1. "E:\1 □□□□\3 □□□□□\1 □□□□□□□\1 □□□□□□□□□\1_□□□□□□_□□□□□\1_LW_□□□□□\4 □□□□□\3 python_code\1 exzample\2 □□□□□□□\9 Code for this paper\Scripts\python.exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode= client --port=21689

2.
3. import sys; print('Python %s on %s' % (sys.version, sys.platform))
4. sys.path.extend(['E:\\1 □□□□\\3 □□□□□\\1 □□□□□□□\\1 □□□□□□□□□\\1_□□□□□□_□□□□□\\1_LW_□□□□□\\4 □□□□□\\3 python_code\\9 Code for this paper', 'E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□□/1_□□□□□□_□□□□□/1_LW_□□□□□/4 □□□□□/3 python_code/9 Code for this paper'])
5.
6. PyDev console: starting.
7.
8. Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
9. >>> runfile('E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□□/1_□□□□□□_□□□□□/1_LW_□□□□□/4 □□□□□/3 python_code/9 Code for this paper/main_DM.py', wdir='E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□□/1_□□□□□□_□□□□□/1_LW_□□□□□/4 □□□□□/3 python_code/9 Code for this paper')
10. Backend TkAgg is interactive backend. Turning interactive mode on.
11. Waiting 5s......
12.
13. Optimize the ./R_6_1.xlsx instance
14.
15. Set parameter TimeLimit to value 1200
16.
17. Set parameter PoolSolutions to value 3
18. Set parameter PoolGap to value 0.05
19. Set parameter PoolSearchMode to value 2
20. Gurobi Optimizer version 11.0.0 build v11.0.0rc2 (win64 - Windows 10.0 (19045.2))
21.
22. CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
23. Thread count: 4 physical cores, 8 logical processors, using up to 8 threads
24.
25. Optimize a model with 100206 rows, 47910 columns and 292506 nonzeros
26. Model fingerprint: 0x6c16ca8a
27. Variable types: 0 continuous, 47910 integer (40308 binary)
28. Coefficient statistics:
29.   Matrix range   [1e+00, 5e+05]
30.   Objective range [1e+00, 1e+00]
31.   Bounds range   [1e+00, 1e+00]
32.   RHS range   [1e+00, 7e+06]
33. Presolve removed 82132 rows and 1795 columns
34. Presolve time: 0.13s
35. Presolved: 18074 rows, 46115 columns, 51760 nonzeros
36. Variable types: 0 continuous, 46115 integer (38519 binary)
37. Found heuristic solution: objective 548.0000000
38.
39. Root relaxation: objective 2.124711e+02, 2323 iterations, 0.09 seconds (0.25 work units)
40.
41.   Nodes | Current Node | Objective Bounds | Work
42. Expl Unexpl | Obj Depth IntInf | Incumbent   BestBd Gap | It/Node Time
43.
44.   0   0 212.47108   0 1776 548.00000 212.47108 61.2%   -   0s
45. H   0   0   319.0000000 212.47108 33.4%   -   1s
46. H   0   0   316.0000000 212.47108 32.8%   -   1s
47. H   0   0   315.0000000 212.47108 32.5%   -   1s
48.   0   0 219.37277   0 1543 315.00000 219.37277 30.4%   -   1s
49.   0   0 219.44687   0 1513 315.00000 219.44687 30.3%   -   1s
50. H   0   0   314.0000000 226.97435 27.7%   -   6s
51.   0   0 236.00000   0 1637 314.00000 236.00000 24.8%   -   6s
52.   0   0 236.00000   0 1744 314.00000 236.00000 24.8%   -   6s
53.   0   0 236.00000   0 1308 314.00000 236.00000 24.8%   -   6s
54.   0   0 237.00000   0 1694 314.00000 237.00000 24.5%   -   9s
55.   0   0 237.00000   0 1694 314.00000 237.00000 24.5%   -   9s
56.   0   0 237.00000   0 1509 314.00000 237.00000 24.5%   - 10s
57.   0   0 237.00000   0 1147 314.00000 237.00000 24.5%   - 10s
58.   0   2 237.00000   0 1120 314.00000 237.00000 24.5%   - 12s
59. 1185 1237 244.00680 328 936 314.00000 237.00000 24.5% 10.2 15s
60. 2751 2123 300.00000 244 1024 314.00000 300.00000 4.46% 11.3 21s
61. 2757 1921 300.00000 191 1105 314.00000 300.00000 4.46% 14.6 27s
62. 2761 1924 300.00000 23 1098 314.00000 300.00000 4.46% 14.6 30s
63. 2769 1929 300.82119 155 1071 314.00000 300.00000 4.46% 14.5 35s
64. 3349 2147 300.00000 94 667 314.00000 300.00000 4.46% 62.5 40s
65. 3547 2145   cutoff 115   314.00000 300.00000 4.46% 72.4 45s
66. 4344 2407 300.00000 216 593 314.00000 300.00000 4.46% 102 50s
67. 5247 2485 307.78858 313 121 314.00000 300.00000 4.46% 112 55s
68. 6219 2597 301.68939 493 213 314.00000 300.00000 4.46% 120 60s
69. 7871 3345 300.00000 334 272 314.00000 300.00000 4.46% 112 65s
70. 10581 5894 300.00000 80 566 314.00000 300.00000 4.46% 93.5 71s
71. 12624 6778 300.00000 59 423 314.00000 300.00000 4.46% 82.8 75s
72. 14920 8484 infeasible 186   314.00000 300.00000 4.46% 79.1 80s
73. 16313 9097 304.00000 243 115 314.00000 300.00000 4.46% 81.6 85s
74. 18819 11214 infeasible 294   314.00000 300.00000 4.46% 77.3 90s
75. 21154 12660 310.00000 178 1147 314.00000 300.00000 4.46% 73.0 97s
76. 21166 12671 300.06988 182 259 314.00000 300.06988 4.44% 73.7 100s
77.
78. Cutting planes:
79.   Learned: 1

```
80   Gomory: 31
81   Cover: 1
82   Implied bound: 7
83   Clique: 12
84   MIR: 16
85   StrongCG: 3
86   Flow cover: 103
87   Zero half: 4
88   RLT: 12
89   Relax-and-lift: 1
90   BQP: 3
91
92   Explored 21171 nodes (1575217 simplex iterations) in 101.37 seconds (187.90 work units)
93   Thread count was 8 (of 8 available processors)
94
95   Solution count 3: 314 314 314
96   No other solutions better than 314
97
98   Optimal solution found (tolerance 1.00e-04)
99   Best objective 3.140000000000e+02, best bound 3.140000000000e+02, gap 0.0000%
100
101  Output optimal solution and the Optimal Obj:  314.0
102
103
104  Obj = 314.0
105
106  Solutions:
107      The total pi =  95.0
108      The total duration time in berth stage =  117.0
109      The total duration time in quay crane scheduling stage =  25.0
110      The total departure time in berth stage=  203.0
111      The total departure time in quay crane scheduling stage =  111.0
112      The total wasted crane work hour according QC0=  7.758530442566491
113      The last depature time in quay crane scheduling stage =  35.0
114
115  The specific solution are as follows:
```

116   Vessel i: 0: l_i: 5,   pi: 9-14,   ai-di: 2-11,   taoi-deltai: 2-11,   periodi: 9,   taoPi_SP-deltaPi_SP: 2-5, periodPi: 3, c_i: 2292581,   dowork: 2504618,   fa_i: 3

117   Vessel i: 1: l_i: 6,   pi: 18-24,   ai-di: 7-27,   taoi-deltai: 7-27,   periodi: 20,   taoPi_SP-deltaPi_SP: 7-11,   periodPi: 4, c_i: 5270879,   dowork: 6327456,   fa_i: 4

118   Vessel i: 2: l_i: 7,   pi: 24-31,   ai-di: 2-15,   taoi-deltai: 2-15,   periodi: 13,   taoPi_SP-deltaPi_SP: 2-5,   periodPi: 3, c_i: 3408100,   dowork: 3427372,   fa_i: 3

119   Vessel i: 3: l_i: 4,   pi: 14-18,   ai-di: 22-50,   taoi-deltai: 22-50,   periodi: 28,   taoPi_SP-deltaPi_SP: 22-27,   periodPi: 5, c_i: 7366651,   dowork: 7382032,   fa_i: 4

120   Vessel i: 4: l_i: 5,   pi: 9-14,   ai-di: 23-62,   taoi-deltai: 23-42,   periodi: 19,   taoPi_SP-deltaPi_SP: 23-28,   periodPi: 5, c_i: 4857867,   dowork: 5009236,   fa_i: 4

121   Vessel i: 5: l_i: 6,   pi: 21-27,   ai-di: 30-70,   taoi-deltai: 30-58,   periodi: 28,   taoPi_SP-deltaPi_SP: 30-35,   periodPi: 5, c_i: 7318466,   dowork: 7909320,   fa_i: 4

122   TimeSolveModel: 108.000000
123
124   TimeAll: 111.000000
125
126