```
 1  D:\Python\Python\setroute\python.exe "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --
    mode=client --port=31688
 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_□□□□1\\4 □□□□\\3 python_code\\9 Code for this
    paper', 'E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW_□□□□1/4 □□□□/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_□□□□1/4 □□□□/3 python_code/9 Code for this paper/
    main_DM.py', wdir='E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW_□□□□1/4 □□□□/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_8_6.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 171112 rows, 64136 columns and 503224 nonzeros
26  Model fingerprint: 0xbd3b461e
27  Variable types: 0 continuous, 64136 integer (54000 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, 4e+06]
33  Presolve removed 153466 rows and 3317 columns
34  Presolve time: 0.07s
35  Presolved: 17646 rows, 60819 columns, 52008 nonzeros
36  Variable types: 0 continuous, 60819 integer (50683 binary)
37
38  Root relaxation: objective 3.836440e+02, 1794 iterations, 0.08 seconds (0.14 work units)
39
40      Nodes    |    Current Node    |     Objective Bounds      |     Work
41   Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time
42
43      0    0  383.64402    0 1444          -  383.64402      -     -    0s
44  H   0    0                    926.0000000  383.64402  58.6%     -    0s
45  H   0    0                    657.0000000  383.64402  41.6%     -    1s
46  H   0    0                    655.0000000  398.43795  39.2%     -    1s
47      0    0  398.43795    0 1447  655.00000  398.43795  39.2%     -    2s
48      0    0  419.06793    0 1262  655.00000  419.06793  36.0%     -    4s
49      0    0  420.00000    0 1444  655.00000  420.00000  35.9%     -    4s
50      0    0  420.00000    0 1445  655.00000  420.00000  35.9%     -    4s
51      0    0  421.00000    0 1272  655.00000  421.00000  35.7%     -    4s
52      0    0  431.89209    0 1401  655.00000  431.89209  34.1%     -    5s
53      0    0  432.49939    0 1400  655.00000  432.49939  34.0%     -    5s
54      0    0  437.00000    0 1090  655.00000  437.00000  33.3%     -    6s
55      0    0  438.00000    0 1185  655.00000  438.00000  33.1%     -    7s
56      0    0  438.00000    0 1144  655.00000  438.00000  33.1%     -    7s
57      0    0  438.00000    0 1182  655.00000  438.00000  33.1%     -    7s
58      0    0  438.00000    0 1008  655.00000  438.00000  33.1%     -    7s
59      0    0  438.00000    0  992  655.00000  438.00000  33.1%     -    8s
60      0    2  438.00000    0  992  655.00000  438.00000  33.1%     -    9s
61    162  172  438.00000   45 1123  655.00000  438.00000  33.1%  25.1   10s
62   2398 2211  512.66127  283 7164  655.00000  438.00000  33.1%  13.7   16s
63   2414 2222  649.00000   92   18  655.00000  649.00000  0.92%  13.6   20s
64
65  Cutting planes:
66    Gomory: 3
67    MIR: 2
68    Flow cover: 1
69    Zero half: 1
70    RLT: 2
71
72  Explored 2443 nodes (58537 simplex iterations) in 22.62 seconds (28.02 work units)
73  Thread count was 8 (of 8 available processors)
74
75  Solution count 3: 655 655 655
76  No other solutions better than 655
77
78  Optimal solution found (tolerance 1.00e-04)
79  Best objective 6.550000000000e+02, best bound 6.550000000000e+02, gap 0.0000%
80
```

```
81   Output optimal solution and the Optimal Obj:  655.0
82
83
84   Obj = 655.0
85
86   Solutions:
87       The total pi =  120.0
88       The total duration time in berth stage =  99.0
89       The total duration time in quay crane scheduling stage =  24.0
90       The total departure time in berth stage=  365.0
91       The total departure time in quay crane scheduling stage =  290.0
92       The total wasted crane work hour according QC0=  16.892119676533508
93       The last depature time in quay crane scheduling stage =  57.0
94
95   The specific solution are as follows:
96       Vessel i: 0:    li: 4,        pi: 14-18,          ai-di: 24-32,          taoi-deltai: 24-32,          periodi: 8,          taoPi_SP-deltaPi_SP
         : 24-27,          periodPi: 3,              c_i: 1949984,          dowork: 2372796,          fa_i: 2
97       Vessel i: 1:    li: 6,        pi: 22-28,          ai-di: 31-39,          taoi-deltai: 31-39,          periodi: 8,          taoPi_SP-deltaPi_SP
         : 31-33,          periodPi: 2,              c_i: 1960425,          dowork: 3163728,          fa_i: 4
98       Vessel i: 2:    li: 7,        pi: 22-29,          ai-di: 17-29,          taoi-deltai: 17-29,          periodi: 12,          taoPi_SP-
         deltaPi_SP: 17-20,              periodPi: 3,              c_i: 3158776,          dowork: 3954660,          fa_i: 3
99       Vessel i: 3:    li: 5,        pi: 9-14,          ai-di: 29-42,          taoi-deltai: 29-42,          periodi: 13,          taoPi_SP-deltaPi_SP
         : 29-31,          periodPi: 2,              c_i: 3342215,          dowork: 3691016,          fa_i: 5
100      Vessel i: 4:    li: 4,        pi: 10-14,          ai-di: 6-23,          taoi-deltai: 6-23,          periodi: 17,          taoPi_SP-deltaPi_SP
         : 6-11,          periodPi: 5,              c_i: 4374536,          dowork: 4481948,          fa_i: 2
101      Vessel i: 5:    li: 6,        pi: 14-20,          ai-di: 51-72,          taoi-deltai: 51-68,          periodi: 17,          taoPi_SP-
         deltaPi_SP: 51-54,              periodPi: 3,              c_i: 4257088,          dowork: 5536524,          fa_i: 5
102      Vessel i: 6:    li: 5,        pi: 22-27,          ai-di: 54-70,          taoi-deltai: 54-66,          periodi: 12,          taoPi_SP-
         deltaPi_SP: 54-57,              periodPi: 3,              c_i: 3058819,          dowork: 3163728,          fa_i: 3
103      Vessel i: 7:    li: 7,        pi: 7-14,          ai-di: 54-69,          taoi-deltai: 54-66,          periodi: 12,          taoPi_SP-deltaPi_SP
         : 54-57,          periodPi: 3,              c_i: 2972779,          dowork: 3163728,          fa_i: 5
104  TimeSolveModel: 31.000000
105
106  TimeAll: 34.000000
107
108
```