Documentation

Below is an explanation of the format of the instance definitions (text files). Note that tabulator is used as field separator rather than spaces.

NUMBER OF VEHICLES	CAPACITY	SPEED (not used)
K	Q	S

CUST. NO.	X	Y	DEMAND	EARLIEST PICKUP/DELIVERY TIME	LATEST PICKUP/DELIVERY TIME	SERVICE TIME	PICKUP(index to sibling)	DELIVERY(index to sibling)
0	x0	y0	q0	e0	l0	s0	p0	d0
1	x1	y1	q1	e1	l1	s1	p1	d1
…	…	…	…	…	…	…	…	…

Customer 0 is the depot. For pickup orders, the PICKUP index is 0, whereas the DELIVERY sibling gives the index of the corresponding delivery order. For delivery orders, the PICKUP index gives the index of the corresponding pickup order.

For examples of solution specification files, see for instance the 100 customers page. The format is

NEARP / MCGRP
PDPTW
Li & Lim benchmark
Documentation
100 customers
200 customers
400 customers
600 customers
800 customers
1000 customers
VRPTW
Contact information

100 customers

Here you find instance definitions and the best known solutions (to our knowledge) for the 100 customer instances of Li & Lim's PDPTW benchmark problems. The version reported here has a hierarchical objective: 1) Minimize number of vehicles 2) Minimize total distance. Distance and time should be calculated with double precision, total distance results are rounded to two decimals. Exact methods typically use a total distance objective and use integral or low precision distance and time calculations. Hence, results are not directly comparable.

For instance definitions, click here.

Best Known Results for PDPTW 100-cases

The instance names in blue are hyperlinks to files with corresponding detailed solutions. They have all been checked by our solution checker. Note that many best known solutions do not have a reference to a peer reviewed publication. For these, important details on the solution algorithm, the computing time, and the experimental platform are probably not available. Further, there is no guarantee that the solutions have been produced without using external information, such as detailed solutions published earlier. We may later introduce two categories: 'properly published' and 'freestyle', the latter with no restrictions.

Instance	Vehicles	Distance	Reference	Date
lc101s	10	828.94	Li & Lim	2001
lc102s	10	828.94	Li & Lim	2001
lc103s	9	1035.35	BVH	27-jun-03
lc104	9	860.01	SAM::OPT	11-apr-03
lc105s	10	828.94	Li & Lim	2001
lc106s	10	828.94	Li & Lim	2001
lc107s	10	828.94	Li & Lim	2001
lc108s	10	826.44	Li & Lim	2001
lc109q	9	1000.60	BVH	27-jun-03
lc201s	3	591.56	Li & Lim	2001
lc202s	3	591.56	Li & Lim	2001
lc203*	3	591.17	SAM::OPT	11-mar-03
lc204	3	590.60	SAM::OPT	08-mar-03
lc205s	3	588.88	Li & Lim	2001
lc206s	3	588.49	Li & Lim	2001
lc207s	3	588.29	Li & Lim	2001
lc208s	3	588.32	Li & Lim	2001
lr101s	19	1650.80	Li & Lim	2001
lr102s	17	1487.57	Li & Lim	2001
lr103s	13	1292.68	Li & Lim	2001
lr104s	9	1013.39	Li & Lim	2001
lr105s	14	1377.11	Li & Lim	2001
lr106s	12	1252.62	Li & Lim	2001
lr107s	10	1111.31	Li & Lim	2001
lr108s	9	968.97	Li & Lim	2001
lr109	11	1208.96	SAM::OPT	27-feb-03
lr110s	10	1159.35	Li & Lim	2001
lr111s	10	1108.90	Li & Lim	2001
lr112s	9	1003.77	Li & Lim	2001
lr201	4	1253.23	SAM::OPT	28-feb-03
lr202s	3	1197.67	Li & Lim	2001
lr203s	3	949.40	Li & Lim	2001
lr204s	2	849.05	Li & Lim	2001
lr205s	3	1054.02	Li & Lim	2001
lr206s	3	931.63	Li & Lim	2001
lr207s	2	903.06	Li & Lim	2001
lr208s	2	734.85	Li & Lim	2001

lr209	3	930.59	SAM::OPT	09-mar-03
lr210s	3	964.22	Li & Lim	2001
lr211	2	911.52	SAM::OPT	15-may-03
lrc101s	14	1708.80	Li & Lim	2001
lrc102	12	1558.07	SAM::OPT	19-feb-03
lrc103s	11	1258.74	Li & Lim	2001
lrc104s	10	1128.40	Li & Lim	2001
lrc105s	13	1637.62	Li & Lim	2001
lrc106	11	1424.73	SAM::OPT	28-feb-03
lrc107	11	1230.14	SAM::OPT	18-feb-03
lrc108	10	1147.43	SAM::OPT	28-feb-03
lrc201	4	1406.94	SAM::OPT	28-feb-03
lrc202s	3	1374.27	Li & Lim	2001
lrc203s	3	1089.07	Li & Lim	2001
lrc204	3	818.66	SAM::OPT	23-mar-03
lrc205s	4	1302.20	Li & Lim	2001
lrc206	3	1159.03	SAM::OPT	12-mar-03
lrc207	3	1062.05	SAM::OPT	04-jan-04
lrc208s	3	852.76	Li & Lim	2001

s: Detailed solution provided by SAM::OPT
q: Detailed solution provided by Q

*** The value 585.56 reported by Li & Lim and also here earlier does not seem compatible with the optimal solution value 591.2 reported in Røpke's PhD Thesis (see R below). We thank Richard Kelly at Monash University for pointing this out.**

References

BVH - Bent, R. and Van Hentenryck. P. A: Two-Stage Hybrid Algorithm for Pickup and Delivery Vehicle Routing Problems with Time Windows. In Principles and Practice of Constraint Programming (2003).

Li & Lim - Li H. and A. Lim: A MetaHeuristic for the Pickup and Delivery Problem with Time Windows, In Proceedings of the 13th International Conference on Tools with Artificial Intelligence, Dallas, TX, USA, 2001.

Q - Quintiq. http://www.quintiq.com/optimization-world-records.aspx.

R - Ropke S. Heuristic and exact algorithms for vehicle routing problems. (2005) . Ph.D. thesis, Computer Science Department, University of Copenhagen (DIKU), Copenhagen