```
 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=54949
 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_5_4.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 71827 rows, 39860 columns and 208375 nonzeros
26  Model fingerprint: 0xc302e093
27  Variable types: 0 continuous, 39860 integer (33525 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 61502 rows and 1719 columns
34  Presolve time: 0.11s
35  Presolved: 10325 rows, 38141 columns, 28927 nonzeros
36  Variable types: 0 continuous, 38141 integer (31811 binary)
37  Found heuristic solution: objective 534.0000000
38
39  Root relaxation: objective 2.457259e+02, 1478 iterations, 0.06 seconds (0.13 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  245.72587    0 1256  534.00000  245.72587  54.0%     -    0s
45  H   0    0                396.0000000  245.72587  37.9%     -    1s
46      0    0  259.98198    0 1103  396.00000  259.98198  34.3%     -    1s
47      0    0  291.19772    0 1119  396.00000  291.19772  26.5%     -    4s
48      0    0  291.20511    0 1261  396.00000  291.20511  26.5%     -    4s
49      0    0  292.02361    0  989  396.00000  292.02361  26.3%     -    4s
50      0    0  293.00000    0 1088  396.00000  293.00000  26.0%     -    7s
51      0    0  293.00000    0 1087  396.00000  293.00000  26.0%     -    7s
52      0    0  293.02361    0  880  396.00000  293.02361  26.0%     -    7s
53      0    0  294.00000    0  962  396.00000  294.00000  25.8%     -    8s
54      0    0  294.00000    0  952  396.00000  294.00000  25.8%     -    8s
55      0    0  294.00000    0  949  396.00000  294.00000  25.8%     -    8s
56      0    0  294.00000    0  847  396.00000  294.00000  25.8%     -    9s
57      0    0  294.00000    0  810  396.00000  294.00000  25.8%     -    9s
58      0    2  294.00000    0  801  396.00000  294.00000  25.8%     -   11s
59   1097 1010  312.89225   72  810  396.00000  294.00000  25.8%  31.5   15s
60
61  Cutting planes:
62    Learned: 197
63    Gomory: 10
64    Implied bound: 5
65    Projected implied bound: 7
66    Clique: 4
67    MIR: 82
68    StrongCG: 61
69    Flow cover: 132
70    Zero half: 8
71    RLT: 15
72    Relax-and-lift: 529
73    BQP: 5
74
75  Explored 1105 nodes (51767 simplex iterations) in 17.69 seconds (22.39 work units)
76  Thread count was 8 (of 8 available processors)
77
78  Solution count 3: 396 396 396
79  No other solutions better than 396
80
```

```
81   Optimal solution found (tolerance 1.00e-04)
82   Best objective 3.960000000000e+02, best bound 3.960000000000e+02, gap 0.0000%
83
84   Output optimal solution and the Optimal Obj:  396.0
85
86
87   Obj = 396.0
88
89   Solutions:
90       The total pi =  56.0
91       The total duration time in berth stage =  90.0
92       The total duration time in quay crane scheduling stage =  20.0
93       The total departure time in berth stage=  233.0
94       The total departure time in quay crane scheduling stage =  163.0
95       The total wasted crane work hour according QC0=  5.1045614540820194
96       The last depature time in quay crane scheduling stage =  55.0
97
98   The specific solution are as follows:
99       Vessel i: 0:    li: 7,        pi: 7-14,         ai-di: 36-49,          taoi-deltai: 36-47,        periodi: 11,           taoPi_SP-deltaPi_SP
     : 36-38,            periodPi: 2,                  c_i: 2872279,                   dowork: 3295550,                      fa_i: 7
100      Vessel i: 1:    li: 7,        pi: 20-27,        ai-di: 26-43,          taoi-deltai: 26-41,        periodi: 15,          taoPi_SP-
     deltaPi_SP: 26-31,            periodPi: 5,               c_i: 3842866,              dowork: 3954660,                      fa_i: 2
101      Vessel i: 2:    li: 6,        pi: 14-20,        ai-di: 32-60,          taoi-deltai: 32-58,        periodi: 26,          taoPi_SP-
     deltaPi_SP: 32-36,            periodPi: 4,               c_i: 6846380,              dowork: 7250210,                      fa_i: 5
102      Vessel i: 3:    li: 6,        pi: 8-14,         ai-di: 48-79,          taoi-deltai: 48-72,        periodi: 24,          taoPi_SP-deltaPi_SP
     : 48-55,            periodPi: 7,                  c_i: 6172975,                   dowork: 6327456,                      fa_i: 2
103      Vessel i: 4:    li: 7,        pi: 7-14,         ai-di: 1-21,           taoi-deltai: 1-15,         periodi: 14,          taoPi_SP-deltaPi_SP: 1
     -3,                periodPi: 2,                  c_i: 3438605,                   dowork: 3691016,                      fa_i: 6
104  TimeSolveModel: 24.000000
105
106  TimeAll: 27.000000
107
108
```