E-Companion

In this Online Supplement, Section EC.1 explains how a tight lower bound on the fleet size can be computed for the BMCVRP. Instance-by-instance results are listed in Section EC.2.

EC.1. Computation of a Fleet-Size Lower Bound

We comment on the computation of a tight lower bound $F^\star_{LB}$ for the minimal size of the vehicle fleet. For the case of identical compartments, i.e., $Q_1 = Q_2 = \cdots = Q_m = Q/m$, we can compute such an exact lower bound by solving a bin-packing or cutting-stock problem with bins of capacity Q/m and demands $(d_i)_{i\in N}$. The computed number z_{BP} of bins can then be divided by m and rounded up to the next integer, i.e.,

$$F^\star_{LB} = \left\lceil \frac{z_{BP}}{m} \right\rceil .$$

For the case of compartments of different size, the following approach yields the exact lower bound. Let $\bar{K} \subset K$ be an index set (not unique) of all different capacity values, i.e., $\{Q_k : k \in \bar{K}\} = \{Q_k : k \in K\}$ and $Q_k \neq Q_{k'}$ for all $k, k' \in \bar{K}$ with $k \neq k'$. Further, let h_k denote the frequency, i.e., the number of compartments of size Q_k for all $k \in \bar{K}$, i.e., $h_k = |\{k' \in K : Q_k = Q_{k'}\}|$. For example, $(Q_1, Q_2, \ldots, Q_6) = (50, 50, 30, 20, 20, 20)$ has frequencies $2, 1$, and 3 with $k \in \bar{K} = \{1, 3, 4\}$. Likewise, let $\bar{N}$ be an index set (not unique) of all different demand values occurring with frequencies b_i for $i \in \bar{N}$.

The model that we suggest uses copies of the arc-flow formulation of the *cutting-stock problem* (CSP) (Valerió de Carvalho 1998), more specifically one copy for each compartment size given by $k \in \bar{K}$. Recall that the arc-flow formulation of the CSP uses a digraph in which each feasible pattern is in one-to-one correspondence to a source-to-sink path in the digraph. Hence, a source-to-sink flow through the digraph represents a solution to the CSP if sufficient flow passes through each subset of arcs that corresponds to a specific demand value b_i for all $i \in \bar{N}$.

Let $D^k = (V^k, A^k)$ be the digraph for the index $k \in \bar{K}$ with source vertex o^k and sink vertex d^k. The subset of arcs corresponding to the demand d_i for $i \in \bar{N}$ is denoted by $A^k(i)$. There are non-negative integer flow variables $\mathbf{x}^k = (x^k_{hj})_{(h,j)\in A^k}$. The non-negative integer

variables z^k for $k \in \bar{K}$ indicate the total flow through the network D^k. Finally, the variable z provides the objective value. The model is:

$$F^\star_{LB} = \quad \min \quad z \tag{EC.1a}$$

$$\text{subject to} \quad h^k z \geq z^k \qquad \forall k \in \bar{K} \tag{EC.1b}$$

$$\sum_{h\,:\,(h,i)\in A} x^k_{hi} - \sum_{j\,:\,(i,j)\in A} x^k_{ij} = \begin{cases} +z^k, \text{ if } i = o^k \\ -z^k, \text{ if } i = d^k \\ 0, \quad \text{otherwise} \end{cases} \qquad \forall k \in \bar{K}, i \in \bar{N} \tag{EC.1c}$$

$$\sum_{k\in\bar{K}} \sum_{(h,j)\in A^k(i)} x^k_{hj} \geq b_i \qquad \forall i \in \bar{N} \tag{EC.1d}$$

$$x^k_{hj} \geq 0 \text{ and integer} \qquad \forall k \in \bar{K}, (h,j) \in A^k \tag{EC.1e}$$

$$z, z^k \geq 0 \qquad \forall k \in \bar{K}. \tag{EC.1f}$$

The objective (EC.1a) minimizes the total number of packings covering the entire demand. Constraints (EC.1b) couple the objective value with the total flow through each network D^k for $k \in \bar{K}$. Due to the inequality, empty compartments without any assigned demand are possible. Hence, no additional loss arcs must be added to the network to allow empty compartments. Flow conservation and the coupling with the z^k-variables is accomplished via constraints (EC.1c). The demand covering constraints (EC.1d) differ from those of the original CSP because they refer to all networks D^k for $k \in \bar{K}$ together. The domains of the variables are stated in (EC.1e) and (EC.1f).

Example EC.1. Consider an instance of the BMCVRP in which vehicles have $m = 2$ compartments of size $\mathbf{Q} = (11, 7)$ so that the total vehicle capacity is $Q = 18$. The customers $N = \{1, 2, \ldots, 14\}$ have demands $d_1 = \cdots = d_4 = 8$ and $d_5 = \cdots = d_{14} = 4$. The total demand is $4 \cdot 8 + 10 \cdot 4 = 72$.

The trivial lower bound of the fleet size is $\lceil 72/18 \rceil = 4$. The bin-packing bound, which is the exact lower bound on the number of vehicles for the capacitated VRP, is 5, because every feasible packing into bins of size $Q = 18$ gives a loss of at least 2 units and any greedy

packing produces a solution with 5 bins. Finally, model (EC.1) provides the exact lower bound $F^{\star}_{LB} = 6$. Note that four compartments of size $Q_1 = 11$ are exclusively occupied with the first four demands $d_1 = \cdots = d_4 = 8$. The other ten demands $d_5 = \cdots = d_{14} = 4$ either occupy a second compartment of size $Q_2 = 7$ or two of them can be packed together into the first compartment of size $Q_1 = 11$. A possible solution therefore consists of four packings $(8, 4)$ and two packings $(4+4, 4)$. □

Note that also refined pseudo-polynomial formulations for the CSP and bin-packing problem can be used (Delorme and Iori 2020, provide an overview). Since the computation of the lower bound is not time-critical in our application, we retain the simple model and hereby keep the description clear.

EC.2. Detailed Computational Results

The entries in Table EC.1 have the following meaning:

- No.: number of the instance;
- $|V|$: number of vertices;
- Q: total capacity;
- m: number of compartments;
- **Q**: capacity vector;
- opt: an asterisk * indicates if the respective algorithm could solve the instance to proven optimality within 1 hour of computation time;
- UB: upper bound;
- LB_{tree}: lower bound when reaching the time limit of 1 hour;
- LB_{LP}: linear relaxation lower bound;
- LB_{cut}: linear relaxation lower bound of restricted master problem with cutting planes;
- gap: percentage optimality gap $100 \cdot (UB - LB_{\text{tree}})/LB_{\text{tree}}$ at termination;
- time: computation time in seconds; TL indicates that the time limit of 1 hour was reached;
- #BaB: number of solved branch-and-bound nodes;
- #CC: number of capacity cuts added;
- #SRI: number of subset-row inequalities added.

Table EC.1: Detailed results for all instances solved by labeling with partial dominance.

No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
1	10	120	2	(60, 60)	*	408.3	408.3	344.1	408.3	0.0	0.5	1	300	6
2	10	120	2	(40, 80)	*	408.3	408.3	344.1	408.3	0.0	0.4	1	300	6
3	10	120	3	(40, 40, 40)	*	408.3	408.3	344.1	408.3	0.0	0.4	1	300	6
4	10	120	3	(20, 40, 60)	*	408.3	408.3	344.1	408.3	0.0	0.4	1	300	6
5	10	120	4	(30, 30, 30, 30)	*	408.3	408.3	358.4	408.3	0.0	0.4	1	300	6
6	10	120	4	(10, 15, 30, 65)	*	408.3	408.3	349.9	408.3	0.0	0.1	1	19	0
7	10	120	2	(60, 60)	*	361.3	361.3	331.6	361.3	0.0	0.1	1	20	0
8	10	120	2	(40, 80)	*	361.3	361.3	331.6	361.3	0.0	0.1	1	19	0
9	10	120	3	(40, 40, 40)	*	361.3	361.3	332.1	361.3	0.0	<0.1	1	16	0
10	10	120	3	(20, 40, 60)	*	361.3	361.3	331.6	361.3	0.0	0.1	1	19	0
11	10	120	4	(30, 30, 30, 30)	*	361.3	361.3	342.9	361.3	0.0	<0.1	1	13	0
12	10	120	4	(10, 15, 30, 65)	*	361.3	361.3	342.9	361.3	0.0	0.1	1	13	0
13	10	120	2	(60, 60)	*	300.0	300.0	300.0	300.0	0.0	0.1	1	0	0
14	10	120	2	(40, 80)	*	300.0	300.0	300.0	300.0	0.0	0.1	1	0	0
15	10	120	3	(40, 40, 40)	*	300.0	300.0	300.0	300.0	0.0	<0.1	1	0	0
16	10	120	3	(20, 40, 60)	*	300.0	300.0	300.0	300.0	0.0	<0.1	1	0	0
17	10	120	4	(30, 30, 30, 30)	*	300.0	300.0	300.0	300.0	0.0	0.1	1	0	0
18	10	120	4	(10, 15, 30, 65)	*	300.0	300.0	300.0	300.0	0.0	0.1	1	0	0
19	10	120	2	(60, 60)	*	299.2	299.2	292.1	299.2	0.0	0.1	1	22	0
20	10	120	2	(40, 80)	*	299.2	299.2	292.1	299.2	0.0	0.1	1	22	0
21	10	120	3	(40, 40, 40)	*	321.7	321.7	310.7	321.7	0.0	0.3	1	300	9
22	10	120	3	(20, 40, 60)	*	299.2	299.2	292.1	299.2	0.0	0.1	1	23	0
23	10	120	4	(30, 30, 30, 30)	*	306.8	306.8	299.8	306.8	0.0	<0.1	1	21	0
24	10	120	4	(10, 15, 30, 65)	*	299.2	299.2	292.1	299.2	0.0	0.1	1	25	0
25	10	120	2	(60, 60)	*	374.3	374.3	364.5	374.3	0.0	0.1	1	17	0
26	10	120	2	(40, 80)	*	374.3	374.3	361.8	374.3	0.0	0.1	1	35	0
27	10	120	3	(40, 40, 40)	*	407.5	407.5	407.5	407.5	0.0	<0.1	1	0	0
28	10	120	3	(20, 40, 60)	*	374.3	374.3	374.3	374.3	0.0	<0.1	1	0	0
29	10	120	4	(30, 30, 30, 30)	*	385.8	385.8	385.8	385.8	0.0	<0.1	1	0	0
30	10	120	4	(10, 15, 30, 65)	*	407.5	407.5	407.5	407.5	0.0	<0.1	1	0	0
31	10	240	2	(120, 120)	*	336.4	336.4	336.4	336.4	0.0	0.1	1	0	0
32	10	240	2	(80, 160)	*	336.4	336.4	336.4	336.4	0.0	0.1	1	0	0
33	10	240	3	(80, 80, 80)	*	336.4	336.4	336.4	336.4	0.0	0.1	1	0	0
34	10	240	3	(40, 80, 120)	*	336.4	336.4	336.4	336.4	0.0	0.1	1	0	0
35	10	240	4	(60, 60, 60, 60)	*	336.4	336.4	336.4	336.4	0.0	0.1	1	0	0
36	10	240	4	(20, 30, 60, 130)	*	336.4	336.4	336.4	336.4	0.0	1.0	1	0	0
37	10	240	2	(120, 120)	*	310.5	310.5	310.5	310.5	0.0	0.1	1	0	0
38	10	240	2	(80, 160)	*	310.5	310.5	310.5	310.5	0.0	0.1	1	0	0
39	10	240	3	(80, 80, 80)	*	310.5	310.5	310.5	310.5	0.0	<0.1	1	0	0
40	10	240	3	(40, 80, 120)	*	310.5	310.5	310.5	310.5	0.0	0.1	1	0	0
41	10	240	4	(60, 60, 60, 60)	*	310.5	310.5	310.5	310.5	0.0	<0.1	1	0	0
42	10	240	4	(20, 30, 60, 130)	*	310.5	310.5	310.5	310.5	0.0	0.4	1	0	0
43	10	240	2	(120, 120)	*	279.9	279.9	279.9	279.9	0.0	0.1	1	0	0
44	10	240	2	(80, 160)	*	279.9	279.9	279.9	279.9	0.0	0.1	1	0	0
45	10	240	3	(80, 80, 80)	*	279.9	279.9	279.9	279.9	0.0	<0.1	1	0	0
46	10	240	3	(40, 80, 120)	*	279.9	279.9	279.9	279.9	0.0	0.1	1	0	0
47	10	240	4	(60, 60, 60, 60)	*	279.9	279.9	279.9	279.9	0.0	0.1	1	0	0
48	10	240	4	(20, 30, 60, 130)	*	279.9	279.9	279.9	279.9	0.0	0.4	1	0	0
49	10	240	2	(120, 120)	*	269.2	269.2	269.2	269.2	0.0	0.1	1	0	0
50	10	240	2	(80, 160)	*	269.2	269.2	269.2	269.2	0.0	0.1	1	0	0
51	10	240	3	(80, 80, 80)	*	269.2	269.2	269.2	269.2	0.0	<0.1	1	0	0
52	10	240	3	(40, 80, 120)	*	269.2	269.2	269.2	269.2	0.0	0.1	1	0	0
53	10	240	4	(60, 60, 60, 60)	*	269.2	269.2	269.2	269.2	0.0	<0.1	1	0	0
54	10	240	4	(20, 30, 60, 130)	*	269.2	269.2	269.2	269.2	0.0	0.1	1	0	0
55	10	240	2	(120, 120)	*	257.8	257.8	257.8	257.8	0.0	0.1	1	0	0
56	10	240	2	(80, 160)	*	257.8	257.8	257.8	257.8	0.0	0.1	1	0	0
57	10	240	3	(80, 80, 80)	*	257.8	257.8	257.8	257.8	0.0	<0.1	1	0	0
58	10	240	3	(40, 80, 120)	*	257.8	257.8	257.8	257.8	0.0	0.1	1	0	0
59	10	240	4	(60, 60, 60, 60)	*	257.8	257.8	257.8	257.8	0.0	<0.1	1	0	0
60	10	240	4	(20, 30, 60, 130)	*	257.8	257.8	257.8	257.8	0.0	0.3	1	0	0
61	20	120	2	(60, 60)	*	568.5	568.5	564.4	568.5	0.0	0.5	1	300	6
62	20	120	2	(40, 80)	*	568.5	568.5	564.4	568.5	0.0	0.5	1	300	6

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
63	20	120	3	(40, 40, 40)	*	654.9	654.9	653.1	654.9	0.0	0.5	1	300	2
64	20	120	3	(20, 40, 60)	*	613.6	613.6	609.7	613.6	0.0	0.6	1	300	9
65	20	120	4	(30, 30, 30, 30)	*	602.0	602.0	598.4	602.0	0.0	0.5	1	300	14
66	20	120	4	(10, 15, 30, 65)	*	621.6	621.6	621.2	621.6	0.0	0.9	1	300	10
67	20	120	2	(60, 60)	*	521.4	521.4	517.2	521.4	0.0	0.3	1	37	0
68	20	120	2	(40, 80)	*	521.4	521.4	517.2	521.4	0.0	0.3	1	34	0
69	20	120	3	(40, 40, 40)	*	538.2	538.2	536.2	538.2	0.0	0.5	1	120	0
70	20	120	3	(20, 40, 60)	*	538.2	538.2	528.7	538.2	0.0	1.8	1	300	18
71	20	120	4	(30, 30, 30, 30)	*	547.2	547.2	547.2	547.2	0.0	0.2	1	0	0
72	20	120	4	(10, 15, 30, 65)	*	538.2	538.2	538.2	538.2	0.0	0.9	1	0	0
73	20	120	2	(60, 60)	*	472.6	472.6	457.9	472.6	0.0	3.6	1	300	36
74	20	120	2	(40, 80)	*	472.6	472.6	470.3	472.6	0.0	2.5	1	300	10
75	20	120	3	(40, 40, 40)	*	481.2	481.2	475.1	481.2	0.0	6.1	1	300	10
76	20	120	3	(20, 40, 60)	*	472.6	472.6	470.3	472.6	0.0	16.0	1	300	10
77	20	120	4	(30, 30, 30, 30)	*	472.6	472.6	457.9	472.6	0.0	18.6	1	300	20
78	20	120	4	(10, 15, 30, 65)	*	472.6	472.6	470.3	472.6	0.0	60.8	1	300	10
79	20	120	2	(60, 60)	*	508.4	508.4	484.5	504.1	0.0	121.4	12	300	95
80	20	120	2	(40, 80)	*	508.4	508.4	493.0	504.2	0.0	80.9	7	300	113
81	20	120	3	(40, 40, 40)	*	528.3	528.3	518.2	528.2	0.0	8.6	2	300	77
82	20	120	3	(20, 40, 60)	*	508.4	508.4	493.0	508.4	0.0	2.7	1	160	0
83	20	120	4	(30, 30, 30, 30)	*	509.9	509.9	507.9	509.9	0.0	1.8	1	300	19
84	20	120	4	(10, 15, 30, 65)	*	528.3	528.3	518.2	527.9	0.0	63.0	2	300	75
85	20	120	2	(60, 60)	*	479.3	479.3	471.7	479.3	0.0	0.5	1	300	23
86	20	120	2	(40, 80)	*	479.3	479.3	471.7	479.3	0.0	0.5	1	300	20
87	20	120	3	(40, 40, 40)	*	487.3	487.3	481.1	487.3	0.0	0.6	1	300	9
88	20	120	3	(20, 40, 60)	*	479.3	479.3	473.6	479.3	0.0	0.5	1	61	0
89	20	120	4	(30, 30, 30, 30)	*	482.3	482.3	480.0	482.3	0.0	0.3	1	75	0
90	20	120	4	(10, 15, 30, 65)	*	493.6	493.6	491.2	493.6	0.0	7.5	1	300	22
91	20	240	2	(120, 120)	*	440.8	440.8	437.0	440.8	0.0	0.5	1	45	0
92	20	240	2	(80, 160)	*	440.8	440.8	437.0	440.8	0.0	0.5	1	52	0
93	20	240	3	(80, 80, 80)	*	440.8	440.8	437.0	440.8	0.0	5.2	1	43	0
94	20	240	3	(40, 80, 120)	*	440.8	440.8	437.0	440.8	0.0	7.8	1	43	0
95	20	240	4	(60, 60, 60, 60)	*	440.8	440.8	438.1	440.8	0.0	21.4	1	41	0
96	20	240	4	(20, 30, 60, 130)	*	440.8	440.8	437.9	440.8	0.0	166.6	1	44	0
97	20	240	2	(120, 120)	*	463.6	463.6	450.9	463.6	0.0	1.3	1	300	0
98	20	240	2	(80, 160)	*	463.6	463.6	450.9	463.6	0.0	1.0	1	196	0
99	20	240	3	(80, 80, 80)	*	463.6	463.6	451.1	463.6	0.0	5.9	1	300	10
100	20	240	3	(40, 80, 120)	*	463.6	463.6	450.9	463.6	0.0	8.3	1	156	0
101	20	240	4	(60, 60, 60, 60)	*	463.6	463.6	451.7	463.6	0.0	12.7	1	247	0
102	20	240	4	(20, 30, 60, 130)	*	463.6	463.6	451.1	463.6	0.0	154.9	1	214	0
103	20	240	2	(120, 120)	*	451.6	451.6	418.4	451.6	0.0	17.6	1	300	79
104	20	240	2	(80, 160)	*	451.6	451.6	418.4	451.6	0.0	3.0	1	300	32
105	20	240	3	(80, 80, 80)	*	451.6	451.6	418.4	451.6	0.0	14.1	1	300	9
106	20	240	3	(40, 80, 120)	*	451.6	451.6	418.4	451.6	0.0	33.5	1	300	30
107	20	240	4	(60, 60, 60, 60)	*	451.6	451.6	424.4	451.6	0.0	38.1	1	300	8
108	20	240	4	(20, 30, 60, 130)	*	451.6	451.6	421.3	451.6	0.0	606.0	1	300	16
109	20	240	2	(120, 120)	*	457.4	457.4	446.8	457.4	0.0	0.9	1	104	0
110	20	240	2	(80, 160)	*	457.4	457.4	446.8	457.4	0.0	0.9	1	115	0
111	20	240	3	(80, 80, 80)	*	457.4	457.4	446.8	457.4	0.0	9.2	1	111	0
112	20	240	3	(40, 80, 120)	*	457.4	457.4	446.8	457.4	0.0	13.8	1	111	0
113	20	240	4	(60, 60, 60, 60)	*	457.4	457.4	446.8	457.4	0.0	40.5	1	157	0
114	20	240	4	(20, 30, 60, 130)	*	457.4	457.4	446.8	457.4	0.0	198.7	1	112	0
115	20	240	2	(120, 120)	*	451.0	451.0	425.3	451.0	0.0	1.5	1	122	0
116	20	240	2	(80, 160)	*	451.0	451.0	425.3	451.0	0.0	1.6	1	134	0
117	20	240	3	(80, 80, 80)	*	451.0	451.0	425.3	451.0	0.0	40.0	1	177	0
118	20	240	3	(40, 80, 120)	*	451.0	451.0	425.3	451.0	0.0	53.6	1	69	0
119	20	240	4	(60, 60, 60, 60)	*	451.0	451.0	426.5	451.0	0.0	260.5	1	60	0
120	20	240	4	(20, 30, 60, 130)	*	451.0	451.0	426.8	451.0	0.0	1900.2	1	61	0
121	30	120	2	(60, 60)	*	911.8	911.8	874.1	911.8	0.0	2.0	1	300	29
122	30	120	2	(40, 80)	*	911.8	911.8	867.6	911.8	0.0	2.4	1	300	40
123	30	120	3	(40, 40, 40)	*	926.6	926.6	897.5	921.9	0.0	108.6	9	300	141
124	30	120	3	(20, 40, 60)	*	911.8	911.8	877.6	911.8	0.0	5.6	1	300	28
125	30	120	4	(30, 30, 30, 30)	*	929.0	928.9	896.3	926.7	0.0	21.7	2	300	122
126	30	120	4	(10, 15, 30, 65)	*	942.8	942.8	919.9	942.8	0.0	12.8	1	300	63
127	30	120	2	(60, 60)	*	690.5	690.5	668.3	690.5	0.0	1.4	1	300	48

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
128	30	120	2	(40, 80)	*	690.5	690.5	656.2	690.5	0.0	1.4	1	300	49
129	30	120	3	(40, 40, 40)	*	702.3	702.3	698.9	702.3	0.0	0.8	1	132	0
130	30	120	3	(20, 40, 60)	*	690.5	690.5	672.5	690.5	0.0	2.4	1	300	31
131	30	120	4	(30, 30, 30, 30)	*	702.3	702.3	702.3	702.3	0.0	0.4	1	0	0
132	30	120	4	(10, 15, 30, 65)	*	739.3	739.3	719.1	739.3	0.0	12.2	1	300	69
133	30	120	2	(60, 60)	*	626.2	626.2	618.7	626.2	0.0	0.7	1	300	10
134	30	120	2	(40, 80)	*	624.4	624.4	616.0	624.4	0.0	0.7	1	300	0
135	30	120	3	(40, 40, 40)	*	643.2	643.2	636.6	643.2	0.0	2.8	1	300	30
136	30	120	3	(20, 40, 60)	*	626.2	626.2	618.7	626.2	0.0	1.8	1	263	0
137	30	120	4	(30, 30, 30, 30)	*	626.2	626.2	625.4	626.2	0.0	0.8	1	143	0
138	30	120	4	(10, 15, 30, 65)	*	626.2	626.2	626.2	626.2	0.0	6.1	1	0	0
139	30	120	2	(60, 60)	*	646.1	646.1	634.4	644.1	0.0	16.0	2	300	73
140	30	120	2	(40, 80)	*	643.0	643.0	629.5	643.0	0.0	1.8	1	300	0
141	30	120	3	(40, 40, 40)	*	650.5	650.5	643.3	650.0	0.0	29.4	2	300	37
142	30	120	3	(20, 40, 60)	*	650.5	650.5	639.0	645.3	0.0	141.9	3	300	52
143	30	120	4	(30, 30, 30, 30)	*	650.5	650.5	644.6	650.5	0.0	11.5	1	300	10
144	30	120	4	(10, 15, 30, 65)	*	650.5	650.5	639.7	650.5	0.0	196.0	1	300	50
145	30	120	2	(60, 60)	*	638.7	638.7	628.6	638.7	0.0	5.5	1	300	30
146	30	120	2	(40, 80)	*	638.7	638.7	628.6	638.7	0.0	5.3	1	300	30
147	30	120	3	(40, 40, 40)	*	656.9	656.9	640.0	652.2	0.0	741.3	4	300	246
148	30	120	3	(20, 40, 60)	*	638.7	638.7	628.6	638.7	0.0	45.4	1	300	20
149	30	120	4	(30, 30, 30, 30)	*	638.7	638.7	636.3	638.7	0.0	29.6	1	300	10
150	30	120	4	(10, 15, 30, 65)		656.9	655.6	640.0	652.6	0.2	*TL*	2	300	215
151	30	240	2	(120, 120)	*	582.7	582.7	543.3	582.7	0.0	13.4	1	300	25
152	30	240	2	(80, 160)	*	582.7	582.7	543.3	582.7	0.0	8.7	1	300	10
153	30	240	3	(80, 80, 80)	*	582.7	582.7	543.4	582.7	0.0	99.3	1	300	10
154	30	240	3	(40, 80, 120)	*	582.7	582.7	543.3	582.7	0.0	212.8	1	300	26
155	30	240	4	(60, 60, 60, 60)	*	582.7	582.7	543.7	582.7	0.0	785.7	1	300	23
156	30	240	4	(20, 30, 60, 130)	*	582.7	582.7	543.4	582.7	0.0	1727.4	1	300	16
157	30	240	2	(120, 120)	*	511.1	511.1	491.1	511.1	0.0	366.1	1	300	53
158	30	240	2	(80, 160)	*	511.1	511.1	491.1	511.1	0.0	314.2	1	300	30
159	30	240	3	(80, 80, 80)	*	511.1	511.1	491.1	511.1	0.0	2599.1	1	300	30
160	30	240	3	(40, 80, 120)			501.3	491.1	501.3		*TL*	1	300	30
161	30	240	4	(60, 60, 60, 60)			491.2	491.2	491.2		*TL*	1	113	0
162	30	240	4	(20, 30, 60, 130)							*TL*	0	0	0
163	30	240	2	(120, 120)	*	467.7	467.7	458.8	467.7	0.0	2.9	1	198	0
164	30	240	2	(80, 160)	*	467.7	467.7	458.8	467.7	0.0	4.8	1	191	0
165	30	240	3	(80, 80, 80)	*	467.7	467.7	458.8	467.7	0.0	73.4	1	203	0
166	30	240	3	(40, 80, 120)	*	467.7	467.7	458.8	467.7	0.0	112.4	1	185	0
167	30	240	4	(60, 60, 60, 60)	*	467.7	467.7	458.8	467.7	0.0	760.6	1	181	0
168	30	240	4	(20, 30, 60, 130)	*	467.7	467.7	458.8	467.7	0.0	2061.3	1	204	0
169	30	240	2	(120, 120)	*	541.7	541.7	513.2	541.7	0.0	38.0	1	300	10
170	30	240	2	(80, 160)	*	541.7	541.7	513.2	541.7	0.0	35.5	1	275	0
171	30	240	3	(80, 80, 80)	*	541.7	541.7	513.2	541.7	0.0	835.7	1	300	20
172	30	240	3	(40, 80, 120)	*	541.7	541.7	513.2	541.7	0.0	1305.1	1	300	10
173	30	240	4	(60, 60, 60, 60)			513.2	513.2	513.2		*TL*	1	0	0
174	30	240	4	(20, 30, 60, 130)							*TL*	0	0	0
175	30	240	2	(120, 120)	*	623.4	623.4	593.7	623.4	0.0	15.6	1	300	50
176	30	240	2	(80, 160)	*	623.4	623.4	593.7	623.4	0.0	18.0	1	300	57
177	30	240	3	(80, 80, 80)	*	623.4	623.4	593.8	623.4	0.0	235.3	1	300	50
178	30	240	3	(40, 80, 120)	*	623.4	623.4	593.7	623.4	0.0	319.9	1	300	51
179	30	240	4	(60, 60, 60, 60)	*	630.3	630.3	594.8	630.3	0.0	3400.3	1	300	155
180	30	240	4	(20, 30, 60, 130)			619.9	594.7	619.9		*TL*	1	300	30
181	40	120	2	(60, 60)	*	761.7	761.7	738.5	761.7	0.0	2.1	1	300	30
182	40	120	2	(40, 80)	*	761.7	761.7	738.5	761.7	0.0	2.3	1	300	31
183	40	120	3	(40, 40, 40)	*	782.0	781.9	748.8	778.8	0.0	242.0	6	300	186
184	40	120	3	(20, 40, 60)	*	773.0	773.0	740.9	773.0	0.0	21.4	1	300	73
185	40	120	4	(30, 30, 30, 30)	*	782.7	782.7	762.4	782.7	0.0	32.1	1	300	124
186	40	120	4	(10, 15, 30, 65)	*	782.7	782.7	765.9	782.7	0.0	88.0	1	300	76
187	40	120	2	(60, 60)	*	847.9	847.9	832.5	847.9	0.0	8.1	1	300	82
188	40	120	2	(40, 80)	*	847.9	847.9	826.8	846.8	0.0	24.1	2	300	115
189	40	120	3	(40, 40, 40)	*	874.6	874.6	864.2	868.5	0.0	111.9	5	300	121
190	40	120	3	(20, 40, 60)	*	874.0	873.9	860.6	865.3	0.0	916.2	16	300	226
191	40	120	4	(30, 30, 30, 30)	*	878.8	878.8	851.0	869.5	0.0	3070.7	34	300	297
192	40	120	4	(10, 15, 30, 65)	*	887.6	887.6	874.0	882.7	0.0	467.4	4	300	131

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
193	40	120	2	(60, 60)	*	749.0	749.0	723.5	749.0	0.0	5.8	1	300	106
194	40	120	2	(40, 80)	*	748.2	748.2	722.5	748.2	0.0	12.2	2	300	82
195	40	120	3	(40, 40, 40)	*	767.0	767.0	741.5	767.0	0.0	16.0	1	300	101
196	40	120	3	(20, 40, 60)	*	749.0	749.0	723.5	749.0	0.0	19.0	1	300	70
197	40	120	4	(30, 30, 30, 30)	*	790.0	789.9	773.6	787.6	0.0	37.3	3	300	97
198	40	120	4	(10, 15, 30, 65)	*	787.2	787.2	778.1	787.2	0.0	20.0	1	300	20
199	40	120	2	(60, 60)	*	911.4	911.4	898.3	911.4	0.0	1.5	1	300	10
200	40	120	2	(40, 80)	*	911.4	911.4	898.3	911.4	0.0	2.3	1	300	35
201	40	120	3	(40, 40, 40)	*	984.6	984.6	969.3	978.5	0.0	26.6	2	300	93
202	40	120	3	(20, 40, 60)	*	944.0	944.0	927.9	944.0	0.0	28.0	1	300	33
203	40	120	4	(30, 30, 30, 30)	*	958.2	958.2	940.5	956.0	0.0	52.2	2	300	140
204	40	120	4	(10, 15, 30, 65)			991.1	979.7	991.1		*TL*	2	300	155
205	40	120	2	(60, 60)	*	909.6	909.6	883.5	909.3	0.0	119.5	3	300	155
206	40	120	2	(40, 80)	*	909.6	909.6	883.4	908.6	0.0	110.0	3	300	149
207	40	120	3	(40, 40, 40)	*	917.2	917.2	893.9	917.2	0.0	103.9	1	300	88
208	40	120	3	(20, 40, 60)	*	909.6	909.5	884.6	909.5	0.0	428.6	2	300	165
209	40	120	4	(30, 30, 30, 30)	*	931.8	931.8	909.9	929.7	0.0	480.5	5	300	147
210	40	120	4	(10, 15, 30, 65)	*	922.4	922.4	895.5	921.3	0.0	1696.8	4	300	138
211	40	240	2	(120, 120)	*	615.5	615.5	605.1	615.5	0.0	21.4	1	300	30
212	40	240	2	(80, 160)	*	615.5	615.5	605.1	615.5	0.0	32.5	1	300	52
213	40	240	3	(80, 80, 80)	*	615.5	615.5	605.3	615.5	0.0	326.8	1	300	43
214	40	240	3	(40, 80, 120)	*	615.5	615.5	605.1	615.5	0.0	1530.1	1	300	66
215	40	240	4	(60, 60, 60, 60)	*	615.5	615.5	606.2	615.5	0.0	875.9	1	300	40
216	40	240	4	(20, 30, 60, 130)							*TL*	0	0	0
217	40	240	2	(120, 120)	*	676.7	676.7	671.4	676.7	0.0	23.7	1	300	31
218	40	240	2	(80, 160)	*	676.7	676.7	671.4	676.7	0.0	31.4	1	300	30
219	40	240	3	(80, 80, 80)	*	676.7	676.7	671.5	676.7	0.0	195.3	1	300	29
220	40	240	3	(40, 80, 120)	*	676.7	676.7	671.4	676.7	0.0	385.1	1	300	30
221	40	240	4	(60, 60, 60, 60)			726.9	714.6	726.9		*TL*	1	300	126
222	40	240	4	(20, 30, 60, 130)			715.4	710.0	715.4		*TL*	1	300	10
223	40	240	2	(120, 120)			662.7	647.1	662.7		*TL*	1	300	215
224	40	240	2	(80, 160)			667.0	647.1	667.0		*TL*	1	300	205
225	40	240	3	(80, 80, 80)			662.2	647.1	662.2		*TL*	1	300	60
226	40	240	3	(40, 80, 120)			656.1	647.1	656.1		*TL*	1	300	40
227	40	240	4	(60, 60, 60, 60)			648.1	648.1	648.1		*TL*	1	300	0
228	40	240	4	(20, 30, 60, 130)							*TL*	0	0	0
229	40	240	2	(120, 120)	*	659.5	659.5	647.5	659.5	0.0	43.0	1	300	50
230	40	240	2	(80, 160)	*	659.5	659.5	647.5	659.5	0.0	52.7	1	300	64
231	40	240	3	(80, 80, 80)	*	659.5	659.5	648.8	659.5	0.0	572.3	1	300	61
232	40	240	3	(40, 80, 120)	*	659.5	659.5	647.5	659.5	0.0	594.6	1	300	42
233	40	240	4	(60, 60, 60, 60)	*	659.5	659.5	649.5	659.5	0.0	1204.0	1	300	30
234	40	240	4	(20, 30, 60, 130)			652.8	649.3	652.8		*TL*	1	300	0
235	40	240	2	(120, 120)	*	700.4	700.4	689.9	700.4	0.0	95.5	1	300	83
236	40	240	2	(80, 160)	*	700.4	700.4	689.9	700.4	0.0	110.7	1	300	71
237	40	240	3	(80, 80, 80)	*	700.4	700.4	690.4	700.4	0.0	1689.8	1	300	70
238	40	240	3	(40, 80, 120)	*	700.4	700.4	689.9	700.4	0.0	2654.5	1	300	72
239	40	240	4	(60, 60, 60, 60)			699.3	690.9	699.3		*TL*	1	300	32
240	40	240	4	(20, 30, 60, 130)							*TL*	0	0	0
241	50	120	2	(60, 60)		1345.8	1268.9	1244.4	1263.7	6.0	*TL*	25	300	320
242	50	120	2	(40, 80)		1342.3	1260.3	1236.4	1252.9	6.5	*TL*	15	300	320
243	50	120	3	(40, 40, 40)		1365.3	1293.5	1263.3	1289.5	5.5	*TL*	13	300	320
244	50	120	3	(20, 40, 60)		1333.4	1315.0	1257.8	1311.8	1.4	*TL*	4	300	303
245	50	120	4	(30, 30, 30, 30)		1358.6	1353.2	1339.1	1345.6	0.4	*TL*	26	300	320
246	50	120	4	(10, 15, 30, 65)		1380.7	1309.4	1287.2	1308.0	5.4	*TL*	3	300	198
247	50	120	2	(60, 60)	*	978.4	978.4	959.2	978.1	0.0	31.1	2	300	150
248	50	120	2	(40, 80)	*	978.4	978.4	957.9	976.5	0.0	87.3	3	300	150
249	50	120	3	(40, 40, 40)	*	1066.8	1066.7	1042.1	1061.7	0.0	1228.5	15	300	270
250	50	120	3	(20, 40, 60)		1020.3	1015.2	992.0	1007.5	0.5	*TL*	37	300	320
251	50	120	4	(30, 30, 30, 30)	*	1021.8	1021.8	1003.5	1021.8	0.0	55.9	1	300	79
252	50	120	4	(10, 15, 30, 65)		1055.8	1053.6	1037.0	1052.8	0.2	*TL*	3	300	146
253	50	120	2	(60, 60)	*	974.0	974.0	945.9	967.9	0.0	3333.7	22	300	320
254	50	120	2	(40, 80)		974.0	971.5	941.6	963.7	0.3	*TL*	22	300	320
255	50	120	3	(40, 40, 40)	*	1024.7	1024.7	997.0	1017.8	0.0	223.2	2	300	144
256	50	120	3	(20, 40, 60)	*	989.8	989.8	968.9	989.8	0.0	337.0	2	300	132
257	50	120	4	(30, 30, 30, 30)		1018.7	1016.3	981.5	1001.8	0.2	*TL*	13	300	277

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
258	50	120	4	(10, 15, 30, 65)	*	991.1	991.1	973.3	990.9	0.0	2114.0	3	300	165
259	50	120	2	(60, 60)	*	1035.3	1035.3	1011.9	1035.3	0.0	30.0	1	300	100
260	50	120	2	(40, 80)	*	1030.1	1030.1	1011.7	1030.1	0.0	29.0	1	300	72
261	50	120	3	(40, 40, 40)	*	1079.9	1079.9	1071.8	1079.9	0.0	57.4	1	300	30
262	50	120	3	(20, 40, 60)	*	1051.5	1051.4	1024.9	1043.8	0.0	1463.7	6	300	229
263	50	120	4	(30, 30, 30, 30)		1079.7	1077.1	1044.8	1067.7	0.2	*TL*	9	300	320
264	50	120	4	(10, 15, 30, 65)			1083.9	1062.8	1083.9		*TL*	1	300	110
265	50	120	2	(60, 60)		990.9	970.4	940.4	964.6	2.1	*TL*	18	300	320
266	50	120	2	(40, 80)		990.9	969.1	939.2	963.1	2.2	*TL*	13	300	320
267	50	120	3	(40, 40, 40)		1012.7	1007.4	980.2	997.0	0.5	*TL*	40	300	320
268	50	120	3	(20, 40, 60)		996.9	975.7	947.0	972.6	2.1	*TL*	7	300	320
269	50	120	4	(30, 30, 30, 30)		1077.0	1071.1	1055.6	1061.9	0.5	*TL*	56	300	320
270	50	120	4	(10, 15, 30, 65)		1084.5	1079.2	1065.0	1075.8	0.5	*TL*	3	300	147
271	50	240	2	(120, 120)	*	663.3	663.3	658.2	663.3	0.0	17.5	1	300	20
272	50	240	2	(80, 160)	*	663.3	663.3	658.2	663.3	0.0	19.6	1	300	20
273	50	240	3	(80, 80, 80)	*	663.3	663.3	658.2	663.3	0.0	401.8	1	300	30
274	50	240	3	(40, 80, 120)	*	663.3	663.3	658.2	663.3	0.0	582.8	1	300	20
275	50	240	4	(60, 60, 60, 60)			663.3	658.9	663.3		*TL*	1	300	20
276	50	240	4	(20, 30, 60, 130)							*TL*	0	0	0
277	50	240	2	(120, 120)	*	883.6	883.6	869.7	883.6	0.0	54.6	1	300	40
278	50	240	2	(80, 160)	*	883.6	883.6	869.7	883.6	0.0	41.9	1	300	30
279	50	240	3	(80, 80, 80)	*	890.5	890.5	871.8	890.5	0.0	1644.4	1	300	114
280	50	240	3	(40, 80, 120)	*	883.6	883.6	870.0	883.6	0.0	670.5	1	300	30
281	50	240	4	(60, 60, 60, 60)			895.1	877.1	895.1		*TL*	1	300	90
282	50	240	4	(20, 30, 60, 130)			883.4	872.7	883.4		*TL*	1	300	30
283	50	240	2	(120, 120)	*	875.1	875.1	861.1	875.1	0.0	467.8	1	300	132
284	50	240	2	(80, 160)	*	875.1	875.1	861.1	875.1	0.0	435.9	1	300	122
285	50	240	3	(80, 80, 80)			873.9	861.5	873.9		*TL*	1	300	101
286	50	240	3	(40, 80, 120)			872.3	861.4	872.3		*TL*	1	300	82
287	50	240	4	(60, 60, 60, 60)			877.2	868.7	877.2		*TL*	1	300	10
288	50	240	4	(20, 30, 60, 130)			861.5	861.5	861.5		*TL*	1	300	0
289	50	240	2	(120, 120)		1119.5	1026.3	993.8	1023.3	9.0	*TL*	4	300	320
290	50	240	2	(80, 160)		1112.4	1010.8	993.8	1008.1	10.0	*TL*	3	300	275
291	50	240	3	(80, 80, 80)			1011.6	997.2	1011.6		*TL*	1	300	102
292	50	240	3	(40, 80, 120)			1010.6	994.2	1010.6		*TL*	1	300	50
293	50	240	4	(60, 60, 60, 60)			1021.4	1011.6	1021.4		*TL*	1	300	10
294	50	240	4	(20, 30, 60, 130)			998.7	998.7	998.7		*TL*	1	0	0
295	50	240	2	(120, 120)	*	633.0	633.0	625.5	633.0	0.0	144.7	1	300	20
296	50	240	2	(80, 160)	*	633.0	633.0	625.5	633.0	0.0	270.4	1	300	40
297	50	240	3	(80, 80, 80)			632.6	625.5	632.6		*TL*	1	300	30
298	50	240	3	(40, 80, 120)			627.9	625.5	627.9		*TL*	1	300	0
299	50	240	4	(60, 60, 60, 60)							*TL*	0	0	0
300	50	240	4	(20, 30, 60, 130)							*TL*	0	0	0
301	60	120	2	(60, 60)	*	989.1	989.1	967.7	980.4	0.0	3272.7	19	300	320
302	60	120	2	(40, 80)		989.1	988.4	967.0	980.3	0.1	*TL*	20	300	320
303	60	120	3	(40, 40, 40)		1008.7	1004.3	980.4	997.6	0.4	*TL*	6	300	320
304	60	120	3	(20, 40, 60)		993.4	985.2	969.3	982.2	0.8	*TL*	3	300	229
305	60	120	4	(30, 30, 30, 30)		1016.0	1010.4	990.2	1007.5	0.5	*TL*	3	300	252
306	60	120	4	(10, 15, 30, 65)			998.0	984.9	998.0		*TL*	1	300	126
307	60	120	2	(60, 60)	*	1114.8	1114.8	1094.7	1114.2	0.0	65.6	2	300	190
308	60	120	2	(40, 80)	*	1121.6	1121.6	1097.7	1119.2	0.0	470.0	8	300	264
309	60	120	3	(40, 40, 40)		1167.9	1163.3	1130.4	1157.5	0.4	*TL*	35	300	320
310	60	120	3	(20, 40, 60)	*	1141.7	1141.7	1115.7	1139.0	0.0	860.2	6	300	298
311	60	120	4	(30, 30, 30, 30)	*	1167.6	1167.6	1147.3	1166.8	0.0	625.5	3	300	178
312	60	120	4	(10, 15, 30, 65)		1169.0	1164.3	1135.0	1160.5	0.4	*TL*	16	300	277
313	60	120	2	(60, 60)	*	957.1	957.1	932.3	954.5	0.0	1727.5	9	300	320
314	60	120	2	(40, 80)	*	954.6	954.5	931.8	952.8	0.0	848.7	5	300	307
315	60	120	3	(40, 40, 40)		965.8	965.4	937.3	960.0	0.0	*TL*	10	300	320
316	60	120	3	(20, 40, 60)			957.1	933.8	957.1		*TL*	3	300	273
317	60	120	4	(30, 30, 30, 30)	*	963.1	963.1	949.4	963.1	0.0	525.8	1	300	85
318	60	120	4	(10, 15, 30, 65)			959.8	943.6	959.8		*TL*	1	300	93
319	60	120	2	(60, 60)	*	1002.5	1002.5	979.2	998.9	0.0	1048.2	5	300	320
320	60	120	2	(40, 80)	*	1002.5	1002.5	979.0	998.3	0.0	2776.8	15	300	320
321	60	120	3	(40, 40, 40)		1047.4	1032.8	1004.5	1028.2	1.4	*TL*	7	300	320
322	60	120	3	(20, 40, 60)		1005.9	1000.9	982.2	1000.6	0.5	*TL*	2	300	257

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
323	60	120	4	(30, 30, 30, 30)		1049.9	1041.8	1016.3	1039.6	0.8	*TL*	6	300	320
324	60	120	4	(10, 15, 30, 65)			1021.2	1009.9	1021.2		*TL*	1	300	75
325	60	120	2	(60, 60)	*	1063.9	1063.9	1038.1	1058.7	0.0	1583.8	13	300	320
326	60	120	2	(40, 80)		1063.9	1063.0	1037.4	1057.2	0.1	*TL*	31	300	320
327	60	120	3	(40, 40, 40)		1069.2	1064.2	1042.7	1062.3	0.5	*TL*	4	300	303
328	60	120	3	(20, 40, 60)		1063.9	1062.4	1039.4	1059.9	0.1	*TL*	4	300	279
329	60	120	4	(30, 30, 30, 30)			1088.1	1076.2	1088.1		*TL*	2	300	195
330	60	120	4	(10, 15, 30, 65)			1067.4	1060.2	1067.4		*TL*	1	300	42
331	60	240	2	(120, 120)		943.3	928.3	915.1	927.4	1.6	*TL*	2	300	203
332	60	240	2	(80, 160)		934.1	929.9	915.1	929.8	0.5	*TL*	3	300	224
333	60	240	3	(80, 80, 80)			923.4	915.2	923.4		*TL*	1	300	40
334	60	240	3	(40, 80, 120)			921.0	915.1	921.0		*TL*	1	300	20
335	60	240	4	(60, 60, 60, 60)			918.3	918.3	918.3		*TL*	1	0	0
336	60	240	4	(20, 30, 60, 130)							*TL*	0	0	0
337	60	240	2	(120, 120)	*	915.6	915.6	898.0	915.6	0.0	2046.5	1	300	239
338	60	240	2	(80, 160)	*	915.6	915.6	898.0	915.6	0.0	1845.7	1	300	218
339	60	240	3	(80, 80, 80)			912.0	898.9	912.0		*TL*	1	300	80
340	60	240	3	(40, 80, 120)			909.1	898.8	909.1		*TL*	1	300	50
341	60	240	4	(60, 60, 60, 60)			905.7	903.1	905.7		*TL*	1	300	10
342	60	240	4	(20, 30, 60, 130)							*TL*	0	0	0
343	60	240	2	(120, 120)		823.5	815.5	791.1	812.8	1.0	*TL*	10	300	320
344	60	240	2	(80, 160)		820.6	815.0	791.1	812.9	0.7	*TL*	8	300	320
345	60	240	3	(80, 80, 80)			816.0	791.9	816.0		*TL*	1	300	170
346	60	240	3	(40, 80, 120)			815.4	791.4	815.4		*TL*	1	300	148
347	60	240	4	(60, 60, 60, 60)			803.4	802.1	803.4		*TL*	1	300	20
348	60	240	4	(20, 30, 60, 130)							*TL*	0	0	0
349	60	240	2	(120, 120)			1117.1	1106.5	1117.1		*TL*	2	300	239
350	60	240	2	(80, 160)			1116.7	1106.5	1116.7		*TL*	1	300	243
351	60	240	3	(80, 80, 80)			1112.6	1108.8	1112.6		*TL*	1	300	20
352	60	240	3	(40, 80, 120)			1110.5	1106.9	1110.5		*TL*	1	300	23
353	60	240	4	(60, 60, 60, 60)							*TL*	0	0	0
354	60	240	4	(20, 30, 60, 130)							*TL*	0	0	0
355	60	240	2	(120, 120)	*	764.3	764.3	748.6	764.3	0.0	1109.3	1	300	134
356	60	240	2	(80, 160)	*	764.3	764.3	748.6	764.3	0.0	1128.9	1	300	127
357	60	240	3	(80, 80, 80)			755.8	748.6	755.8		*TL*	1	300	30
358	60	240	3	(40, 80, 120)			754.0	748.6	754.0		*TL*	1	300	20
359	60	240	4	(60, 60, 60, 60)							*TL*	0	0	0
360	60	240	4	(20, 30, 60, 130)							*TL*	0	0	0
361	70	120	2	(60, 60)		1347.2	1339.5	1313.1	1334.0	0.6	*TL*	17	300	320
362	70	120	2	(40, 80)		1334.1	1333.7	1309.8	1330.1	0.0	*TL*	14	300	320
363	70	120	3	(40, 40, 40)	*	1367.3	1367.3	1347.9	1367.3	0.0	1592.0	1	300	194
364	70	120	3	(20, 40, 60)			1340.4	1324.4	1340.4		*TL*	3	300	164
365	70	120	4	(30, 30, 30, 30)		1384.7	1381.4	1366.5	1377.8	0.2	*TL*	2	300	212
366	70	120	4	(10, 15, 30, 65)			1383.3	1365.3	1383.3		*TL*	1	300	121
367	70	120	2	(60, 60)		1292.2	1272.7	1246.6	1262.7	1.5	*TL*	16	300	320
368	70	120	2	(40, 80)		1278.7	1267.8	1243.6	1258.6	0.9	*TL*	14	300	320
369	70	120	3	(40, 40, 40)			1298.2	1285.7	1298.2		*TL*	2	300	167
370	70	120	3	(20, 40, 60)			1265.9	1248.5	1265.9		*TL*	2	300	221
371	70	120	4	(30, 30, 30, 30)	*	1329.2	1329.2	1315.0	1329.2	0.0	323.9	2	300	183
372	70	120	4	(10, 15, 30, 65)			1316.5	1302.6	1316.5		*TL*	2	300	184
373	70	120	2	(60, 60)		1351.0	1343.6	1324.0	1342.6	0.5	*TL*	2	300	319
374	70	120	2	(40, 80)		1357.2	1342.2	1324.6	1341.4	1.1	*TL*	3	300	320
375	70	120	3	(40, 40, 40)			1383.4	1371.6	1383.4		*TL*	1	300	159
376	70	120	3	(20, 40, 60)			1363.3	1352.9	1363.3		*TL*	1	300	93
377	70	120	4	(30, 30, 30, 30)			1388.7	1380.2	1388.7		*TL*	1	300	36
378	70	120	4	(10, 15, 30, 65)			1380.7	1380.7	1380.7		*TL*	1	300	0
379	70	120	2	(60, 60)	*	1109.5	1109.5	1095.8	1106.8	0.0	808.5	5	300	294
380	70	120	2	(40, 80)	*	1109.5	1109.4	1088.5	1104.3	0.0	2390.7	24	300	320
381	70	120	3	(40, 40, 40)		1162.2	1159.3	1139.3	1153.8	0.2	*TL*	23	300	320
382	70	120	3	(20, 40, 60)	*	1131.9	1131.9	1113.8	1129.2	0.0	3135.4	5	300	278
383	70	120	4	(30, 30, 30, 30)		1214.3	1209.6	1186.3	1202.6	0.4	*TL*	10	300	320
384	70	120	4	(10, 15, 30, 65)		1193.8	1182.9	1160.6	1181.2	0.9	*TL*	2	300	250
385	70	120	2	(60, 60)	*	1073.7	1073.6	1047.4	1071.6	0.0	1817.8	6	300	320
386	70	120	2	(40, 80)	*	1072.9	1072.9	1047.4	1069.8	0.0	2790.6	14	300	320
387	70	120	3	(40, 40, 40)	*	1080.7	1080.7	1058.8	1076.2	0.0	2732.7	4	300	248

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
388	70	120	3	(20, 40, 60)			1074.7	1049.4	1074.7		*TL*	1	300	241
389	70	120	4	(30, 30, 30, 30)			1094.3	1075.3	1094.3		*TL*	2	300	215
390	70	120	4	(10, 15, 30, 65)			1088.6	1067.4	1088.6		*TL*	1	300	148
391	70	240	2	(120, 120)	*	970.1	970.1	958.6	970.1	0.0	427.4	1	300	72
392	70	240	2	(80, 160)	*	970.1	970.1	958.6	970.1	0.0	862.0	1	300	112
393	70	240	3	(80, 80, 80)			965.0	958.6	965.0		*TL*	1	300	10
394	70	240	3	(40, 80, 120)			964.5	958.6	964.5		*TL*	1	300	10
395	70	240	4	(60, 60, 60, 60)							*TL*	0	0	0
396	70	240	4	(20, 30, 60, 130)							*TL*	0	0	0
397	70	240	2	(120, 120)	*	1009.6	1009.6	985.7	1007.4	0.0	3595.9	3	300	305
398	70	240	2	(80, 160)		1009.6	1009.3	985.7	1007.6	0.0	*TL*	3	300	300
399	70	240	3	(80, 80, 80)			1005.0	990.2	1005.0		*TL*	1	300	94
400	70	240	3	(40, 80, 120)			1002.3	986.5	1002.3		*TL*	1	300	77
401	70	240	4	(60, 60, 60, 60)			1003.0	1001.0	1003.0		*TL*	1	300	10
402	70	240	4	(20, 30, 60, 130)			818.6	818.6	818.6		*TL*	1	0	0
403	70	240	2	(120, 120)			1131.7	1109.4	1131.7		*TL*	1	300	204
404	70	240	2	(80, 160)			1131.4	1109.4	1131.4		*TL*	1	300	186
405	70	240	3	(80, 80, 80)			1118.1	1109.5	1118.1		*TL*	1	300	10
406	70	240	3	(40, 80, 120)			1112.4	1109.4	1112.4		*TL*	1	300	0
407	70	240	4	(60, 60, 60, 60)							*TL*	0	0	0
408	70	240	4	(20, 30, 60, 130)							*TL*	0	0	0
409	70	240	2	(120, 120)			1001.5	987.1	1001.5		*TL*	1	300	171
410	70	240	2	(80, 160)			1001.0	987.1	1001.0		*TL*	1	300	171
411	70	240	3	(80, 80, 80)			990.8	987.6	990.8		*TL*	1	300	10
412	70	240	3	(40, 80, 120)			720.2	720.2	720.2		*TL*	1	0	0
413	70	240	4	(60, 60, 60, 60)							*TL*	0	0	0
414	70	240	4	(20, 30, 60, 130)							*TL*	0	0	0
415	70	240	2	(120, 120)			958.5	937.2	958.5		*TL*	1	300	259
416	70	240	2	(80, 160)			958.4	937.2	958.4		*TL*	1	300	257
417	70	240	3	(80, 80, 80)			945.8	937.2	945.8		*TL*	1	300	20
418	70	240	3	(40, 80, 120)			945.8	937.2	945.8		*TL*	1	300	10
419	70	240	4	(60, 60, 60, 60)			954.9	954.9	954.9		*TL*	1	0	0
420	70	240	4	(20, 30, 60, 130)							*TL*	0	0	0
421	80	120	2	(60, 60)		1414.5	1410.1	1385.1	1405.7	0.3	*TL*	24	300	320
422	80	120	2	(40, 80)		1413.4	1409.0	1384.0	1405.1	0.3	*TL*	23	300	320
423	80	120	3	(40, 40, 40)		1428.2	1423.8	1404.2	1420.8	0.3	*TL*	13	300	320
424	80	120	3	(20, 40, 60)		1414.7	1412.5	1389.9	1411.4	0.2	*TL*	5	300	279
425	80	120	4	(30, 30, 30, 30)		1499.7	1489.6	1479.4	1486.6	0.7	*TL*	6	300	320
426	80	120	4	(10, 15, 30, 65)		1462.2	1455.5	1440.5	1455.2	0.5	*TL*	3	300	223
427	80	120	2	(60, 60)		1325.3	1322.7	1299.2	1317.8	0.2	*TL*	22	300	320
428	80	120	2	(40, 80)		1330.6	1322.5	1300.9	1319.6	0.6	*TL*	9	300	320
429	80	120	3	(40, 40, 40)	*	1373.4	1373.4	1361.9	1373.4	0.0	295.8	1	300	106
430	80	120	3	(20, 40, 60)			1334.5	1320.7	1334.5		*TL*	2	300	263
431	80	120	4	(30, 30, 30, 30)	*	1410.7	1410.7	1389.2	1410.3	0.0	1936.2	3	300	295
432	80	120	4	(10, 15, 30, 65)	*	1386.1	1386.1	1366.4	1386.1	0.0	1775.3	1	300	108
433	80	120	2	(60, 60)		1570.0	1525.1	1505.4	1523.7	2.9	*TL*	4	300	262
434	80	120	2	(40, 80)		1557.7	1525.4	1505.0	1524.2	2.1	*TL*	5	300	248
435	80	120	3	(40, 40, 40)		1585.7	1566.8	1547.8	1564.6	1.2	*TL*	6	300	320
436	80	120	3	(20, 40, 60)		1570.5	1532.1	1515.5	1531.1	2.5	*TL*	3	300	218
437	80	120	4	(30, 30, 30, 30)		1576.5	1569.6	1558.6	1566.1	0.4	*TL*	5	300	261
438	80	120	4	(10, 15, 30, 65)			1585.2	1572.0	1585.2		*TL*	1	300	193
439	80	120	2	(60, 60)		1575.6	1572.1	1554.2	1567.6	0.2	*TL*	19	300	320
440	80	120	2	(40, 80)	*	1561.0	1561.0	1545.2	1558.0	0.0	1771.6	9	300	304
441	80	120	3	(40, 40, 40)		1617.1	1611.2	1590.6	1607.8	0.4	*TL*	2	300	297
442	80	120	3	(20, 40, 60)			1573.3	1557.0	1573.3		*TL*	1	300	229
443	80	120	4	(30, 30, 30, 30)			1647.4	1627.7	1647.4		*TL*	1	300	202
444	80	120	4	(10, 15, 30, 65)			1621.2	1608.9	1621.2		*TL*	1	300	81
445	80	120	2	(60, 60)		1447.6	1436.6	1414.1	1429.8	0.8	*TL*	12	300	320
446	80	120	2	(40, 80)		1447.6	1434.7	1412.3	1428.1	0.9	*TL*	9	300	320
447	80	120	3	(40, 40, 40)			1448.9	1430.3	1448.9		*TL*	1	300	211
448	80	120	3	(20, 40, 60)			1430.3	1415.2	1430.3		*TL*	1	300	182
449	80	120	4	(30, 30, 30, 30)			1495.5	1479.0	1495.5		*TL*	1	300	136
450	80	120	4	(10, 15, 30, 65)			1464.7	1454.0	1464.7		*TL*	1	300	56
451	80	240	2	(120, 120)			1340.6	1326.6	1340.6		*TL*	1	300	209
452	80	240	2	(80, 160)			1340.7	1326.6	1340.7		*TL*	1	300	207

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
453	80	240	3	(80, 80, 80)			1333.3	1329.7	1333.3		*TL*	1	300	10
454	80	240	3	(40, 80, 120)			1328.5	1328.5	1328.5		*TL*	1	300	0
455	80	240	4	(60, 60, 60, 60)							*TL*	0	0	0
456	80	240	4	(20, 30, 60, 130)							*TL*	0	0	0
457	80	240	2	(120, 120)			1159.5	1138.8	1159.5		*TL*	1	300	191
458	80	240	2	(80, 160)			1156.4	1138.7	1156.4		*TL*	1	300	240
459	80	240	3	(80, 80, 80)			1145.1	1140.4	1145.1		*TL*	1	300	20
460	80	240	3	(40, 80, 120)			1139.0	1139.0	1139.0		*TL*	1	300	0
461	80	240	4	(60, 60, 60, 60)			1152.5	1152.5	1152.5		*TL*	1	0	0
462	80	240	4	(20, 30, 60, 130)							*TL*	0	0	0
463	80	240	2	(120, 120)			1328.6	1313.9	1328.6		*TL*	1	300	286
464	80	240	2	(80, 160)			1327.8	1313.9	1327.8		*TL*	1	300	262
465	80	240	3	(80, 80, 80)			1323.2	1314.6	1323.2		*TL*	1	300	30
466	80	240	3	(40, 80, 120)			1320.7	1314.1	1320.7		*TL*	1	300	10
467	80	240	4	(60, 60, 60, 60)			1322.9	1322.9	1322.9		*TL*	1	0	0
468	80	240	4	(20, 30, 60, 130)							*TL*	0	0	0
469	80	240	2	(120, 120)			1168.0	1156.7	1168.0		*TL*	1	300	169
470	80	240	2	(80, 160)			1168.2	1156.7	1168.2		*TL*	1	300	165
471	80	240	3	(80, 80, 80)			1162.1	1157.2	1162.1		*TL*	1	300	30
472	80	240	3	(40, 80, 120)			1158.8	1157.5	1158.8		*TL*	1	300	20
473	80	240	4	(60, 60, 60, 60)			755.7	755.7	755.7		*TL*	1	0	0
474	80	240	4	(20, 30, 60, 130)							*TL*	0	0	0
475	80	240	2	(120, 120)		1323.6	1315.5	1298.3	1313.0	0.6	*TL*	4	300	320
476	80	240	2	(80, 160)		1326.9	1315.1	1298.3	1313.1	0.9	*TL*	3	300	286
477	80	240	3	(80, 80, 80)			1316.0	1305.1	1316.0		*TL*	1	300	70
478	80	240	3	(40, 80, 120)			1307.9	1299.0	1307.9		*TL*	1	300	50
479	80	240	4	(60, 60, 60, 60)			1326.7	1322.7	1326.7		*TL*	1	300	10
480	80	240	4	(20, 30, 60, 130)			1277.2	1277.2	1277.2		*TL*	1	0	0
481	90	120	2	(60, 60)		1531.3	1519.7	1498.3	1514.2	0.8	*TL*	15	300	320
482	90	120	2	(40, 80)		1531.2	1517.2	1496.2	1512.9	0.9	*TL*	12	300	320
483	90	120	3	(40, 40, 40)		1576.5	1547.6	1531.2	1545.8	1.8	*TL*	2	300	320
484	90	120	3	(20, 40, 60)			1533.4	1519.6	1533.4		*TL*	1	300	231
485	90	120	4	(30, 30, 30, 30)			1566.9	1553.3	1566.9		*TL*	1	300	247
486	90	120	4	(10, 15, 30, 65)			1556.5	1548.2	1556.5		*TL*	1	300	80
487	90	120	2	(60, 60)	*	1559.6	1559.6	1528.5	1557.2	0.0	2032.9	13	300	320
488	90	120	2	(40, 80)		1562.8	1559.8	1528.4	1556.6	0.2	*TL*	19	300	320
489	90	120	3	(40, 40, 40)			1591.9	1561.3	1591.9		*TL*	1	300	312
490	90	120	3	(20, 40, 60)			1566.3	1538.9	1566.3		*TL*	1	300	254
491	90	120	4	(30, 30, 30, 30)			1626.7	1604.0	1626.7		*TL*	1	300	233
492	90	120	4	(10, 15, 30, 65)			1610.0	1592.5	1610.0		*TL*	1	300	95
493	90	120	2	(60, 60)		1466.2	1435.4	1410.7	1433.2	2.1	*TL*	7	300	320
494	90	120	2	(40, 80)		1458.0	1434.6	1410.7	1432.0	1.6	*TL*	8	300	320
495	90	120	3	(40, 40, 40)			1444.1	1426.2	1444.1		*TL*	1	300	291
496	90	120	3	(20, 40, 60)			1429.3	1413.0	1429.3		*TL*	1	300	243
497	90	120	4	(30, 30, 30, 30)			1497.3	1486.9	1497.3		*TL*	1	300	220
498	90	120	4	(10, 15, 30, 65)			1478.1	1468.0	1478.1		*TL*	1	300	54
499	90	120	2	(60, 60)		1473.9	1473.0	1446.1	1469.5	0.1	*TL*	25	300	320
500	90	120	2	(40, 80)		1470.6	1467.5	1445.7	1465.4	0.2	*TL*	24	300	320
501	90	120	3	(40, 40, 40)		1485.9	1482.5	1461.4	1480.8	0.2	*TL*	5	300	320
502	90	120	3	(20, 40, 60)			1475.8	1451.7	1475.8		*TL*	1	300	296
503	90	120	4	(30, 30, 30, 30)		1542.8	1536.8	1515.0	1535.8	0.4	*TL*	2	300	308
504	90	120	4	(10, 15, 30, 65)			1493.2	1476.2	1493.2		*TL*	1	300	162
505	90	120	2	(60, 60)		1889.7	1881.5	1851.0	1878.4	0.4	*TL*	17	300	320
506	90	120	2	(40, 80)		1899.0	1873.6	1833.8	1871.1	1.3	*TL*	8	300	320
507	90	120	3	(40, 40, 40)			1927.6	1910.4	1927.6		*TL*	1	300	236
508	90	120	3	(20, 40, 60)			1886.4	1875.2	1886.4		*TL*	1	300	136
509	90	120	4	(30, 30, 30, 30)			1953.9	1945.9	1953.9		*TL*	1	300	104
510	90	120	4	(10, 15, 30, 65)			1925.6	1915.9	1925.6		*TL*	1	300	43
511	90	240	2	(120, 120)			1244.2	1225.4	1244.2		*TL*	1	300	320
512	90	240	2	(80, 160)			1240.6	1225.4	1240.6		*TL*	1	300	295
513	90	240	3	(80, 80, 80)			1232.4	1227.6	1232.4		*TL*	1	300	21
514	90	240	3	(40, 80, 120)			1230.7	1227.3	1230.7		*TL*	1	300	10
515	90	240	4	(60, 60, 60, 60)			939.5	939.5	939.5		*TL*	1	0	0
516	90	240	4	(20, 30, 60, 130)							*TL*	0	0	0
517	90	240	2	(120, 120)			1178.4	1150.8	1178.4		*TL*	1	300	320

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
518	90	240	2	(80, 160)			1178.2	1149.6	1178.2		*TL*	1	300	305
519	90	240	3	(80, 80, 80)			1163.9	1152.8	1163.9		*TL*	1	300	40
520	90	240	3	(40, 80, 120)			1161.8	1151.2	1161.8		*TL*	1	300	20
521	90	240	4	(60, 60, 60, 60)			1161.8	1161.8	1161.8		*TL*	1	0	0
522	90	240	4	(20, 30, 60, 130)							*TL*	0	0	0
523	90	240	2	(120, 120)		1222.5	1188.9	1164.7	1187.9	2.8	*TL*	4	300	320
524	90	240	2	(80, 160)		1228.7	1188.6	1164.7	1187.8	3.3	*TL*	3	300	320
525	90	240	3	(80, 80, 80)			1185.8	1167.0	1185.8		*TL*	1	300	74
526	90	240	3	(40, 80, 120)			1181.9	1166.8	1181.9		*TL*	1	300	41
527	90	240	4	(60, 60, 60, 60)			1187.3	1184.3	1187.3		*TL*	1	300	0
528	90	240	4	(20, 30, 60, 130)							*TL*	0	0	0
529	90	240	2	(120, 120)			1017.2	1001.0	1017.2		*TL*	1	300	269
530	90	240	2	(80, 160)			1016.9	1000.5	1016.9		*TL*	1	300	224
531	90	240	3	(80, 80, 80)			1005.4	1001.0	1005.4		*TL*	1	300	20
532	90	240	3	(40, 80, 120)			1006.5	1001.0	1006.5		*TL*	1	300	10
533	90	240	4	(60, 60, 60, 60)							*TL*	0	0	0
534	90	240	4	(20, 30, 60, 130)							*TL*	0	0	0
535	90	240	2	(120, 120)			1193.3	1186.2	1193.3		*TL*	1	300	61
536	90	240	2	(80, 160)			1192.2	1186.3	1192.2		*TL*	1	300	70
537	90	240	3	(80, 80, 80)			1188.9	1188.9	1188.9		*TL*	1	0	0
538	90	240	3	(40, 80, 120)							*TL*	0	0	0
539	90	240	4	(60, 60, 60, 60)							*TL*	0	0	0
540	90	240	4	(20, 30, 60, 130)							*TL*	0	0	0
541	100	120	2	(60, 60)		1653.5	1649.6	1626.6	1646.4	0.2	*TL*	13	300	320
542	100	120	2	(40, 80)		1661.5	1646.7	1626.5	1644.0	0.9	*TL*	8	300	320
543	100	120	3	(40, 40, 40)			1690.8	1674.4	1690.8		*TL*	1	300	248
544	100	120	3	(20, 40, 60)			1655.0	1639.0	1655.0		*TL*	1	300	168
545	100	120	4	(30, 30, 30, 30)			1716.2	1698.4	1716.2		*TL*	1	300	164
546	100	120	4	(10, 15, 30, 65)			1716.4	1704.9	1716.4		*TL*	1	300	86
547	100	120	2	(60, 60)		2040.0	2001.2	1978.5	1999.6	1.9	*TL*	4	300	320
548	100	120	2	(40, 80)		2036.8	1997.5	1975.6	1996.9	2.0	*TL*	5	300	320
549	100	120	3	(40, 40, 40)			2011.3	1999.2	2011.3		*TL*	1	300	120
550	100	120	3	(20, 40, 60)			2000.2	1988.4	2000.2		*TL*	1	300	71
551	100	120	4	(30, 30, 30, 30)			2048.6	2043.4	2048.6		*TL*	1	300	42
552	100	120	4	(10, 15, 30, 65)			2019.1	2018.9	2019.1		*TL*	1	300	0
553	100	120	2	(60, 60)		1921.5	1899.8	1875.7	1899.5	1.1	*TL*	3	300	309
554	100	120	2	(40, 80)		1904.7	1899.0	1874.2	1896.3	0.3	*TL*	10	300	320
555	100	120	3	(40, 40, 40)			1970.6	1949.0	1970.6		*TL*	1	300	169
556	100	120	3	(20, 40, 60)			1917.3	1903.0	1917.3		*TL*	1	300	97
557	100	120	4	(30, 30, 30, 30)			1969.1	1958.2	1969.1		*TL*	1	300	73
558	100	120	4	(10, 15, 30, 65)			1961.3	1956.4	1961.3		*TL*	1	300	20
559	100	120	2	(60, 60)		1624.7	1609.5	1589.2	1608.0	0.9	*TL*	9	300	320
560	100	120	2	(40, 80)		1617.6	1597.8	1573.3	1595.3	1.2	*TL*	12	300	320
561	100	120	3	(40, 40, 40)			1636.8	1618.7	1636.8		*TL*	3	300	320
562	100	120	3	(20, 40, 60)			1632.0	1613.2	1632.0		*TL*	1	300	282
563	100	120	4	(30, 30, 30, 30)			1660.0	1647.2	1660.0		*TL*	1	300	177
564	100	120	4	(10, 15, 30, 65)			1651.4	1638.4	1651.4		*TL*	1	300	115
565	100	120	2	(60, 60)		1951.8	1927.0	1902.4	1921.3	1.3	*TL*	6	300	320
566	100	120	2	(40, 80)		1937.0	1924.0	1897.6	1917.9	0.7	*TL*	11	300	320
567	100	120	3	(40, 40, 40)	*	2025.4	2025.4	2005.1	2024.3	0.0	2206.2	3	300	294
568	100	120	3	(20, 40, 60)			1935.3	1918.8	1935.3		*TL*	1	300	261
569	100	120	4	(30, 30, 30, 30)		2133.6	2129.6	2113.1	2120.4	0.2	*TL*	6	300	320
570	100	120	4	(10, 15, 30, 65)			2119.5	2105.1	2119.5		*TL*	1	300	252
571	100	240	2	(120, 120)			1236.7	1217.7	1236.7		*TL*	1	300	151
572	100	240	2	(80, 160)			1236.0	1217.5	1236.0		*TL*	1	300	140
573	100	240	3	(80, 80, 80)			1218.5	1218.5	1218.5		*TL*	1	300	10
574	100	240	3	(40, 80, 120)			1219.3	1219.3	1219.3		*TL*	1	0	0
575	100	240	4	(60, 60, 60, 60)							*TL*	0	0	0
576	100	240	4	(20, 30, 60, 130)							*TL*	0	0	0
577	100	240	2	(120, 120)			1375.8	1361.0	1375.8		*TL*	1	300	102
578	100	240	2	(80, 160)			1376.4	1361.0	1376.4		*TL*	1	300	91
579	100	240	3	(80, 80, 80)			1362.2	1362.2	1362.2		*TL*	1	0	0
580	100	240	3	(40, 80, 120)			1366.8	1366.8	1366.8		*TL*	1	0	0
581	100	240	4	(60, 60, 60, 60)							*TL*	0	0	0
582	100	240	4	(20, 30, 60, 130)							*TL*	0	0	0

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No.	$\|V\|$	Q	m	**Q**	opt	UB	LB_{tree}	LB_{LP}	LB_{cut}	gap	time	#BaB	#CC	#SRI
583	100	240	2	(120, 120)		1341.9	1291.6	1256.5	1291.6	3.8	*TL*	3	300	320
584	100	240	2	(80, 160)			1283.2	1256.5	1283.2		*TL*	1	300	316
585	100	240	3	(80, 80, 80)			1268.3	1256.9	1268.3		*TL*	1	300	51
586	100	240	3	(40, 80, 120)			1265.5	1256.9	1265.5		*TL*	1	300	30
587	100	240	4	(60, 60, 60, 60)			1278.5	1278.5	1278.5		*TL*	1	300	0
588	100	240	4	(20, 30, 60, 130)							*TL*	0	0	0
589	100	240	2	(120, 120)			1269.6	1253.6	1269.6		*TL*	1	300	90
590	100	240	2	(80, 160)			1268.6	1253.6	1268.6		*TL*	1	300	80
591	100	240	3	(80, 80, 80)			1257.9	1257.9	1257.9		*TL*	1	0	0
592	100	240	3	(40, 80, 120)							*TL*	0	0	0
593	100	240	4	(60, 60, 60, 60)							*TL*	0	0	0
594	100	240	4	(20, 30, 60, 130)							*TL*	0	0	0
595	100	240	2	(120, 120)			1379.7	1360.4	1379.7		*TL*	1	300	178
596	100	240	2	(80, 160)			1380.7	1360.4	1380.7		*TL*	1	300	186
597	100	240	3	(80, 80, 80)			1362.3	1362.3	1362.3		*TL*	1	300	0
598	100	240	3	(40, 80, 120)			1217.4	1217.4	1217.4		*TL*	1	0	0
599	100	240	4	(60, 60, 60, 60)			1373.9	1373.9	1373.9		*TL*	1	0	0
600	100	240	4	(20, 30, 60, 130)							*TL*	0	0	0