	7126.7
		9	12565.8	12466.4	0.79	2453.7		9	9	16885.9	16790.0	0.57	15.6		9	9	14324.3	14180.7	1.00	7109.9		9	9	13424.5	13305.5	0.89	288.0
		10	15915.7	15915.7	0.00	7.1		10	10	20878.4	20739.5	0.67	14.0		10	10	17907.8	17776.2	0.73	71.8		10	10	16962.3	16947.9	0.08	92.4
25	8	1	15238.2	15132.1	0.70	3943.5	25	∞	1	15256.8	15014.0	1.59	7122.7														
		2	15275.6	15087.8	1.23	7200.0		2	2	15200.2	14997.7	1.33	7123.6														
		3	14536.1	14486.1	0.34	4594.5		3	3	14417.7	14274.8	0.99	7167.6														
		4	15228.3	15053.5	1.15	7086.1		4	4	15061.7	14801.8	1.73	7108.9														
		5	13744.0	13608.5	0.99	4592.4		5	5	13563.1	13532.8	0.22	2725.2														
		6	12516.0	12474.8	0.33	3745.5		6	6	12478.0	12337.0	1.13	7110.1														
		7	14874.1	14712.4	1.09	7107.7		7	7	14747.2	14437.4	2.30	7122.6														
		8	14299.6	14163.4	0.95	7109.7		8	8	13884.6	13884.6	0.00	7162.2														
		9	13127.3	13002.9	0.95	1299.8		9	9	12735.8	12735.8	0.00	7108.9														
		10	16713.5	16664.1	0.30	7087.6		10	10	16766.4	16410.4	2.12	7185.3														

Table OA.6 (continued)

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
		2	16642.7	16485.2	0.95	4.4			2	14551.5	14539.7	0.08	0.6			2	17042.1	16925.0	0.69	8.8			2	17042.1	16925.0	0.69	9.0
		3	16417.9	16417.9	0.00	11.4			3	14156.0	14119.1	0.26	2.0			3	17129.6	17069.3	0.35	2.7			3	17129.6	17069.3	0.35	2.6
		4	15948.7	15948.7	0.00	4.9			4	14037.7	13906.9	0.93	1.4			4	16513.1	16364.2	0.90	3.4			4	16513.1	16364.2	0.90	3.4
		5	14746.6	14746.6	0.00	4.6			5	12827.5	12827.5	0.00	13.3			5	15711.1	15679.3	0.20	5.6			5	15711.1	15679.3	0.20	5.6
		6	13504.4	13504.4	0.00	4.3			6	11787.2	11680.2	0.91	0.7			6	14391.9	14370.9	0.15	3.8			6	14391.9	14370.9	0.15	3.8
		7	15908.7	15834.4	0.47	8.8			7	13900.4	13840.5	0.43	13.9			7	16345.2	16345.2	0.00	25.2			7	16345.2	16345.2	0.00	25.6
		8	16190.9	16190.9	0.00	13.6			8	13840.0	13751.4	0.64	14.3			8	15989.9	15843.2	0.92	1.8			8	15989.9	15843.2	0.92	1.7
		9	14381.7	14381.7	0.00	9.4			9	12462.9	12390.7	0.58	0.6			9	14339.1	14229.6	0.76	2.4			9	14339.1	14229.6	0.76	2.4
		10	18048.5	17947.8	0.56	4.3			10	15982.8	15982.8	0.00	0.4			10	19080.4	19036.8	0.23	23.3			10	19080.4	18981.9	0.52	21.0
9	∞	1	14459.6	14459.6	0.00	0.8	13	4	1	18466.0	18292.5	0.94	3.1	13	6	1	17827.1	17827.1	0.00	1.6	13	8	1	15784.8	15634.0	0.96	63.8
		2	14489.0	14427.1	0.43	1.4			2	17550.7	17412.8	0.79	7.1			2	17520.8	17353.0	0.96	5.9			2	15837.3	15682.7	0.98	32.2
		3	14442.9	14442.9	0.00	84.7			3	17910.3	17909.1	0.01	2.3			3	17847.3	17698.2	0.84	5.2			3	15621.1	15476.7	0.92	1054.5
		4	14094.6	14094.6	0.00	0.8			4	18633.4	18471.2	0.87	2.7			4	18633.4	18482.7	0.81	11.2			4	15665.2	15521.7	0.92	94.4
		5	12964.7	12938.8	0.20	1.2			5	17186.4	17095.0	0.53	4.4			5	16451.9	16451.9	0.00	2.2			5	14400.9	14264.4	0.95	797.9
		6	11978.3	11869.3	0.91	30.3			6	16075.8	15963.0	0.70	4.8			6	14848.3	14820.7	0.19	1.7			6	13132.1	13011.1	0.92	822.7
		7	13762.7	13762.7	0.00	0.8			7	17524.9	17407.0	0.67	5.5			7	16856.2	16856.2	0.00	1.7			7	15363.3	15214.5	0.97	505.0
		8	13547.4	13547.4	0.00	7.0			8	17441.0	17441.0	0.00	1.5			8	17425.4	17423.2	0.01	4.1			8	15105.5	14961.5	0.95	1252.4
		9	12301.7	12301.7	0.00	1.1			9	16729.5	16675.0	0.33	1.6			9	16169.0	16169.0	0.00	2.2			9	13956.7	13866.0	0.65	13.3
		10	15897.3	15897.3	0.00	1.3			10	20369.4	20219.1	0.74	2.3			10	20137.2	20122.6	0.07	1.6			10	17742.8	17570.6	0.97	29.9
13	∞	1	14666.4	14631.4	0.24	7.7	25	2	1	21984.8	21984.8	0.00	11.4	25	4	1	17732.9	17587.2	0.82	43.0	25	6	1	16547.9	16387.4	0.97	207.0
		2	14924.3	14851.9	0.49	7.9			2	21638.0	21616.8	0.10	19.5			2	17720.0	17559.1	0.91	79.6			2	16365.4	16211.8	0.94	173.0
		3	14040.5	14040.5	0.00	9.8			3	20569.6	20569.6	0.00	10.3			3	17395.7	17278.1	0.68	44.1			3	16154.8	16006.5	0.92	7109.9
		4	14574.3	14479.0	0.65	6.2			4	22449.9	22361.9	0.39	18.2			4	17604.3	17448.6	0.88	122.5			4	16346.2	16188.3	0.97	680.9
		5	13304.8	13304.8	0.00	8.0			5	20773.9	20773.9	0.00	13.9			5	16122.4	15963.7	0.98	1434.6			5	14909.7	14762.4	0.99	507.4
		6	12164.1	12156.7	0.06	7.0			6	18795.6	18680.8	0.61	10.9			6	14855.8	14712.3	0.97	50.3			6	13727.2	13597.0	0.95	3021.8
		7	14303.7	14180.0	0.86	9.4			7	21253.7	21253.7	0.00	12.0			7	17115.3	16995.6	0.70	51.1			7	15908.7	15756.2	0.96	1093.7
		8	13984.0	13984.0	0.00	2221.4			8	20690.3	20686.9	0.02	22.3			8	16878.1	16739.5	0.82	71.1			8	15474.4	15346.4	0.83	142.2
		9	12960.5	12943.1	0.13	6.2			9	19313.1	19269.2	0.23	15.8			9	15687.1	15555.3	0.84	50.4			9	14354.6	14214.8	0.97	214.2
		10	16795.2	16661.6	0.80	1438.0			10	24143.0	24040.5	0.42	22.9			10	19656.9	19512.1	0.74	608.6			10	18132.7	17952.5	0.99	387.2
25	8	1	16177.5	16009.5	1.04	7101.0	25	∞	1	16271.5	15829.7	2.72	7200.0														
		2	16168.6	16027.5	0.87	4769.3			2	16175.2	15841.9	2.06	7124.3														
		3	15386.3	15269.0	0.76	7102.7			3	15403.6	14901.4	3.26	7200.0														
		4	16004.0	15845.5	0.99	1558.4			4	15953.9	15637.1	1.99	7126.2														
		5	14641.6	14493.5	1.01	7097.1			5	14544.5	14228.7	2.17	7119.3														
		6	13196.5	13130.4	0.50	770.1			6	13260.3	13054.0	1.56	7096.3														
		7	15693.4	15478.3	1.37	7110.1			7	15507.6	15211.8	1.91	7104.2														
		8	14952.5	14826.9	0.84	212.0			8	14893.6	14719.6	1.17	7118.0														
		9	13881.0	13752.9	0.92	1934.5			9	13707.4	13564.6	1.04	7149.1														
		10	17758.9	17508.5	1.41	7090.9			10	17667.4	17151.1	2.92	7122.3														

OA.3. Results on Instances with $n_c = 100$ customers

This section reports the performance of the BCP algorithm on the instances with $n_c = 100$ customers: first the aggregate statistics per (n, K) configuration, and then the detailed results on every instance.

OA.3.1. Aggregate Performance on the $n_c = 100$ Instances

Table OA.7: Branch-cut-and-price performance per (n, K, τ) configuration on the $n_c = 100$ instances.

n	K	τ	#inst	Objective			Optimality gap (%)			Runtime (s)		
				Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
15	7	0	10	24248.0	25919.1	27960.6	0.234	0.631	0.947	6.2	14.7	70.8
15	7	6	10	26018.8	27665.1	29890.0	0.194	0.767	0.992	4.7	157.9	550.2
15	7	9	10	26857.7	28572.8	30670.6	0.055	0.823	0.997	4.2	282.5	1024.7
15	7	15	10	28435.7	30400.7	32900.3	0.197	0.732	0.943	61.6	459.9	927.5
15	10	0	10	24248.0	25919.1	27960.6	0.234	0.631	0.947	5.0	15.2	72.6
15	10	6	10	26018.8	27682.2	30123.8	0.334	0.844	0.998	4.5	178.6	770.0
15	10	9	10	26857.7	28573.8	30670.6	0.055	0.793	0.996	3.8	316.1	960.2
15	10	15	10	28435.7	30400.7	32900.3	0.197	0.732	0.935	65.3	452.7	907.3
15	∞	0	10	22093.8	24018.0	26384.5	0.000	0.286	0.821	258.7	429.3	695.6
15	∞	6	10	23418.1	25110.0	27572.1	0.000	0.305	0.995	33.9	85.9	235.1
15	∞	9	10	23787.3	25693.9	28199.8	0.000	0.606	1.877	326.7	2451.8	7123.9
15	∞	15	10	25563.7	26883.9	29602.5	0.026	1.724	3.947	54.7	2559.6	7090.3
20	5	0	10	24576.6	26177.7	28096.7	0.135	0.556	0.975	20.1	29.6	42.3
20	5	6	10	26743.3	28302.4	30377.8	0.002	0.525	0.966	11.5	38.3	161.3

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Table OA.7 (continued)

n	K	τ	#inst	Objective			Optimality gap (%)			Runtime (s)		
				Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
20	5	9	10	27645.2	29262.9	31209.4	0.000	0.216	0.588	8.9	16.0	24.2
20	5	15	10	30557.0	31752.2	33491.0	0.000	0.133	0.371	6.2	12.1	19.7
20	6	0	10	24576.6	26183.3	28096.7	0.135	0.566	0.976	18.3	33.2	61.6
20	6	6	10	26743.3	28301.8	30366.5	0.002	0.520	0.966	12.9	45.5	158.1
20	6	9	10	27645.2	29262.9	31209.4	0.000	0.216	0.588	9.1	14.7	24.9
20	6	15	10	30557.0	31759.7	33491.0	0.000	0.156	0.371	7.7	13.5	24.1
20	7	0	10	24576.6	26171.0	28037.7	0.135	0.527	0.945	18.0	29.8	41.6
20	7	6	10	26827.3	28310.2	30366.5	0.002	0.555	0.966	12.2	37.2	148.2
20	7	9	10	27645.2	29265.9	31209.4	0.000	0.226	0.588	10.0	15.9	23.1
20	7	15	10	30557.0	31759.7	33491.0	0.000	0.156	0.371	7.6	12.9	21.9
20	10	0	10	22999.2	24915.2	26885.6	0.487	0.776	0.975	75.5	285.5	683.3
20	10	6	10	24719.5	26620.4	28689.2	0.483	0.681	0.970	38.1	108.8	372.5
20	10	9	10	25535.0	27317.7	29384.7	0.492	0.743	0.990	39.9	103.3	330.6
20	10	15	10	26571.1	28447.3	30510.2	0.679	0.920	1.123	39.7	1894.6	7113.7
20	∞	0	10	22086.3	24014.1	26192.0	0.000	0.013	0.134	2444.2	4398.7	7177.5
20	∞	6	10	23941.9	25849.8	28073.1	1.231	1.762	2.200	818.6	3517.4	7088.2
20	∞	9	10	24720.2	26560.7	28729.9	1.361	2.189	2.974	1092.0	5475.7	7112.8
20	∞	15	10	25740.0	27675.8	29330.6	1.724	3.451	5.668	1992.6	5539.5	7130.8
30	4	0	10	24532.0	26575.0	28559.4	0.366	0.711	0.988	45.5	123.9	626.0
30	4	6	10	28102.1	29967.0	32288.8	0.187	0.356	0.711	40.8	50.8	66.6
30	4	9	10	30124.2	31581.0	33844.9	0.005	0.198	0.482	36.0	42.9	50.3
30	4	15	10	34404.7	35332.7	36697.9	0.000	0.152	0.385	29.5	42.9	60.9
30	5	0	10	24532.0	26587.8	28559.4	0.366	0.760	0.988	49.2	129.3	619.8
30	5	6	10	28102.1	29967.0	32288.8	0.187	0.356	0.711	38.6	47.5	59.8
30	5	9	10	30124.2	31578.3	33844.9	0.005	0.189	0.448	25.3	44.0	54.1
30	5	15	10	34404.7	35333.4	36697.9	0.000	0.154	0.529	37.3	46.2	63.5
30	6	0	10	23248.7	25442.8	27686.6	0.782	0.888	0.994	93.7	385.4	1337.5
30	6	6	10	26074.2	27890.2	30134.8	0.646	0.851	0.985	52.7	145.3	311.3
30	6	9	10	27080.1	28816.4	31005.5	0.477	0.750	0.986	47.7	201.9	1100.5
30	6	15	10	28785.9	30747.2	32810.4	0.139	0.748	1.000	53.6	955.8	7091.4
30	7	0	10	23078.7	25106.2	27339.4	0.635	0.874	0.999	116.6	1163.9	5017.8
30	7	6	10	25559.4	27412.0	29777.7	0.424	0.764	0.979	82.2	533.6	2215.4
30	7	9	10	26431.6	28233.9	30566.0	0.463	0.690	0.935	72.5	147.9	541.0
30	7	15	10	27978.6	29930.6	32068.5	0.426	0.659	0.919	58.8	119.7	182.6
30	10	0	10	22867.0	24806.7	27031.6	0.955	1.193	2.019	543.0	4637.3	7200.0
30	10	6	10	24869.1	26833.2	29162.4	0.509	0.896	1.151	275.6	3130.6	7123.6
30	10	9	10	25608.1	27613.0	30032.9	0.624	0.811	0.982	126.4	2916.5	7100.1
30	10	15	10	26912.1	28913.4	31242.2	0.636	0.878	1.226	130.0	1012.3	7200.0
30	∞	0	10	21919.5	24386.3	26177.2	0.000	1.534	3.560	7081.1	7159.6	7200.0
30	∞	6	10	24660.7	26473.3	28876.3	0.886	2.493	3.365	7200.0	7200.0	7200.0
30	∞	9	10	25801.0	27358.6	29774.3	1.789	2.757	3.691	7200.0	7200.0	7200.0
30	∞	15	10	25968.9	28009.4	30311.2	0.698	2.346	3.656	7081.4	7153.0	7200.0
40	3	0	10	24311.0	26459.3	28778.5	0.204	0.684	0.997	78.2	134.2	255.0
40	3	6	10	28889.0	31063.8	33424.6	0.153	0.413	0.645	51.3	76.8	121.1
40	3	9	10	31468.1	33261.6	34853.0	0.000	0.157	0.485	44.7	64.0	88.6
40	3	15	10	36440.7	38158.9	39806.6	0.000	0.146	0.438	53.0	62.7	98.3
40	4	0	10	23593.8	25845.5	28157.4	0.758	0.862	0.943	118.3	727.4	2668.7
40	4	6	10	26983.1	29251.3	31723.9	0.433	0.653	0.856	74.7	345.8	2632.0
40	4	9	10	28609.9	30823.1	32987.9	0.488	0.619	0.855	57.7	218.4	1369.7
40	4	15	10	32320.1	34017.5	35875.4	0.251	0.441	0.596	62.6	107.4	304.3
40	5	0	10	23008.1	25211.3	27580.8	0.546	0.916	1.066	156.4	2976.0	7200.0
40	5	6	10	25856.0	28206.7	30525.3	0.607	0.881	0.998	149.9	1117.2	5294.1
40	5	9	10	27066.8	29412.0	31792.7	0.797	0.922	0.983	99.9	745.6	2552.7
40	5	15	10	29328.4	31677.8	33994.3	0.561	0.745	0.997	75.5	422.1	2875.1

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Table OA.7 (continued)

n	K	τ	#inst	Objective			Optimality gap (%)			Runtime (s)		
				Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
40	6	0	10	22838.6	25026.3	27413.1	0.771	1.031	1.256	413.9	5065.8	7200.0
40	6	6	10	25407.4	27718.0	30057.9	0.689	0.935	1.088	193.6	2565.0	7200.0
40	6	9	10	26400.7	28739.3	31303.7	0.766	0.884	0.981	332.4	3325.1	7200.0
40	6	15	10	28414.9	30685.3	33239.9	0.726	0.950	1.010	784.9	4018.1	7200.0
40	7	0	10	22497.8	24842.2	27279.4	0.698	1.228	1.955	453.7	4908.1	7200.0
40	7	6	10	25059.5	27438.1	29904.9	0.854	1.061	1.552	353.4	4765.0	7200.0
40	7	9	10	25867.7	28303.1	30896.3	0.860	0.990	1.169	792.7	4411.6	7200.0
40	7	15	10	27555.5	29994.7	32612.5	0.600	1.031	1.287	1043.7	5450.5	7200.0
40	10	0	10	22523.8	24768.8	27180.6	1.212	1.621	2.229	7130.0	7193.0	7200.0
40	10	6	10	24800.6	27098.6	29583.8	0.925	1.254	2.010	1386.0	5850.3	7200.0
40	10	9	10	25651.0	27976.2	30586.7	0.808	1.234	1.582	2401.3	5851.0	7200.0
40	10	15	10	26630.3	29423.9	32257.2	1.002	1.676	2.605	7200.0	7200.0	7200.0
40	∞	0	10	22131.6	24385.8	26781.1	0	1.899	4.234	7200.0	7200.0	7200.0
40	∞	6	10	24410.5	26896.3	29374.2	0.270	1.916	2.876	7150.9	7187.6	7200.0
40	∞	9	10	25340.2	27957.0	30383.7	2.287	3.214	5.015	7200.0	7200.0	7200.0
40	∞	15	10	25925.3	29604.9	33019.5	1.184	2.672	3.905	7082.9	7167.7	7200.0

We should note that the columns $K = 7$ and $K = 10$ at $n = 15$ define the same problem, since both let the aide serve one node in a loop. The cause of their small differences is explained in Section OA.2.1.

Table OA.8: Per-instance results of the exact BCP algorithm on the $n_c = 100$ instances with $\tau = 0$ minutes.

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
15	7	1	24853.7	24651.8	0.81	6.2	15	10	1	24853.7	24651.8	0.81	6.1	15	∞	1	23302.2	23143.4	0.68	340.5	20	5	1	25911.7	25845.8	0.25	20.1
		2	24248.0	24075.3	0.71	9.3			2	24248.0	24075.3	0.71	11.4			2	22093.8	22093.8	0.00	608.9			2	24576.6	24441.0	0.55	23.9
		3	26356.8	26114.0	0.92	70.8			3	26356.8	26114.0	0.92	72.6			3	24180.1	23981.7	0.82	393.2			3	25830.5	25634.7	0.76	29.6
		4	27069.1	26812.7	0.95	6.6			4	27069.1	26812.7	0.95	5.0			4	24870.9	24870.9	0.00	435.0			4	26827.5	26658.1	0.63	22.1
		5	26481.5	26348.0	0.50	11.2			5	26481.5	26348.0	0.50	12.7			5	24744.4	24583.0	0.65	293.9			5	26900.3	26637.9	0.98	31.8
		6	25136.5	25044.5	0.37	6.5			6	25136.5	25044.5	0.37	9.0			6	23276.2	23202.6	0.32	258.7			6	25281.3	25174.4	0.42	33.7
		7	26359.0	26118.1	0.91	8.5			7	26359.0	26118.1	0.91	10.6			7	24368.8	24339.7	0.12	416.5			7	26362.0	26326.4	0.14	29.8
		8	25645.9	25582.2	0.25	8.8			8	25645.9	25582.2	0.25	8.0			8	23788.9	23725.7	0.27	427.5			8	26240.9	26063.2	0.68	42.3
		9	27960.6	27895.0	0.23	9.4			9	27960.6	27895.0	0.23	9.1			9	26384.5	26384.5	0.00	422.8			9	28096.7	27934.5	0.58	26.4
		10	25080.0	24916.3	0.65	9.7			10	25080.0	24916.4	0.65	7.2			10	23170.0	23170.0	0.00	695.6			10	25749.6	25600.0	0.58	36.1
20	6	1	25967.6	25845.8	0.47	23.8	20	7	1	25911.7	25845.8	0.25	18.0	20	10	1	24379.6	24260.8	0.49	359.4	20	∞	1	23606.8	23606.8	0.00	2738.1
		2	24576.6	24441.0	0.55	18.3			2	24576.6	24441.0	0.55	20.4			2	22999.2	22870.8	0.56	75.5			2	22086.3	22086.3	0.00	7101.2
		3	25830.5	25634.7	0.76	32.1			3	25830.5	25634.7	0.76	28.7			3	24677.0	24455.7	0.90	329.2			3	23796.8	23796.8	0.00	2473.0
		4	26827.5	26658.2	0.63	24.1			4	26827.5	26658.1	0.63	21.0			4	25838.6	25613.3	0.87	683.3			4	24959.0	24959.0	0.00	2444.2
		5	26900.3	26637.7	0.98	36.6			5	26892.0	26637.9	0.94	40.5			5	25600.0	25350.4	0.98	400.7			5	24703.2	24703.2	0.00	7177.5
		6	25281.3	25174.4	0.42	29.6			6	25281.3	25174.4	0.42	32.2			6	24134.5	23920.1	0.89	186.4			6	23081.6	23081.6	0.00	7087.2
		7	26362.0	26326.4	0.14	30.7			7	26362.0	26326.4	0.14	30.7			7	25313.2	25109.4	0.81	156.5			7	24372.8	24372.8	0.00	3708.3
		8	26240.9	26063.2	0.68	49.3			8	26240.9	26063.1	0.68	39.6			8	24899.9	24660.8	0.96	170.3			8	23836.6	23836.6	0.00	4200.9
		9	28096.7	27934.5	0.58	25.6			9	28037.7	27934.5	0.37	25.4			9	26885.6	26754.8	0.49	86.6			9	26192.0	26192.0	0.00	3576.6
		10	25749.6	25630.7	0.46	61.6			10	25749.6	25614.4	0.53	41.6			10	24424.3	24222.0	0.83	407.5			10	23505.9	23474.3	0.13	3480.0
30	4	1	25198.1	25105.9	0.37	111.6	30	5	1	25198.1	25105.8	0.37	89.4	30	6	1	24501.7	24280.3	0.90	222.3	30	7	1	24295.6	24079.3	0.89	693.1
		2	24532.0	24340.9	0.78	59.2			2	24532.0	24340.9	0.78	79.4			2	23248.7	23049.2	0.86	1337.5			2	23078.7	22932.2	0.63	5017.8
		3	26602.2	26367.9	0.88	115.3			3	26580.5	26367.9	0.80	116.4			3	25154.5	24936.2	0.87	361.1			3	24922.8	24688.4	0.94	799.9
		4	27582.0	27309.5	0.99	626.0			4	27582.0	27309.6	0.99	619.8			4	26334.3	26075.8	0.98	285.1			4	26051.5	25794.8	0.99	116.6
		5	26834.9	26715.9	0.44	45.5			5	26834.9	26715.9	0.44	49.8			5	25636.1	25428.1	0.81	93.7			5	25277.1	25107.5	0.67	2720.1
		6	26464.6	26288.3	0.67	54.0			6	26536.2	26288.3	0.93	49.2			6	25079.6	24883.5	0.78	430.9			6	24699.4	24453.6	1.00	483.6
		7	27491.0	27233.0	0.94	60.9			7	27493.9	27233.0	0.95	66.2			7	26327.9	26105.2	0.85	106.9			7	26046.5	25814.4	0.89	444.6
		8	26722.3	26483.9	0.89	55.6			8	26722.3	26483.9	0.89	93.1			8	25659.0	25424.9	0.91	245.7			8	25081.8	24838.5	0.97	258.2
		9	28559.4	28341.1	0.76	55.5			9	28559.4	28341.1	0.76	55.8			9	27686.6	27411.5	0.99	562.3			9	27339.4	27066.2	1.00	185.6
		10	25763.3	25663.0	0.39	55.8			10	25839.1	25662.9	0.68	74.1			10	24799.8	24570.6	0.92	208.7			10	24269.4	24083.9	0.76	919.1
30	10	1	24021.0	23714.6	1.28	7114.1	30	∞	1	23038.8	23011.0	0.12	7089.5	40	3	1	25162.8	25111.5	0.20	126.6	40	4	1	24739.9	24549.7	0.77	157.3
		2	22867.0	22634.4	1.02	7123.1			2	21919.5	21919.5	0.00	7081.1			2	24311.0	24075.2	0.97	139.4			2	23593.8	23375.5	0.93	813.7
		3	24544.7	24308.4	0.96	5742.0			3	24242.6	23853.2	1.61	7200.0			3	26085.8	25987.5	0.38	82.4			3	25307.1	25113.3	0.77	118.3
		4	25753.5	25499.3	0.99	5183.3			4	24699.8	24699.8	0.00	7082.1			4	27620.9	27377.3	0.88	109.5			4	26766.9	26524.6	0.91	293.6
		5	24967.1	24718.4	1.00	4620.1			5	24914.2	24340.5	2.30	7200.0			5	27385.4	27112.5	1.00	255.0			5	26714.6	26512.0	0.76	508.9
		6	24364.3	23872.4	2.02	958.3			6	24363.5	23630.1	3.01	7200.0			6	26040.6	25909.4	0.50	108.0			6	25437.7	25204.4	0.92	129.9
		7	25659.1	25414.0	0.96	788.1			7	25450.7	24995.2	1.79	7200.0			7	27398.8	27210.9	0.69	113.7			7	26869.9	26616.6	0.94	1726.3
		8	24759.7	24501.6	1.04	7101.2			8	24805.0	24073.3	2.95	7200.0			8	25839.7	25712.6	0.49	88.5			8	25374.0	25137.4	0.93	712.7
		9	27031.6	26770.0	0.97	543.0			9	26177.2	26177.2	0.00	7143.8			9	28778.5	28559.9	0.76	240.6			9	28157.4	27933.7	0.79	144.7
		10	24098.5	23686.1	1.71	7200.0			10	24252.0	23388.6	3.56	7200.0			10	25969.9	25718.8	0.97	78.2			10	25494.1	25261.5	0.91	2668.7
40	5	1	24089.8	23958.3	0.55	156.4	40	6	1	24046.4	23812.9	0.97	1273.2	40	7	1	23856.4	23618.6	1.00	1684.8	40	10	1	23636.1	23283.2	1.49	7200.0

Table OA.8 (continued)

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
	2	23008.1	22783.4	0.98	798.6		2	22838.6	22587.1	1.10	7129.7		2	22497.8	22302.0	0.87	2693.4		2	22523.8	22154.1	1.64	7200.0				
	3	24951.2	24711.1	0.96	2749.0		3	24622.2	24432.3	0.77	413.9		3	24578.8	24098.4	1.95	7200.0		3	24535.2	24127.9	1.66	7200.0				
	4	26219.8	25961.2	0.99	3982.4		4	25943.9	25653.2	1.12	7200.0		4	25648.0	25468.9	0.70	1049.6		4	25722.8	25343.7	1.47	7200.0				
	5	26068.5	25790.6	1.07	7200.0		5	25800.0	25530.9	1.04	7200.0		5	25576.1	25264.5	1.22	7200.0		5	25583.8	25141.0	1.73	7200.0				
	6	24618.2	24406.7	0.86	264.4		6	24423.2	24218.1	0.84	577.4		6	24218.4	24007.5	0.87	453.7		6	24117.4	23825.2	1.21	7130.0				
	7	26104.6	25883.6	0.85	4566.7		7	26047.5	25720.3	1.26	7200.0		7	25867.1	25472.5	1.53	7200.0		7	25560.9	25214.6	1.35	7200.0				
	8	24813.3	24579.6	0.94	1165.1		8	24732.3	24445.8	1.16	7200.0		8	24580.8	24251.4	1.34	7200.0		8	24566.0	24042.9	2.13	7200.0				
	9	27580.8	27309.2	0.98	1796.9		9	27413.1	27145.3	0.98	5264.3		9	27279.4	26971.1	1.13	7200.0		9	27180.6	26831.7	1.28	7200.0				
	10	24659.0	24415.1	0.99	7080.6		10	24395.4	24134.4	1.07	7200.0		10	24319.4	23912.6	1.67	7200.0		10	24261.4	23720.7	2.23	7200.0				
40	∞	1	23277.9	23060.9	0.93	7200.0																					
		2	22131.6	21930.6	0.91	7200.0																					
		3	23926.0	23926.0	0.00	7200.0																					
		4	25115.9	24590.0	2.09	7200.0																					
		5	25186.4	24471.1	2.84	7200.0																					
		6	24008.7	23641.8	1.53	7200.0																					
		7	25285.5	24509.7	3.07	7200.0																					
		8	23949.9	23450.1	2.09	7200.0																					
		9	26781.1	26432.4	1.30	7200.0																					
		10	24194.7	23170.4	4.23	7200.0																					

Table OA.9: Per-instance results of the exact BCP algorithm on the $n_c = 100$ instances with $\tau = 6$ minutes.

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
15	7	1	26620.8	26359.3	0.98	424.3	15	10	1	26620.8	26355.1	1.00	611.9	15	∞	1	24410.8	24244.3	0.68	52.9	20	5	1	27563.6	27433.5	0.47	11.5
		2	26018.8	25806.7	0.82	435.8			2	26018.8	25799.4	0.84	225.4			2	23418.1	23185.1	1.00	84.3			2	26743.3	26650.0	0.35	15.2
		3	27859.9	27704.3	0.56	4.7			3	27797.1	27704.3	0.33	5.0			3	25007.9	25007.9	0.00	163.5			3	27999.6	27748.9	0.90	63.7
		4	28889.7	28650.9	0.83	5.3			4	28889.7	28650.9	0.83	4.5			4	26073.4	26007.8	0.25	235.1			4	29221.0	28970.6	0.86	17.8
		5	28332.1	28055.1	0.98	9.5			5	28332.1	28056.1	0.97	17.3			5	25718.8	25648.5	0.27	44.2			5	28922.0	28921.4	0.00	24.2
		6	26811.8	26545.7	0.99	11.7			6	26811.8	26545.7	0.99	12.6			6	24339.9	24339.9	0.00	60.3			6	27142.3	27081.3	0.22	17.7
		7	27900.6	27634.1	0.96	125.7			7	27900.6	27634.1	0.96	124.9			7	25483.4	25483.4	0.00	55.1			7	28742.7	28465.0	0.97	161.3
		8	27861.9	27640.8	0.79	550.2			8	27861.9	27591.7	0.97	770.0			8	24896.2	24831.3	0.26	49.7			8	28344.3	28246.5	0.34	28.6
		9	29890.0	29832.1	0.19	6.6			9	30123.8	29832.1	0.97	7.8			9	27572.1	27410.7	0.59	33.9			9	30377.8	30086.1	0.96	28.5
		10	26465.7	26312.3	0.58	5.4			10	26465.7	26312.3	0.58	6.3			10	24179.3	24179.3	0.00	80.5			10	27967.3	27916.8	0.18	15.1
20	6	1	27568.6	27433.5	0.49	12.9	20	7	1	27563.6	27433.5	0.47	12.2	20	10	1	26126.3	25969.9	0.60	39.5	20	∞	1	25257.1	24937.7	1.26	818.6
		2	26743.3	26650.0	0.35	13.9			2	26827.3	26650.0	0.66	15.5			2	24719.5	24585.6	0.54	43.7			2	23941.9	23415.2	2.20	6550.5
		3	27999.6	27756.8	0.87	158.1			3	27999.6	27748.9	0.90	72.5			3	26439.1	26182.7	0.97	119.5			3	25575.8	25120.1	1.78	2100.9
		4	29221.0	28970.6	0.86	17.0			4	29221.0	28970.6	0.86	16.0			4	27514.3	27314.6	0.73	56.0			4	26836.5	26383.7	1.69	1213.8
		5	28922.0	28921.4	0.00	26.4			5	28922.0	28921.4	0.00	25.7			5	27403.1	27149.9	0.92	65.4			5	26742.3	26188.0	2.07	2190.3
		6	27142.3	27081.3	0.22	15.8			6	27147.9	27081.3	0.25	14.3			6	25980.7	25752.0	0.88	372.5			6	24890.6	24584.3	1.23	7088.2
		7	28742.7	28465.0	0.97	143.3			7	28742.7	28465.0	0.97	148.2			7	27063.9	26901.0	0.60	129.6			7	26223.6	25765.5	1.75	1100.0
		8	28344.3	28246.5	0.34	27.4			8	28344.3	28246.5	0.34	32.3			8	26214.1	26087.4	0.48	62.4			8	25697.2	25172.7	2.04	4297.1
		9	30366.5	30086.1	0.92	24.5			9	30366.5	30086.1	0.92	21.5			9	28689.2	28522.0	0.58	38.1			9	28073.1	27584.4	1.74	3468.5
		10	27967.3	27916.8	0.18	15.9			10	27967.3	27916.8	0.18	13.5			10	26053.9	25921.8	0.51	161.2			10	25259.6	24791.9	1.85	6345.9
30	4	1	29008.7	28949.0	0.21	64.3	30	5	1	29008.7	28949.0	0.21	47.1	30	6	1	27040.4	26831.7	0.77	100.2	30	7	1	26661.4	26400.4	0.98	105.6
		2	28102.1	27992.5	0.39	66.6			2	28102.1	27992.5	0.39	59.8			2	26074.2	25852.3	0.85	176.5			2	25559.4	25360.6	0.78	112.5
		3	29582.2	29458.8	0.42	40.8			3	29582.2	29458.8	0.42	38.6			3	27151.6	27437.3	0.65	52.7			3	27158.3	26945.9	0.78	649.1
		4	30825.9	30768.3	0.19	48.0			4	30825.9	30768.3	0.19	42.7			4	28781.6	28502.5	0.97	190.6			4	28392.8	28137.4	0.90	1778.6
		5	30138.8	29924.4	0.71	48.1			5	30138.8	29924.4	0.71	45.5			5	28127.7	27857.0	0.96	58.7			5	27536.5	27402.6	0.49	84.8
		6	29504.7	29384.6	0.41	56.3			6	29504.7	29384.6	0.41	53.9			6	27551.7	27299.9	0.91	311.3			6	27045.0	26815.8	0.85	82.2
		7	30905.0	30821.6	0.27	47.8			7	30905.0	30821.6	0.27	42.7			7	28697.5	28449.6	0.86	162.6			7	28061.9	27942.9	0.42	97.4
		8	29890.8	29812.1	0.26	42.7			8	29890.8	29812.1	0.26	51.5			8	27860.9	27586.5	0.98	66.9			8	27289.6	27122.7	0.61	104.2
		9	32288.8	32210.4	0.24	46.5			9	32288.8	32209.5	0.25	48.6			9	30134.8	29868.6	0.88	140.1			9	29777.7	29502.1	0.93	105.8
		10	29422.8	29285.4	0.47	47.2			10	29422.8	29285.4	0.47	44.4			10	27018.0	26839.5	0.66	193.8			10	26637.7	26396.5	0.91	2215.4
30	10	1	25888.1	25756.2	0.51	838.4	30	∞	1	25697.5	24922.9	3.01	7200.0	40	3	1	29698.5	29653.2	0.15	86.6	40	4	1	28078.0	27956.5	0.43	82.3
		2	24869.1	24643.9	0.91	1302.6			2	24660.7	23830.8	3.37	7200.0			2	28889.0	28702.7	0.64	58.2			2	26983.1	26793.3	0.70	84.6
		3	26577.0	26347.1	0.87	1109.2			3	26201.9	25380.3	3.14	7200.0			3	31245.4	31125.9	0.38	92.1			3	29089.0	28930.6	0.54	74.7
		4	27879.6	27558.7	1.15	7123.6			4	27428.6	26611.7	2.98	7200.0			4	31936.5	31772.1	0.51	60.3			4	29712.9	29458.6	0.86	78.7
		5	27078.0	26793.1	1.05	7123.1			5	26504.8	25896.5	2.30	7200.0			5	31539.4	31418.4	0.38	75.2			5	29985.0	29815.9	0.56	78.0

Table OA.9 (continued)

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
	3	26691.6	25928.4	2.86	7200.0																						
	4	27750.0	27675.1	0.27	7200.0																						
	5	27928.8	27439.9	1.75	7200.0																						
	6	26551.8	25991.2	2.11	7200.0																						
	7	27539.2	26911.4	2.28	7167.7																						
	8	26705.9	25937.8	2.88	7200.0																						
	9	29374.2	28750.8	2.12	7157.8																						
	10	25619.1	25365.2	0.99	7200.0																						

Table OA.10: Per-instance results of the exact BCP algorithm on the $n_c = 100$ instances with $\tau = 9$ minutes.

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
15	7	1	27607.8	27334.5	0.99	505.9	15	10	1	27607.8	27428.0	0.65	905.4	15	∞	1	24760.8	24737.1	0.10	528.6	20	5	1	28548.0	28496.7	0.18	10.5
		2	26857.7	26603.0	0.95	408.6			2	26857.7	26595.0	0.98	337.9			2	23787.3	23697.7	0.38	412.5			2	27645.2	27636.9	0.03	10.3
		3	28639.7	28459.4	0.63	4.2			3	28650.4	28459.4	0.67	3.8			3	25939.8	25540.9	1.54	7123.9			3	28963.7	28866.0	0.34	20.7
		4	29709.5	29413.3	1.00	82.0			4	29709.5	29421.2	0.97	152.2			4	26493.7	26493.7	0.00	473.2			4	30126.2	30082.0	0.15	8.9
		5	29279.4	29002.7	0.95	122.4			5	29279.4	29002.7	0.95	135.1			5	26345.1	26155.5	0.72	639.2			5	30062.6	29923.2	0.46	17.6
		6	27810.0	27539.7	0.97	437.3			6	27810.0	27539.7	0.97	414.4			6	24810.2	24810.2	0.00	463.0			6	28470.3	28470.3	0.00	10.4
		7	28862.1	28648.3	0.74	1024.7			7	28862.1	28648.3	0.74	960.2			7	26051.8	26003.6	0.18	326.7			7	29556.9	29383.2	0.59	19.6
		8	28776.5	28490.0	1.00	150.8			8	28776.5	28490.0	1.00	154.3			8	25373.2	25305.1	0.27	371.7			8	29123.9	29105.6	0.06	24.2
		9	30670.6	30653.7	0.06	5.0			9	30670.6	30653.7	0.06	7.1			9	28199.8	27918.3	1.00	7084.4			9	31209.4	31209.4	0.00	18.4
		10	27514.5	27250.8	0.96	84.4			10	27514.5	27250.8	0.96	90.5			10	25177.2	24704.6	1.88	7094.4			10	28923.0	28820.1	0.36	19.0
20	6	1	28548.0	28496.7	0.18	9.1	20	7	1	28548.0	28496.7	0.18	10.1	20	10	1	26840.2	26660.4	0.67	74.4	20	∞	1	26038.6	25554.0	1.86	3225.4
		2	27645.2	27636.9	0.03	12.3			2	27645.2	27636.9	0.03	10.7			2	25535.0	25282.3	0.99	105.9			2	24720.2	23985.0	2.97	7112.8
		3	28963.7	28866.0	0.34	24.9			3	28963.7	28866.0	0.34	23.1			3	27030.6	26897.6	0.49	330.6			3	26222.1	25700.1	1.99	7100.7
		4	30126.2	30082.0	0.15	9.3			4	30135.8	30082.0	0.18	10.0			4	28329.5	28072.9	0.91	127.6			4	27631.7	27007.9	2.26	6820.0
		5	30062.6	29923.2	0.46	18.1			5	30082.6	29923.2	0.53	16.8			5	27996.7	27851.6	0.52	66.7			5	27158.3	26788.7	1.36	1092.0
		6	28470.3	28470.3	0.00	10.3			6	28470.3	28470.3	0.00	10.7			6	26747.7	26585.2	0.61	49.7			6	25754.4	25183.2	2.22	7064.6
		7	29556.9	29383.2	0.59	18.0			7	29556.9	29383.2	0.59	19.9			7	27678.7	27533.4	0.53	120.7			7	27002.5	26338.3	2.46	7087.5
		8	29123.9	29105.6	0.06	15.9			8	29123.9	29105.6	0.06	21.0			8	26969.9	26727.3	0.90	62.9			8	26473.3	25756.1	2.71	7087.2
		9	31209.4	31209.4	0.00	13.5			9	31209.4	31209.4	0.00	14.1			9	29384.7	29107.1	0.94	39.9			9	28729.9	28149.1	2.02	4489.5
		10	28923.0	28819.9	0.36	15.4			10	28923.0	28820.1	0.36	22.5			10	26663.9	26429.9	0.88	54.4			10	25876.3	25350.2	2.03	3677.0
30	4	1	30319.8	30222.7	0.32	44.6	30	5	1	30319.8	30224.3	0.32	53.0	30	6	1	28000.8	27863.6	0.49	92.0	30	7	1	27431.3	27263.0	0.61	95.0
		2	30124.2	30121.9	0.01	47.7			2	30124.2	30121.9	0.01	46.1			2	27080.1	26880.5	0.74	86.1			2	26431.6	26214.4	0.82	541.0
		3	31043.9	30929.5	0.37	37.1			3	31028.1	30929.5	0.32	25.3			3	28523.6	28311.6	0.74	75.1			3	27961.8	27700.3	0.94	72.5
		4	32453.0	32296.7	0.48	37.9			4	32442.0	32296.7	0.45	38.3			4	29590.7	29332.7	0.87	110.7			4	29086.6	28923.2	0.56	72.6
		5	31760.3	31757.2	0.01	36.0			5	31760.3	31757.2	0.01	40.4			5	29024.4	28738.1	0.99	285.3			5	28351.2	28143.0	0.73	81.7
		6	30916.0	30860.0	0.18	46.7			6	30916.0	30860.0	0.18	52.2			6	28399.8	28160.7	0.84	72.2			6	27752.8	27624.2	0.46	79.2
		7	32708.4	32623.3	0.26	44.4			7	32708.4	32623.3	0.26	45.5			7	29545.6	29404.6	0.48	78.5			7	29112.9	28947.3	0.57	96.4
		8	31256.7	31234.7	0.07	37.7			8	31256.7	31234.7	0.07	36.9			8	28865.0	28708.8	0.54	47.7			8	28177.5	27965.6	0.75	76.5
		9	33844.9	33843.2	0.01	46.5			9	33844.9	33843.2	0.01	54.1			9	31005.5	30730.6	0.89	70.7			9	30566.0	30347.7	0.71	189.2
		10	31382.8	31295.9	0.28	50.3			10	31382.8	31295.9	0.28	48.5			10	28128.2	27869.0	0.92	1100.5			10	27467.5	27266.7	0.73	174.6
30	10	1	26847.9	26654.6	0.72	4982.1	30	∞	1	26598.0	26044.9	2.08	7200.0	40	3	1	32036.5	32011.5	0.08	59.7	40	4	1	29595.9	29449.7	0.49	96.3
		2	25608.1	25448.3	0.62	3981.0			2	25801.0	24969.1	3.22	7200.0			2	31468.1	31315.4	0.49	54.8			2	28609.9	28470.4	0.49	57.7
		3	27351.9	27114.1	0.87	126.4			3	27112.0	26560.8	2.03	7200.0			3	33535.0	33535.0	0.00	55.6			3	30613.4	30433.5	0.59	78.5
		4	28613.3	28352.4	0.91	1497.4			4	28046.4	27251.9	2.83	7200.0			4	33765.0	33726.7	0.11	73.1			4	31295.2	31139.3	0.50	84.0
		5	27723.7	27492.4	0.83	2181.5			5	27438.1	26592.2	3.08	7200.0			5	33589.7	33539.7	0.15	88.6			5	31857.3	31585.0	0.85	201.0
		6	27303.2	27070.3	0.85	7100.1			6	26811.6	26120.2	2.58	7200.0			6	32691.5	32625.5	0.20	56.9			6	30203.7	30032.5	0.57	67.6
		7	28291.4	28107.4	0.65	7087.1			7	28418.1	27461.5	3.37	7200.0			7	34472.4	34367.7	0.30	78.6			7	32213.3	31976.6	0.73	78.0
		8	27541.0	27320.6	0.80	285.0			8	27303.1	26814.7	1.79	7200.0			8	33183.7	33152.5	0.09	68.3			8	30620.7	30390.9	0.75	1369.7
		9	30032.9	29737.9	0.98	1499.7			9	29774.3	28675.2	3.69	7200.0			9	34853.0	34849.8	0.01	44.7			9	32987.9	32814.1	0.53	70.0
		10	26816.9	26585.1	0.86	424.4			10	26283.5	25524.1	2.89	7200.0			10	33021.6	32975.4	0.14	59.2			10	30234.0	30027.0	0.68	80.6
40	5	1	28528.3	28268.7	0.91	2552.7	40	6	1	27860.1	27646.6	0.77	1265.4	40	7	1	27407.5	27171.7	0.86	967.0	40	10	1	27293.6	26861.9	1.58	7200.0
		2	27066.8	26800.7	0.98	475.1			2	26400.7	26146.0	0.96	7180.6			2	25867.7	25613.5	0.98	1337.9			2	25651.0	25263.7	1.51	7200.0
		3	29061.6	28829.9	0.80	482.7			3	28125.5	27908.4	0.77	2118.7			3	27763.6	27472.8	1.05	7200.0			3	27431.8	27063.3	1.34	7200.0
		4	30352.8	30055.0	0.98	1027.7			4	29622.4	29342.3	0.95	332.4			4	29371.7	29091.9	0.95	3199.1			4	29001.0	28737.7	0.91	2445.4
		5	30096.1	29804.3	0.97	1982.3			5	29411.3	29131.8	0.95	7160.8			5	29041.0	28751.9	1.00	1903.5			5	28810.5	28412.5	1.38	7200.0
		6	28661.3	28386.9	0.96	125.0			6	28208.5	27991.1	0.77	2782.8			6	27774.5	27449.9	1.17	7200.0			6	27413.4	27037.9	1.37	7200.0
		7	30585.0	30289.0	0.97	273.7			7	29891.2	29604.1	0.96	1121.2			7	29321.4	29054.1	0.91	7116.0			7	27868.5	27454.1	0.81	3263.4
		8	29216.5	28974.7	0.83	188.2			8	28474.6	28195.2	0.98	3630.3			8	28041.1	27757.5	1.01	7200.0			8	27789.8	27410.3	1.37	7200.0
		9	31792.7	31498.6	0.93	99.9			9	31303.7	31023.2	0.90	458.7			9	30896.3	30598.0	0.97	792.7			9	30586.7	30228.7	1.17	7200.0
		10	28759.1	28499.1	0.90	248.6			10	28095.1	27860.5	0.83	7200.0			10	27546.3	27269.9	1.00	7200.0			10	27098.7	26854.3	0.90	2401.3
40	∞	1	27403.9	26567.8	3.05	7200.0																					
		2	25340.2	24619.8	2.84	7200.0																					

Table OA.11: Per-instance results of the exact BCP algorithm on the $n_c = 100$ instances with $\tau = 15$ minutes.

n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT	n	K	Inst	UB	LB	Gap	RT
15	7	1	29241.3	29110.7	0.45	452.9	15	10	1	29241.3	29110.7	0.45	467.9	15	∞	1	26225.7	25644.0	2.22	7088.3	20	5	1	30951.5	30869.3	0.27	7.2
		2	28435.7	28231.2	0.72	236.2			2	28435.7	28231.2	0.72	240.9			2	25563.7	24554.6	3.95	127.0			2	30557.0	30527.1	0.10	9.4
		3	30579.5	30333.6	0.80	508.8			3	30579.5	30333.6	0.80	540.6			3	26609.9	26374.3	0.89	464.9			3	31238.1	31218.8	0.06	17.8
		4	31349.0	31066.0	0.90	61.6			4	31349.0	31062.3	0.91	65.3			4	27755.1	27456.3	1.08	7082.3			4	32574.5	32562.5	0.04	7.8
		5	31104.9	30833.8	0.87	367.4			5	31104.9	30833.8	0.87	363.8			5	27360.8	27056.3	1.11	7090.3			5	32593.3	32572.7	0.06	19.7
		6	30108.1	29862.5	0.82	401.1			6	30108.1	29862.5	0.82	381.0			6	26020.4	25761.3	1.00	1403.1			6	31131.0	31131.0	0.00	7.8
		7	30860.1	30799.3	0.20	449.3			7	30860.1	30799.3	0.20	450.0			7	27021.8	26940.7	0.30	343.2			7	31732.8	31732.8	0.00	6.2
		8	30251.6	29984.2	0.88	598.9			8	30251.6	29984.2	0.88	584.7			8	26191.1	26184.3	0.03	1858.2			8	31864.4	31746.2	0.37	19.2
		9	32900.3	32590.1	0.94	927.5			9	32900.3	32592.8	0.93	907.3			9	29602.5	28730.2	2.95	84.1			9	33491.0	33465.6	0.08	11.0
		10	29176.6	28962.1	0.74	594.9			10	29176.6	28962.1	0.74	525.6			10	26488.5	25499.1	3.74	54.7			10	31388.1	31274.3	0.36	14.4
20	6	1	30951.5	30869.3	0.27	7.7	20	7	1	30951.5	30869.3	0.27	7.6	20	10	1	27979.5	27722.2	0.92	2014.4	20	∞	1	27363.2	26634.6	2.66	7086.1
		2	30557.0	30527.1	0.10	12.0			2	30557.0	30527.1	0.10	10.1			2	26571.1	26272.8	1.12	7089.2			2	25740.0	25016.2	2.81	7114.2
		3	31238.1	31218.8	0.06	13.2			3	31238.1	31218.8	0.06	12.2			3	28261.7	27992.1	0.95	1057.2			3	27373.5	26735.3	2.33	7090.6
		4	32649.7	32562.5	0.27	8.4			4	32649.7	32562.5	0.27	12.6			4	29330.8	29131.8	0.68	39.7			4	28830.0	28088.7	2.57	7114.5
		5	32593.3	32572.7	0.06	20.1			5	32593.3	32572.7	0.06	21.9			5	29116.5	28829.6	0.99	117.3			5	29210.4	29100.0	0.45	1992.6
		6	31131.0	31131.0	0.00	8.5			6	31131.0	31131.0	0.00	11.9			6	27762.0	27484.4	1.00	104.5			6	27891.6	26315.0	5.65	4840.7
		7	31732.8	31732.8	0.00	13.8			7	31732.8	31732.8	0.00	8.4			7	28854.7	28632.8	0.77	52.0			7	27530.9	27056.3	1.72	3463.5
		8	31864.4	31746.2	0.37	24.1			8	31864.4	31746.2	0.37	21.7			8	28180.3	27944.2	0.84	7113.7			8	26940.2	26085.1	3.17	2466.1
		9	33491.0	33465.6	0.08	12.6			9	33491.0	33465.6	0.08	13.6			9	30510.2	30205.2	1.00	49.5			9	29330.6	28314.5	3.46	7096.0
		10	31388.1	31274.3	0.36	15.0			10	31388.1	31274.3	0.36	9.4			10	27906.2	27646.0	0.93	1308.4			10	26547.8	25943.1	5.67	7130.8
30	4	1	34699.7	34604.0	0.28	38.5	30	5	1	34699.7	34604.0	0.28	47.5	30	6	1	29622.6	29581.5	0.14	137.0	30	7	1	29106.9	28889.9	0.75	180.1
		2	34404.7	34383.2	0.06	60.9			2	34404.7	34383.2	0.06	63.5			2	27978.9	28518.3	0.93	517.8			2	27978.6	27850.7	0.46	69.0
		3	34837.1	34837.1	0.00	29.5			3	34837.1	34837.1	0.00	37.3			3	30664.9	30373.3	0.95	1209.5			3	29698.8	29448.4	0.84	58.8
		4	35908.5	35776.1	0.37	39.9			4	35908.5	35776.1	0.37	42.2			4	31472.3	31260.3	0.67	65.5			4	30738.7	30518.3	0.72	98.1
		5	36117.2	35978.1	0.39	42.6			5	36066.4	35978.1	0.24	41.4			5	31171.2	30932.8	0.76	68.1			5	30009.9	29858.6	0.50	91.6
		6	34443.2	34415.9	0.08	44.7			6	34443.2	34415.9	0.08	44.0			6	30119.7	29921.9	0.66	53.6			6	29423.5	29298.1	0.43	71.0
		7	36697.9	36621.5	0.21	46.9			7	36697.9	36621.5	0.21	50.7			7	31611.2	31316.3	0.93	7091.4			7	30951.6	30801.6	0.48	111.1
		8	35591.1	35546.8	0.12	36.0			8	35591.1	35546.8	0.12	40.6			8	31192.0	30880.2	1.00	147.0			8	29965.8	29690.3	0.92	182.6
		9	36034.7	36034.7	0.00	46.0			9	36034.7	36034.7	0.00	50.3			9	32810.4	32567.2	0.74	111.5			9	32068.5	31869.1	0.62	181.7
		10	34593.3	34587.1	0.02	44.4			10	34593.3	34587.1	0.02	44.5			10	30021.4	29815.2	0.69	156.5			10	29363.7	29107.5	0.87	153.4
30	10	1	27994.7	27816.6	0.64	249.2	30	∞	1	27041.4	26294.4	2.76	7149.7	40	3	1	37015.7	36965.6	0.14	53.7	40	4	1	32958.0	32835.4	0.37	89.0
		2	26912.1	26685.4	0.84	179.4			2	25968.9	25019.4	3.66	7095.0			2	36440.7	36280.9	0.44	53.8			2	32320.1	32206.5	0.35	62.8
		3	28475.9	28226.1	0.88	130.0			3	28278.4	27533.6	2.63	7200.0			3	38036.5	37990.6	0.12	54.4			3	33397.2	33198.2	0.60	74.3
		4	29885.2	29597.3	0.96	435.8			4	28791.0	28015.6	2.69	7081.4			4	39118.9	39083.8	0.09	98.3			4	34839.2	34651.1	0.54	304.3
		5	29105.5	28900.0	0.71	361.4			5	28346.0	27954.8	1.38	7200.0			5	38966.6	38932.7	0.09	55.0			5	35125.9	34961.9	0.47	93.4
		6	28674.7	28439.1	0.82	548.5			6	28301.5	27532.9	2.72	7200.0			6	37037.1	36999.3	0.10	57.3			6	33378.3	33294.5	0.25	70.0
		7	29586.3	29298.8	0.97	311.1			7	28282.9	27914.5	1.30	7106.9			7	39070.6	38969.7	0.26	71.2			7	35158.3	35048.8	0.31	90.3
		8	29040.2	28760.5	0.96	278.3			8	27756.3	27015.3	2.67	7106.1			8	38055.0	38055.0	0.00	69.5			8	33374.4	33190.3	0.55	141.3
		9	31242.2	31000.0	0.78	429.8			9	30311.2	29416.3	2.95	7191.0			9	39806.6	39769.2	0.09	60.5			9	35875.4	35676.5	0.55	86.2
		10	28217.0	27871.0	1.23	7200.0			10	27015.9	26827.3	0.70	7200.0			10	38040.9	37990.5	0.13	53.0			10	33748.3	33606.5	0.42	62.6
40	5	1	30665.2	30450.3	0.70	173.6	40	6	1	29833.4	29555.2	0.93	7200.0	40	7	1	29197.7	28842.5	1.22	7169.5	40	10	1	28607.5	28188.4	1.46	7200.0
		2	29328.4	29163.9	0.56	92.1			2	28414.9	28135.7	0.98	7159.1			2	27555.5	27295.7	0.94	7122.6			2	26630.3	26363.4	1.00	7200.0
		3	31369.3	31142.6	0.72	129.4			3	30340.1	30045.8	0.97	7200.0			3	29513.6	29239.9	0.93	1043.7			3	28650.8	28305.2	1.21	7200.0
		4	32564.1	32295.0	0.83	251.1			4	31245.9	31018.9	0.73	7134.4			4	30828.7	30643.7	0.60	2841.4			4	30610.4	30172.0	1.43	7200.0
		5	32407.2	32158.5	0.77	120.5			5	31259.3	30947.2	1.00	2879.9			5	30739.6	30384.6	1.15	7200.0			5	30597.4	29800.3	2.61	7200.0
		6	31060.4	30858.3	0.65	93.2			6	30138.4	29847.7	0.96	1454.0			6	29297.3	29006.4	0.99	2420.5			6	28834.4	28305.0	1.84	7200.0
		7	32883.6	32609.9	0.83	152.8			7	31917.3	31599.4	1.00	1580.8			7	30987.8	30684.7	0.98	5182.2			7	30345.7	29592.2	1.48	7200.0
		8	31266.7	31019.7	0.79	257.8			8	30309.5	30022.3	0.95	784.9			8	29840.8	29456.7	1.29	7192.2			8	29245.9	28707.6	1.84	7200.0
		9	33994.3	33790.8	0.60	75.5			9	33239.9	32918.4	0.97	3587.7			9	32612.5	32266.8	1.06	7133.4			9	32257.2	31714.1	1.68	7200.0
		10	31239.1	30927.8	1.00	2875.1			10	30154.8	29850.1	1.01	7200.0			10	29373.2	29034.7	1.15	7200.0			10	28459.9	28116.7	1.21	7200.0
40	∞	1	28691.5	27848.5	2.94	7200.0																					
		2	25925.3	25486.3	1.69																						