



รายการอ้างอิง

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ภาคผนวก

ภาคผนวก ก

สำหรับปัญหาการหาที่ตั้งของสถานประกอบการใช้ปัญหามาตรฐานทั้งหมด 7 ปัญหา
ได้แก่ ปัญหา

1. cap41
2. cap42
3. cap43
4. cap44
5. cap51
6. cap61
7. cap62

ข้อมูลของแต่ละปัญหาจะประกอบไปด้วย จำนวนของสถานที่ตั้งที่เป็นไปได้ของคุณ
กระจายสินค้า จำนวนในความต้องการ ความสามารถในการให้บริการของแต่ละสถานที่ตั้ง
ค่าใช้จ่ายในการตั้งศูนย์ในแต่ละที่ตั้ง ปริมาณความต้องการของในความต้องการ และค่าใช้จ่าย
ในการจัดสรรปริมาณความต้องการทั้งหมดให้แก่แต่ละสถานที่ตั้ง

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6739.72500 10355.05000 7650.40000 5219.50000 5776.12500 6641.17500
4374.52500 3847.10000 6429.47500 5396.52500 5219.50000 4182.90000
7391.25000 5038.82500 10349.57500 6051.70000

87

3204.86250 5457.07500 3845.40000 2396.85000 2628.48750 3220.08750
1838.96250 2266.35000 3117.86250 2582.81250 2296.80000 1779.15000
5115.60000 2189.13750 5399.43750 2838.37500

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4914.00000 26409.60000 19622.40000 13876.80000 9147.60000 14977.20000
21848.40000 35330.40000 15111.60000 23679.60000 9828.00000 19303.20000
57472.80000 11180.40000 22957.20000 15489.60000

1337

32372.11250 29982.22500 21024.32500 29681.40000 21275.01250
20071.71250 64292.98750 80186.57500 25921.08750 69206.46250
23096.67500 48700.22500 135170.70000 40527.81250 60515.96250
52911.77500

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1715.46250 2152.17500 1577.90000 1061.75000 1250.46250 1363.61250
1524.03750 955.57500 1318.66250 1789.08750 1133.05000 1015.25000
2005.70000 1379.88750 2512.93750 1823.57500

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6421.51250 23701.60000 16197.02500 10383.42500 7483.61250 12332.93750
15840.66250 27251.25000 12444.73750 17769.21250 7029.42500 13919.10000
45474.65000 6966.53750 20326.63750 10956.40000

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81972.37500 28499.25000 43134.00000 65767.50000 58805.62500
48555.37500 138615.37500 155294.25000 53176.87500 147325.12500
56998.50000 102384.00000 259515.00000 96429.37500 131920.12500
118381.50000

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33391.46250 26544.37500 6370.65000 16770.60000 13571.66250 8861.73750

51550.53750 57907.57500 10985.28750 57376.68750 12741.30000

33595.65000 105796.35000 32220.78750 60071.96250 46527.52500

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2020.83750 2480.77500 1869.45000 1324.95000 1525.83750 1646.28750

1817.06250 1211.92500 1593.48750 2099.21250 1395.90000 1275.45000

1940.40000 1663.61250 2869.76250 2135.92500

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1459.60000 1995.20000 1402.40000 869.60000 1050.80000 1181.20000

1133.20000 546.40000 1134.80000 1406.80000 928.80000 768.80000

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66146.06250 198300.81250 220212.12500 58178.31250 241573.93750

25277.00000 97536.25000 461992.12500 106122.18750 288418.81250

185456.25000

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17684.50000 32069.40000 15322.80000 8429.80000 1231.70000 9073.90000

32781.30000 41335.40000 9254.70000 37595.10000 2463.40000 19775.00000

79235.60000 16712.70000 41956.90000 28589.00000

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38207.62500 42477.35000 15319.70000 15832.80000 11526.42500 5185.97500

62653.17500 71210.95000 11563.07500 70496.27500 10371.95000

38482.50000 135275.15000 36631.67500 77569.72500 55891.25000

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1953.73750 5044.32500 4089.80000 3428.42500 2289.78750 3530.31250

5553.76250 8308.30000 3558.91250 5947.01250 2434.57500 4897.75000

13134.55000 3283.63750

4634.98750 4204.20000

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17181.56250 36054.37500 25399.50000 16297.50000 15828.56250
21148.31250 7310.81250 21709.50000 20779.31250 12569.06250 14621.62500
11931.00000 39913.50000 11169.93750 32479.68750 14375.62500

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25640.85000 35602.50000 25154.40000 15763.80000 18421.65000
21255.75000 18478.05000 8135.70000 20437.95000 23300.25000 16271.40000
12619.50000 35094.90000 19253.55000 39867.75000 24957.00000

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7031.42500 10492.05000 6305.40000 2542.50000 3918.27500 4743.17500
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22846.20000 74042.80000 274079.00000 75211.50000 159433.30000
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9452.71250 12441.27500 7754.45000 3542.00000 5082.13750 6005.58750
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5467.31250 6371.62500 8870.06250 6729.93750 7312.50000 5869.50000
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1581.27500 2030.15000 1326.20000 693.50000 924.82500 1063.52500
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1950.40000 1145.20000 2314.80000 1500.80000

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1466

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78453.70000 92515.80000 36644.40000 27445.60000 23562.50000
23034.70000 126332.70000
141375.00000 11423.10000 144881.10000 22846.20000 74042.80000
274079.00000 75211.50000
159433.30000 114834.20000
253
9452.71250 12441.27500 7754.45000 3542.00000 5082.13750 6005.58750
10274.96250
10214.87500 5638.73750 12438.11250 4123.90000 5635.57500 21789.62500
8073.86250
16239.43750 11726.55000
195

8597.06250 14113.12500 10500.75000 7254.00000 7875.56250 9152.81250
5467.31250

6371.62500 8870.06250 6729.93750 7312.50000 5869.50000 9506.25000
6695.81250

13554.93750 7707.37500

38

1581.27500 2030.15000 1326.20000 693.50000 924.82500 1063.52500
1628.77500

1619.75000 1008.42500 1953.67500 780.90000 931.95000 3066.60000
1298.17500

2600.62500 1846.80000

807

23170.98750 48702.45000 36072.90000 26166.97500 23493.78750
30494.51250 14919.41250

33813.30000 30655.91250 11166.86250 22333.72500 20982.00000
56025.97500 17380.76250

40178.51250 15978.60000

551

12087.56250 19877.32500 9670.05000 3801.90000 2252.21250 5847.48750
19650.03750

23844.52500 6260.73750 22873.38750 .00000 10703.17500 46945.20000
10145.28750

26881.91250 17728.42500

304

4883.00000 12851.60000 10822.40000 8930.00000 6798.20000 9435.40000
11943.40000

18148.80000 9496.20000 11616.60000 7106.00000 10898.40000 28226.40000
7117.40000

7725.40000 7911.60000

814

24063.87500 39682.50000 24603.15000 11050.05000 13644.67500
18976.37500 20197.37500
24684.55000 17796.07500 27157.07500 10541.30000 5270.65000 59259.20000
14845.32500
44597.02500 26495.70000
337
4124.03750 12148.85000 8180.67500 5611.05000 2952.96250 5851.16250
11613.86250
17111.17500 5918.56250 12852.33750 3268.90000 9073.72500 29479.07500
5623.68750
13172.48750 8745.15000
4368
281463.00000 406770.00000 325852.80000 253234.80000 264755.40000
294457.80000 211356.60000
210756.00000 289434.60000 239639.40000 248102.40000 222222.00000
124051.20000 238875.00000
392519.40000 261534.00000
577
11056.76250 22113.52500 11424.60000 5582.47500 2430.61250 7436.08750
19279.01250
25460.12500 7551.48750 22351.53750 1601.17500 11698.67500 49650.85000
9022.83750
26549.21250 16963.80000
482
8585.62500 22449.15000 14122.60000 7458.95000 6609.42500 10790.77500
11525.82500
20448.85000 10887.17500 14092.47500 5916.55000 8953.15000 37089.90000
2958.27500
20575.37500 9917.15000
495

12480.18750 25455.37500 22151.25000 19069.87500 15598.68750
19892.81250 23976.56250
34080.75000 19991.81250 23444.43750 16099.87500 22275.00000
50490.00000 16118.43750
8049.93750 17411.62500
231
3727.76250 11116.87500 8229.37500 5826.97500 4628.66250 6632.58750
6476.66250
11884.95000 6678.78750 6101.28750 4440.97500 6843.37500 18722.55000
3693.11250
8596.08750 3285.97500
322
4673.02500 13346.90000 7880.95000 4330.90000 2861.77500 5655.12500
9623.77500
14610.75000 5719.52500 11338.42500 2398.90000 6931.05000 26701.85000
3900.22500
13310.67500 7961.45000
685
13451.68750 35106.25000 25927.25000 17347.62500 15249.81250
21192.18750 16808.18750
32845.75000 21329.18750 15695.06250 14693.25000 19385.50000
53121.75000 10951.43750
27888.06250 7346.62500
12912
372672.60000 229188.00000 203364.00000 322800.00000 261306.60000
229995.00000 681269.40000
810550.80000 258078.60000 728398.20000 261790.80000 512606.40000
1361570.40000 451435.80000
644793.00000 575875.20000
325

9745.93750 18070.00000 12049.37500 7198.75000 7592.81250 9802.81250
5780.93750
10692.50000 9607.81250 8559.68750 6353.75000 4891.25000 21336.25000
5951.56250
17830.31250 9514.37500
366
12055.12500 18181.05000 11400.90000 5307.00000 7379.47500 8870.92500
10865.62500
10202.25000 8340.22500 13994.92500 5984.10000 4154.10000 26946.75000
8459.17500
21470.47500 13697.55000
3671
97602.71250 73603.55000 59561.97500 83331.70000 65940.33750
56946.38750 185247.83750
222003.72500 73007.01250 198738.76250 65986.22500 137295.40000
378755.42500 119995.81250
174969.03750 155375.07500
2213
60774.51250 63568.42500 27330.55000 30982.00000 20497.91250
15076.06250 97731.61250
114578.07500 24757.93750 109515.83750 20525.57500 63513.10000
209073.17500 58395.53750
114439.76250 87468.82500
705
54470.06250 65177.25000 52117.12500 40378.87500 44494.31250
47243.81250 47631.56250
34351.12500 46820.81250 53659.31250 42775.87500 39250.87500
40960.50000 48318.93750
73399.31250 55712.62500
328

7146.30000 8618.20000 6428.80000 7822.80000 5211.10000 5621.10000
15256.10000
19762.00000 7047.90000 16305.70000 5658.00000 11939.20000 32644.20000
9417.70000
13583.30000 12308.20000
1681
38011.61250 70728.07500 39587.55000 15801.40000 16494.81250
27925.61250 49862.66250
62659.27500 26917.01250 61965.86250 10086.00000 22567.42500
133135.20000 23134.76250
81255.33750 47404.20000
1117
39723.31250 52917.87500 32225.45000 13627.40000 20427.13750
24504.18750 41119.56250
40854.27500 22884.53750 50669.91250 16196.50000 20636.57500
91957.02500 31401.66250
69686.83750 47528.35000
275
16111.56250 20714.37500 15620.00000 11041.25000 12598.43750
13719.06250 12502.18750
7885.62500 13320.31250 14853.43750 11550.00000 10071.87500 13193.12500
13052.18750
23103.43750 15654.37500
500
16981.25000 32575.00000 23312.50000 16250.00000 16268.75000
19856.25000 9331.25000
20750.00000 19556.25000 9543.75000 14550.00000 13087.50000 32087.50000
12481.25000
27518.75000 12525.00000
2241

168663.26250 210766.05000 169251.52500 131938.87500 144628.53750
153760.61250 134768.13750
109304.77500 150511.16250 149278.61250 136084.72500 124879.72500
89976.15000 142499.58750
224408.13750 160511.62500
733
57109.86250 66703.00000 53124.17500 40919.72500 45381.86250
48057.31250 52583.58750
39050.57500 46994.46250 58814.08750 42605.62500 40553.22500
45922.45000 49175.13750
75966.28750 61003.92500
222
15576.07500 18481.50000 14368.95000 10672.65000 12024.07500
12834.37500 14205.22500
10134.30000 12512.47500 16103.32500 11183.25000 10561.65000
14940.60000 13172.92500
21287.02500 16755.45000
49
2542.48750 3928.57500 3020.85000 2205.00000 2361.18750 2682.13750
1756.03750
1983.27500 2611.08750 2073.31250 2174.37500 1857.10000 2006.55000
2064.73750
3788.31250 2318.92500
1464
34056.30000 34221.00000 24448.80000 31329.60000 21905.10000
20807.10000 69009.30000
86632.20000 27212.10000 74352.90000 23899.80000 51935.40000
147937.20000 42986.70000
64873.50000 56510.40000
222

7095.67500 11999.10000 7886.55000 4190.25000 4847.92500 6351.97500
4903.42500
6421.35000 6030.07500 6801.52500 4001.55000 2614.05000 14979.45000
4503.82500
12617.92500 7448.10000

สำหรับปัญหาการจัดเส้นทางการเดินทางที่มีข้อจำกัดด้านกรอบเวลาใช้ปัญหามาตรฐาน
ทั้งหมด 7 ปัญหาได้แก่ ปัญหา

1. r101
2. r102
3. r103
4. r104
5. r105
6. r106
7. r107

ข้อมูลของแต่ละปัญหาจะประกอบไปด้วย จำนวนของยานพาหนะ ความจุของ
ยานพาหนะ สถานที่ตั้งของโหนดความต้องการ ปริมาณความต้องการของโหนดความต้องการ เวลา
เริ่มต้นที่สามารถรับบริการ เวลาสิ้นสุดที่สามารถรับบริการ และเวลาที่ต้องใช้รับบริการ

1. r101

R101

VEHICLE

NUMBER	CAPACITY
25	200

CUSTOMER

CUST NO.	XCOORD.	YCOORD.	DEMAND	READY TIME	DUE DATE	SERVICE TIME
0	35	35	0	0	230	0
1	41	49	10	161	171	10
2	35	17	7	50	60	10
3	55	45	13	116	126	10
4	55	20	19	149	159	10
5	15	30	26	34	44	10
6	25	30	3	99	109	10
7	20	50	5	81	91	10
8	10	43	9	95	105	10
9	55	60	16	97	107	10

10	30	60	16	124	134	10
11	20	65	12	67	77	10
12	50	35	19	63	73	10
13	30	25	23	159	169	10
14	15	10	20	32	42	10
15	30	5	8	61	71	10
16	10	20	19	75	85	10
17	5	30	2	157	167	10
18	20	40	12	87	97	10
19	15	60	17	76	86	10
20	45	65	9	126	136	10
21	45	20	11	62	72	10
22	45	10	18	97	107	10
23	55	5	29	68	78	10
24	65	35	3	153	163	10
25	65	20	6	172	182	10
26	45	30	17	132	142	10
27	35	40	16	37	47	10
28	41	37	16	39	49	10
29	64	42	9	63	73	10
30	40	60	21	71	81	10
31	31	52	27	50	60	10
32	35	69	23	141	151	10
33	53	52	11	37	47	10
34	65	55	14	117	127	10
35	63	65	8	143	153	10
36	2	60	5	41	51	10
37	20	20	8	134	144	10
38	5	5	16	83	93	10
39	60	12	31	44	54	10
40	40	25	9	85	95	10
41	42	7	5	97	107	10
42	24	12	5	31	41	10

43	23	3	7	132	142	10
44	11	14	18	69	79	10
45	6	38	16	32	42	10
46	2	48	1	117	127	10
47	8	56	27	51	61	10
48	13	52	36	165	175	10
49	6	68	30	108	118	10
50	47	47	13	124	134	10
51	49	58	10	88	98	10
52	27	43	9	52	62	10
53	37	31	14	95	105	10
54	57	29	18	140	150	10
55	63	23	2	136	146	10
56	53	12	6	130	140	10
57	32	12	7	101	111	10
58	36	26	18	200	210	10
59	21	24	28	18	28	10
60	17	34	3	162	172	10
61	12	24	13	76	86	10
62	24	58	19	58	68	10
63	27	69	10	34	44	10
64	15	77	9	73	83	10
65	62	77	20	51	61	10
66	49	73	25	127	137	10
67	67	5	25	83	93	10
68	56	39	36	142	152	10
69	37	47	6	50	60	10
70	37	56	5	182	192	10
71	57	68	15	77	87	10
72	47	16	25	35	45	10
73	44	17	9	78	88	10
74	46	13	8	149	159	10
75	49	11	18	69	79	10

76	49	42	13	73	83	10
77	53	43	14	179	189	10
78	61	52	3	96	106	10
79	57	48	23	92	102	10
80	56	37	6	182	192	10
81	55	54	26	94	104	10
82	15	47	16	55	65	10
83	14	37	11	44	54	10
84	11	31	7	101	111	10
85	16	22	41	91	101	10
86	4	18	35	94	104	10
87	28	18	26	93	103	10
88	26	52	9	74	84	10
89	26	35	15	176	186	10
90	31	67	3	95	105	10
91	15	19	1	160	170	10
92	22	22	2	18	28	10
93	18	24	22	188	198	10
94	26	27	27	100	110	10
95	25	24	20	39	49	10
96	22	27	11	135	145	10
97	25	21	12	133	143	10
98	19	21	10	58	68	10
99	20	26	9	83	93	10
100	18	18	17	185	195	10

2. r102

R102

VEHICLE

NUMBER CAPACITY

25 200

CUSTOMER

CUST				READY	DUE	SERVICE
NO.	XCOORD.	YCOORD.	DEMAND	TIME	DATE	TIME
0	35	35	0	0	230	0
1	41	49	10	0	204	10
2	35	17	7	0	202	10
3	55	45	13	0	197	10
4	55	20	19	149	159	10
5	15	30	26	0	199	10
6	25	30	3	99	109	10
7	20	50	5	0	198	10
8	10	43	9	95	105	10
9	55	60	16	97	107	10
10	30	60	16	124	134	10
11	20	65	12	67	77	10
12	50	35	19	0	205	10
13	30	25	23	159	169	10
14	15	10	20	32	42	10
15	30	5	8	61	71	10
16	10	20	19	75	85	10
17	5	30	2	157	167	10
18	20	40	12	87	97	10
19	15	60	17	76	86	10
20	45	65	9	126	136	10
21	45	20	11	0	201	10
22	45	10	18	97	107	10
23	55	5	29	68	78	10
24	65	35	3	153	163	10
25	65	20	6	172	182	10
26	45	30	17	0	208	10
27	35	40	16	37	47	10
28	41	37	16	39	49	10

29	64	42	9	63	73	10
30	40	60	21	71	81	10
31	31	52	27	0	202	10
32	35	69	23	141	151	10
33	53	52	11	37	47	10
34	65	55	14	0	183	10
35	63	65	8	143	153	10
36	2	60	5	41	51	10
37	20	20	8	0	198	10
38	5	5	16	83	93	10
39	60	12	31	44	54	10
40	40	25	9	85	95	10
41	42	7	5	97	107	10
42	24	12	5	31	41	10
43	23	3	7	132	142	10
44	11	14	18	69	79	10
45	6	38	16	32	42	10
46	2	48	1	117	127	10
47	8	56	27	51	61	10
48	13	52	36	0	192	10
49	6	68	30	108	118	10
50	47	47	13	0	203	10
51	49	58	10	88	98	10
52	27	43	9	0	208	10
53	37	31	14	95	105	10
54	57	29	18	140	150	10
55	63	23	2	136	146	10
56	53	12	6	130	140	10
57	32	12	7	101	111	10
58	36	26	18	200	210	10
59	21	24	28	0	202	10
60	17	34	3	162	172	10
61	12	24	13	76	86	10

62	24	58	19	58	68	10
63	27	69	10	34	44	10
64	15	77	9	73	83	10
65	62	77	20	51	61	10
66	49	73	25	127	137	10
67	67	5	25	83	93	10
68	56	39	36	142	152	10
69	37	47	6	50	60	10
70	37	56	5	182	192	10
71	57	68	15	77	87	10
72	47	16	25	0	197	10
73	44	17	9	78	88	10
74	46	13	8	149	159	10
75	49	11	18	0	192	10
76	49	42	13	73	83	10
77	53	43	14	179	189	10
78	61	52	3	96	106	10
79	57	48	23	92	102	10
80	56	37	6	182	192	10
81	55	54	26	94	104	10
82	15	47	16	0	196	10
83	14	37	11	0	198	10
84	11	31	7	101	111	10
85	16	22	41	0	196	10
86	4	18	35	94	104	10
87	28	18	26	93	103	10
88	26	52	9	74	84	10
89	26	35	15	176	186	10
90	31	67	3	95	105	10
91	15	19	1	0	194	10
92	22	22	2	18	28	10
93	18	24	22	188	198	10
94	26	27	27	0	207	10

95	25	24	20	0	205	10
96	22	27	11	0	204	10
97	25	21	12	133	143	10
98	19	21	10	0	198	10
99	20	26	9	83	93	10
100	18	18	17	185	195	10

3. r103

R103

VEHICLE

NUMBER	CAPACITY
25	200

CUSTOMER

CUST NO.	XCOORD.	YCOORD.	DEMAND	READY		DUE DATE	SERVICE TIME
				TIME			
0	35	35	0	0		230	0
1	41	49	10	0		204	10
2	35	17	7	0		202	10
3	55	45	13	0		197	10
4	55	20	19	149		159	10
5	15	30	26	0		199	10
6	25	30	3	99		109	10
7	20	50	5	0		198	10
8	10	43	9	95		105	10
9	55	60	16	97		107	10
10	30	60	16	124		134	10
11	20	65	12	67		77	10
12	50	35	19	0		205	10
13	30	25	23	159		169	10

14	15	10	20	0	187	10
15	30	5	8	61	71	10
16	10	20	19	0	190	10
17	5	30	2	157	167	10
18	20	40	12	0	204	10
19	15	60	17	0	187	10
20	45	65	9	0	188	10
21	45	20	11	0	201	10
22	45	10	18	97	107	10
23	55	5	29	68	78	10
24	65	35	3	0	190	10
25	65	20	6	172	182	10
26	45	30	17	0	208	10
27	35	40	16	37	47	10
28	41	37	16	0	213	10
29	64	42	9	0	190	10
30	40	60	21	71	81	10
31	31	52	27	0	202	10
32	35	69	23	0	186	10
33	53	52	11	37	47	10
34	65	55	14	0	183	10
35	63	65	8	143	153	10
36	2	60	5	41	51	10
37	20	20	8	0	198	10
38	5	5	16	83	93	10
39	60	12	31	44	54	10
40	40	25	9	85	95	10
41	42	7	5	97	107	10
42	24	12	5	31	41	10
43	23	3	7	0	185	10
44	11	14	18	69	79	10
45	6	38	16	32	42	10

46	2	48	1	0	184	10
47	8	56	27	0	185	10
48	13	52	36	0	192	10
49	6	68	30	108	118	10
50	47	47	13	0	203	10
51	49	58	10	0	193	10
52	27	43	9	0	208	10
53	37	31	14	95	105	10
54	57	29	18	0	197	10
55	63	23	2	136	146	10
56	53	12	6	130	140	10
57	32	12	7	0	196	10
58	36	26	18	200	210	10
59	21	24	28	0	202	10
60	17	34	3	0	201	10
61	12	24	13	0	194	10
62	24	58	19	58	68	10
63	27	69	10	0	185	10
64	15	77	9	73	83	10
65	62	77	20	51	61	10
66	49	73	25	127	137	10
67	67	5	25	83	93	10
68	56	39	36	142	152	10
69	37	47	6	50	60	10
70	37	56	5	182	192	10
71	57	68	15	0	180	10
72	47	16	25	0	197	10
73	44	17	9	0	199	10
74	46	13	8	149	159	10
75	49	11	18	0	192	10
76	49	42	13	73	83	10
77	53	43	14	179	189	10

78	61	52	3	96	106	10
79	57	48	23	92	102	10
80	56	37	6	182	192	10
81	55	54	26	0	192	10
82	15	47	16	0	196	10
83	14	37	11	0	198	10
84	11	31	7	101	111	10
85	16	22	41	0	196	10
86	4	18	35	0	184	10
87	28	18	26	93	103	10
88	26	52	9	74	84	10
89	26	35	15	0	211	10
90	31	67	3	0	187	10
91	15	19	1	0	194	10
92	22	22	2	18	28	10
93	18	24	22	188	198	10
94	26	27	27	0	207	10
95	25	24	20	0	205	10
96	22	27	11	0	204	10
97	25	21	12	0	202	10
98	19	21	10	0	198	10
99	20	26	9	83	93	10
100	18	18	17	185	195	10

4. r104

R104

VEHICLE

NUMBER CAPACITY

25 200

CUSTOMER

NO.	XCOORD.	YCOORD.	DEMAND	READY	DUE	SERVICE
0	35	35	0	0	230	0
1	41	49	10	0	204	10
2	35	17	7	0	202	10
3	55	45	13	0	197	10
4	55	20	19	149	159	10
5	15	30	26	0	199	10
6	25	30	3	0	208	10
7	20	50	5	0	198	10
8	10	43	9	95	105	10
9	55	60	16	97	107	10
10	30	60	16	0	194	10
11	20	65	12	67	77	10
12	50	35	19	0	205	10
13	30	25	23	159	169	10
14	15	10	20	0	187	10
15	30	5	8	61	71	10
16	10	20	19	0	190	10
17	5	30	2	0	189	10
18	20	40	12	0	204	10
19	15	60	17	0	187	10
20	45	65	9	0	188	10
21	45	20	11	0	201	10
22	45	10	18	0	193	10
23	55	5	29	68	78	10
24	65	35	3	0	190	10
25	65	20	6	172	182	10
26	45	30	17	0	208	10
27	35	40	16	0	215	10
28	41	37	16	0	213	10
29	64	42	9	0	190	10

30	40	60	21	0	194	10
31	31	52	27	0	202	10
32	35	69	23	0	186	10
33	53	52	11	0	195	10
34	65	55	14	0	183	10
35	63	65	8	0	178	10
36	2	60	5	0	178	10
37	20	20	8	0	198	10
38	5	5	16	83	93	10
39	60	12	31	0	186	10
40	40	25	9	0	208	10
41	42	7	5	0	191	10
42	24	12	5	0	194	10
43	23	3	7	0	185	10
44	11	14	18	69	79	10
45	6	38	16	0	190	10
46	2	48	1	0	184	10
47	8	56	27	0	185	10
48	13	52	36	0	192	10
49	6	68	30	0	176	10
50	47	47	13	0	203	10
51	49	58	10	0	193	10
52	27	43	9	0	208	10
53	37	31	14	95	105	10
54	57	29	18	0	197	10
55	63	23	2	136	146	10
56	53	12	6	0	190	10
57	32	12	7	0	196	10
58	36	26	18	200	210	10
59	21	24	28	0	202	10
60	17	34	3	0	201	10
61	12	24	13	0	194	10

62	24	58	19	58	68	10
63	27	69	10	0	185	10
64	15	77	9	0	173	10
65	62	77	20	0	170	10
66	49	73	25	0	179	10
67	67	5	25	83	93	10
68	56	39	36	0	198	10
69	37	47	6	50	60	10
70	37	56	5	0	198	10
71	57	68	15	0	180	10
72	47	16	25	0	197	10
73	44	17	9	0	199	10
74	46	13	8	149	159	10
75	49	11	18	0	192	10
76	49	42	13	73	83	10
77	53	43	14	179	189	10
78	61	52	3	0	188	10
79	57	48	23	92	102	10
80	56	37	6	0	198	10
81	55	54	26	0	192	10
82	15	47	16	0	196	10
83	14	37	11	0	198	10
84	11	31	7	101	111	10
85	16	22	41	0	196	10
86	4	18	35	0	184	10
87	28	18	26	93	103	10
88	26	52	9	0	200	10
89	26	35	15	0	211	10
90	31	67	3	0	187	10
91	15	19	1	0	194	10
92	22	22	2	18	28	10
93	18	24	22	0	199	10

94	26	27	27	0	207	10
95	25	24	20	0	205	10
96	22	27	11	0	204	10
97	25	21	12	0	202	10
98	19	21	10	0	198	10
99	20	26	9	83	93	10
100	18	18	17	185	195	10

5. r105

R105

VEHICLE

NUMBER	CAPACITY
25	200

CUSTOMER

CUST NO.	XCOORD.	YCOORD.	DEMAND	READY		DUE DATE	SERVICE TIME
				TIME			
0	35	35	0	0		230	0
1	41	49	10	151		181	10
2	35	17	7	40		70	10
3	55	45	13	106		136	10
4	55	20	19	139		169	10
5	15	30	26	24		54	10
6	25	30	3	89		119	10
7	20	50	5	71		101	10
8	10	43	9	85		115	10
9	55	60	16	87		117	10
10	30	60	16	114		144	10
11	20	65	12	57		87	10
12	50	35	19	53		83	10

13	30	25	23	149	179	10
14	15	10	20	32	62	10
15	30	5	8	51	81	10
16	10	20	19	65	95	10
17	5	30	2	147	177	10
18	20	40	12	77	107	10
19	15	60	17	66	96	10
20	45	65	9	116	146	10
21	45	20	11	52	82	10
22	45	10	18	87	117	10
23	55	5	29	58	88	10
24	65	35	3	143	173	10
25	65	20	6	156	186	10
26	45	30	17	122	152	10
27	35	40	16	27	57	10
28	41	37	16	29	59	10
29	64	42	9	53	83	10
30	40	60	21	61	91	10
31	31	52	27	40	70	10
32	35	69	23	131	161	10
33	53	52	11	27	57	10
34	65	55	14	107	137	10
35	63	65	8	133	163	10
36	2	60	5	41	71	10
37	20	20	8	124	154	10
38	5	5	16	73	103	10
39	60	12	31	34	64	10
40	40	25	9	75	105	10
41	42	7	5	87	117	10
42	24	12	5	25	55	10
43	23	3	7	122	152	10
44	11	14	18	59	89	10

45	6	38	16	29	59	10
46	2	48	1	107	137	10
47	8	56	27	41	71	10
48	13	52	36	155	185	10
49	6	68	30	98	128	10
50	47	47	13	114	144	10
51	49	58	10	78	108	10
52	27	43	9	42	72	10
53	37	31	14	85	115	10
54	57	29	18	130	160	10
55	63	23	2	126	156	10
56	53	12	6	120	150	10
57	32	12	7	91	121	10
58	36	26	18	180	210	10
59	21	24	28	17	47	10
60	17	34	3	152	182	10
61	12	24	13	66	96	10
62	24	58	19	48	78	10
63	27	69	10	34	64	10
64	15	77	9	63	93	10
65	62	77	20	49	79	10
66	49	73	25	117	147	10
67	67	5	25	73	103	10
68	56	39	36	132	162	10
69	37	47	6	40	70	10
70	37	56	5	168	198	10
71	57	68	15	67	97	10
72	47	16	25	25	55	10
73	44	17	9	68	98	10
74	46	13	8	139	169	10
75	49	11	18	59	89	10
76	49	42	13	63	93	10

77	53	43	14	169	199	10
78	61	52	3	86	116	10
79	57	48	23	82	112	10
80	56	37	6	168	198	10
81	55	54	26	84	114	10
82	15	47	16	45	75	10
83	14	37	11	34	64	10
84	11	31	7	91	121	10
85	16	22	41	81	111	10
86	4	18	35	84	114	10
87	28	18	26	83	113	10
88	26	52	9	64	94	10
89	26	35	15	166	196	10
90	31	67	3	85	115	10
91	15	19	1	150	180	10
92	22	22	2	18	48	10
93	18	24	22	169	199	10
94	26	27	27	90	120	10
95	25	24	20	29	59	10
96	22	27	11	125	155	10
97	25	21	12	123	153	10
98	19	21	10	48	78	10
99	20	26	9	73	103	10
100	18	18	17	165	195	10

6. r106

R106

VEHICLE

NUMBER

CAPACITY

25

200



CUSTOMER

CUST NO.	XCOORD.	YCOORD.	DEMAND	READY		DUE DATE	SERVICE TIME
				TIME			
0	35	35	0	0		230	0
1	41	49	10	0		204	10
2	35	17	7	0		202	10
3	55	45	13	0		197	10
4	55	20	19	139		169	10
5	15	30	26	0		199	10
6	25	30	3	89		119	10
7	20	50	5	0		198	10
8	10	43	9	85		115	10
9	55	60	16	87		117	10
10	30	60	16	114		144	10
11	20	65	12	57		87	10
12	50	35	19	0		205	10
13	30	25	23	149		179	10
14	15	10	20	32		62	10
15	30	5	8	51		81	10
16	10	20	19	65		95	10
17	5	30	2	147		177	10
18	20	40	12	77		107	10
19	15	60	17	66		96	10
20	45	65	9	116		146	10
21	45	20	11	0		201	10
22	45	10	18	87		117	10
23	55	5	29	58		88	10
24	65	35	3	143		173	10
25	65	20	6	156		186	10
26	45	30	17	0		208	10
27	35	40	16	27		57	10

28	41	37	16	29	59	10
29	64	42	9	53	83	10
30	40	60	21	61	91	10
31	31	52	27	0	202	10
32	35	69	23	131	161	10
33	53	52	11	27	57	10
34	65	55	14	0	183	10
35	63	65	8	133	163	10
36	2	60	5	41	71	10
37	20	20	8	0	198	10
38	5	5	16	73	103	10
39	60	12	31	34	64	10
40	40	25	9	75	105	10
41	42	7	5	87	117	10
42	24	12	5	25	55	10
43	23	3	7	122	152	10
44	11	14	18	59	89	10
45	6	38	16	29	59	10
46	2	48	1	107	137	10
47	8	56	27	41	71	10
48	13	52	36	0	192	10
49	6	68	30	98	128	10
50	47	47	13	0	203	10
51	49	58	10	78	108	10
52	27	43	9	0	208	10
53	37	31	14	85	115	10
54	57	29	18	130	160	10
55	63	23	2	126	156	10
56	53	12	6	120	150	10
57	32	12	7	91	121	10
58	36	26	18	180	210	10
59	21	24	28	0	202	10

60	17	34	3	152	182	10
61	12	24	13	66	96	10
62	24	58	19	48	78	10
63	27	69	10	34	64	10
64	15	77	9	63	93	10
65	62	77	20	49	79	10
66	49	73	25	117	147	10
67	67	5	25	73	103	10
68	56	39	36	132	162	10
69	37	47	6	40	70	10
70	37	56	5	168	198	10
71	57	68	15	67	97	10
72	47	16	25	0	197	10
73	44	17	9	68	98	10
74	46	13	8	139	169	10
75	49	11	18	0	192	10
76	49	42	13	63	93	10
77	53	43	14	169	199	10
78	61	52	3	86	116	10
79	57	48	23	82	112	10
80	56	37	6	168	198	10
81	55	54	26	84	114	10
82	15	47	16	0	196	10
83	14	37	11	0	198	10
84	11	31	7	91	121	10
85	16	22	41	0	196	10
86	4	18	35	84	114	10
87	28	18	26	83	113	10
88	26	52	9	64	94	10
89	26	35	15	166	196	10
90	31	67	3	85	115	10
91	15	19	1	0	194	10

92	22	22	2	18	48	10
93	18	24	22	169	199	10
94	26	27	27	0	207	10
95	25	24	20	0	205	10
96	22	27	11	0	204	10
97	25	21	12	123	153	10
98	19	21	10	0	198	10
99	20	26	9	73	103	10
100	18	18	17	165	195	10

7. r107

R107

VEHICLE

NUMBER	CAPACITY
25	200

CUSTOMER

CUST NO.	XCOORD.	YCOORD.	DEMAND	READY		DUE DATE	SERVICE TIME
				TIME			
0	35	35	0	0		230	0
1	41	49	10	0		204	10
2	35	17	7	0		202	10
3	55	45	13	0		197	10
4	55	20	19	139		169	10
5	15	30	26	0		199	10
6	25	30	3	89		119	10
7	20	50	5	0		198	10
8	10	43	9	85		115	10
9	55	60	16	87		117	10
10	30	60	16	114		144	10

11	20	65	12	57	87	10
12	50	35	19	0	205	10
13	30	25	23	149	179	10
14	15	10	20	0	187	10
15	30	5	8	51	81	10
16	10	20	19	0	190	10
17	5	30	2	147	177	10
18	20	40	12	0	204	10
19	15	60	17	0	187	10
20	45	65	9	0	188	10
21	45	20	11	0	201	10
22	45	10	18	87	117	10
23	55	5	29	58	88	10
24	65	35	3	0	190	10
25	65	20	6	156	186	10
26	45	30	17	0	208	10
27	35	40	16	27	57	10
28	41	37	16	0	213	10
29	64	42	9	0	190	10
30	40	60	21	61	91	10
31	31	52	27	0	202	10
32	35	69	23	0	186	10
33	53	52	11	27	57	10
34	65	55	14	0	183	10
35	63	65	8	133	163	10
36	2	60	5	41	71	10
37	20	20	8	0	198	10
38	5	5	16	73	103	10
39	60	12	31	34	64	10
40	40	25	9	75	105	10
41	42	7	5	87	117	10
42	24	12	5	25	55	10

43	23	3	7	0	185	10
44	11	14	18	59	89	10
45	6	38	16	29	59	10
46	2	48	1	0	184	10
47	8	56	27	0	185	10
48	13	52	36	0	192	10
49	6	68	30	98	128	10
50	47	47	13	0	203	10
51	49	58	10	0	193	10
52	27	43	9	0	208	10
53	37	31	14	85	115	10
54	57	29	18	0	197	10
55	63	23	2	126	156	10
56	53	12	6	120	150	10
57	32	12	7	0	196	10
58	36	26	18	180	210	10
59	21	24	28	0	202	10
60	17	34	3	0	201	10
61	12	24	13	0	194	10
62	24	58	19	48	78	10
63	27	69	10	0	185	10
64	15	77	9	63	93	10
65	62	77	20	49	79	10
66	49	73	25	117	147	10
67	67	5	25	73	103	10
68	56	39	36	132	162	10
69	37	47	6	40	70	10
70	37	56	5	168	198	10
71	57	68	15	0	180	10
72	47	16	25	0	197	10
73	44	17	9	0	199	10
74	46	13	8	139	169	10

75	49	11	18	0	192	10
76	49	42	13	63	93	10
77	53	43	14	169	199	10
78	61	52	3	86	116	10
79	57	48	23	82	112	10
80	56	37	6	168	198	10
81	55	54	26	0	192	10
82	15	47	16	0	196	10
83	14	37	11	0	198	10
84	11	31	7	91	121	10
85	16	22	41	0	196	10
86	4	18	35	0	184	10
87	28	18	26	83	113	10
88	26	52	9	64	94	10
89	26	35	15	0	211	10
90	31	67	3	0	187	10
91	15	19	1	0	194	10
92	22	22	2	18	48	10
93	18	24	22	169	199	10
94	26	27	27	0	207	10
95	25	24	20	0	205	10
96	22	27	11	0	204	10
97	25	21	12	0	202	10
98	19	21	10	0	198	10
99	20	26	9	73	103	10
100	18	18	17	165	195	10



ประวัติผู้เขียนวิทยานิพนธ์

นายชยธัช เผือกสามัญ เกิดเมื่อวันจันทร์ที่ 5 มิถุนายน พ.ศ. 2525 ที่เขตปทุมวัน จังหวัด กรุงเทพมหานคร สำเร็จการศึกษาวิศวกรรมศาสตรบัณฑิต สาขาวิศวกรรมอุตสาหการ จาก มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี ในปีการศึกษา 2544 และเข้าศึกษาต่อในหลักสูตร วิศวกรรมศาสตรมหาบัณฑิต สาขาวิศวกรรมอุตสาหการ คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์ มหาวิทยาลัย ในปีการศึกษา 2545