```
D:\Python\Python\setroute\python.exe "D:\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Python\Pyt
       mode=client --port=7397
  3
       import sys; print('Python %s on %s' % (sys.version, sys.platform))
       paper', 'E:/1 | 0 | 0/3 | 0 | 0/1 | 0 | 0 | 0/1 | 0 | 0 | 0/1 | 0 | 0 | 0/1 | 0 | 0 | 0/1 | 0 | 0 | 0/1 | 0 | 0 | 0/1 | 0 | 0/1 | 0 | 0/1 | 0 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 
  6
       PyDev console: starting.
      Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
  8
       main_DM.py', wdir='E:/1 000/3 00000/1 000000/1 000000/1 000000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1 00000/1
10
       Backend TkAgg is interactive backend. Turning interactive mode on.
11
       Waiting 5s.....
13
       Optimize the ./R_7_5.xlsx instance
14
15
       Set parameter TimeLimit to value 1200
16
       Set parameter PoolSolutions to value 3
17
18
       Set parameter PoolGap to value 0.05
        Set parameter PoolSearchMode to value 2
19
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]
       Thread count: 4 physical cores, 8 logical processors, using up to 8 threads
24
       Optimize a model with 133301 rows, 56000 columns and 390789 nonzeros
25
26
       Model fingerprint: 0x5ea1ac96
        Variable types: 0 continuous, 56000 integer (47131 binary)
28
       Coefficient statistics:
29
         Matrix range [1e+00, 5e+05]
30
         Objective range [1e+00, 1e+00]
         Bounds range
                                       [1e+00, 1e+00]
31
         RHS range
                                      [1e+00, 5e+06]
33
       Presolve removed 114909 rows and 2646 columns
       Presolve time: 0.17s
35
       Presolved: 18392 rows, 53354 columns, 53149 nonzeros
36
        Variable types: 0 continuous, 53354 integer (44492 binary)
       Found heuristic solution: objective 568.0000000
38
       Root relaxation: objective 2.287607e+02, 2044 iterations, 0.07 seconds (0.18 work units)
39
40
41
            Nodes | Current Node | Objective Bounds
         Expl\ Unexpl\ |\ Obj\ Depth\ IntInf\ |\ Incumbent \quad BestBd\ Gap\ |\ It/Node\ Time
42
43
44
                    45
      H \quad 0 \quad 0
                                                 365.0000000 228.76073 37.3%
46
       Н
             0
                       0
                                                 364.0000000 228.76073 37.2%
47
                     2s
                                               0 1355 364.00000 248.00000 31.9%
48
                     0 248.00000
                                                                                                                                  6s
49
             0
                     0 248.00000
                                                 0 1530 364.00000 248.00000 31.9%
                                                                                                                                  6s
50
             0
                     0 248 00000
                                               0 1268 364.00000 248.00000 31.9%
                                                                                                                                  75
51
                     0 250.00000
                                               0 1471 364.00000 250.00000 31.3%
52
                     0.250,00000
                                               0 1470 364.00000 250.00000 31.3%
                                                                                                                                 11s
                     0 250.00000 0 1023 364.00000 250.00000 31.3%
53
                                                                                                                            - 12s
             0
54
                     0 250.00000
                                                 0 1216 364.00000 250.00000 31.3%
                                                                                                                            - 13s
                                                 0\ 1121\ 364.00000\ 250.00000\ 31.3\%
55
                     0 250.00000
                                                                                                                                 13s
56
                     0 250.00000
                                               0 1194 364.00000 250.00000 31.3%
                                                                                                                            - 13s
             0
57
             0
                     0.250.25669
                                                 0 1164 364.00000 250.25669 31.2%
                                                                                                                            - 13s
58
             0
                     0 251.00000
                                                 0 1272 364.00000 251.00000 31.0%
                                                                                                                            - 16s
                                               0 1270 364.00000 251.00000 31.0%
                     0 251.00000
                                                                                                                            - 16s
60
                                               0 1271 364.00000 251.00000 31.0%
             0
                     0 251.00000
                                                                                                                            - 16s
61
             0
                     0 251.00000
                                                 0 1174 364.00000 251.00000 31.0%
                                                                                                                            - 16s
                                                 0 1158 364.00000 251.00000 31.0%
                     0 251.00000
63
                     29
                     32 251.51785 8 1163 364.00000 251.13382 31.0% 44.2 299
64
65
           153 162 252.80422 33 1082 364.00000 251.13382 31.0% 19.3 30s
66
          1148 1075 274.61265 92 1158 364.00000 252.99576 30.5% 12.1 35s
         1151 1077 342.00000 28 68 364.00000 342.00000 6.04% 12.1 40s
67
         1155 1080 344.02565 143 195 364.00000 344.02565 5.49% 12.1 45s
68
69
          1167 1088 351.31179 181 589 364.00000 351.31179 3.49% 11.9
70
         1172 1091 352.77507 105 339 364.00000 352.77507 3.08% 11.9 55s
                                                        363 0000000 353 29958 2.67% 11.8 60s
       H 1178 1039
         1187 993 353.38760 62 275 363.00000 353.38760 2.65% 11.7 65s
         1194 947 353.67735 64 536 363.00000 353.67735 2.57% 11.7 71s
74
         1199
                      950 353.87135 112 566 363.00000 353.87135 2.51% 11.6
75
         1204
                      953 354.03064 123 499 363.00000 354.03064 2.47% 11.6
76
         1211
                      958 354.26305 48 525 363.00000 354.26305 2.41% 11.5 91s
          1214
                      960 354.30692 134 495 363.00000 354.30692 2.39% 11.5 95s
                      964 354.39589 96 554 363.00000 354.39589 2.37% 11.4 100s
         1220
78
79
         1236
                      976 361.40476 65 55 363.00000 361.40476 0.44% 66.2 105s
80
```

```
unknown
  81 Cutting planes:
  82
       Learned: 2
       Gomory: 7
  83
  84
       Lift-and-project: 5
       MIR: 25
       StrongCG: 13
  86
  87
       Flow cover: 66
  88
       Zero half: 10
  89
       RLT: 2
  90
       Relax-and-lift: 46
  91
  92
      Explored 1260 nodes (102217 simplex iterations) in 107.69 seconds (105.58 work units)
     Thread count was 8 (of 8 available processors)
  94
  95
      Solution count 3: 363 363 363
     No other solutions better than 363
 98 Optimal solution found (tolerance 1.00e-04)
  99
     Best objective 3.630000000000e+02, best bound 3.63000000000e+02, gap 0.0000%
 100
101 Output optimal solution and the Optimal Obj: 363.0
102
103
104 \text{ Obj} = 363.0
105
106
      Solutions:
         The total pi = 116.0
107
108
         The total duration time in berth stage = 101.0
109
         The total duration time in quay crane scheduling stage = 28.0
110
         The total departure time in berth stage= 218.0
111
         The total departure time in quay crane scheduling stage = 145.0
         The total wasted crane work hour according QC0= 3.682162309781372
112
113
         The last depature time in quay crane scheduling stage = 40.0
114
115 The specific solution are as follows:
                                                                                                                                                  taoPi_SP-deltaPi_SP
                                    pi: 7-14,
                                                                                                                    periodi: 14,
116
        Vessel i: 0:
                       li: 7,
                                                          ai-di: 38-52,
                                                                                   taoi-deltai: 38-52.
                                                                    c_i: 3637964,
      : 38-40,
                                 periodPi: 2,
                                                                                                          dowork: 3691016,
                                                                                                                                                       fa_i: 7
                                                                                      taoi-deltai: 12-26,
        Vessel i: 1:
                       li: 6,
                                    pi: 14-20,
                                                             ai-di: 12-26,
                                                                                                                      periodi: 14,
                                                                                                                                                    taoPi SP-
      deltaPi SP: 12-15,
                                           periodPi: 3,
                                                                              c_i: 3529264,
                                                                                                                    dowork: 3559194,
                                                                                                                                                                 fa i: 4
                                                                                                                                                  taoPi_SP-deltaPi_SP
118
        Vessel i: 2:
                       li: 4,
                                    pi: 30-34,
                                                             ai-di: 4-15,
                                                                                   taoi-deltai: 4-15,
                                                                                                                    periodi: 11,
      : 4-8,
                               periodPi: 4,
                                                                  c_i: 2863362,
                                                                                                        dowork: 3031906,
                                                                                                                                                    fa_i: 2
119
                       li: 4,
                                    pi: 24-28,
                                                             ai-di: 9-19,
                                                                                   taoi-deltai: 9-19,
                                                                                                                    periodi: 10,
                                                                                                                                                  taoPi SP-deltaPi SP
        Vessel i: 3:
      : 9-12,
                                                                    c_i: 2387699,
                                                                                                          dowork: 2768262,
                                                                                                                                                       fa_i: 2
                                  periodPi: 3,
120
        Vessel i: 4:
                       li: 7,
                                   pi: 7-14,
                                                          ai-di: 16-38,
                                                                                   taoi-deltai: 16-36,
                                                                                                                    periodi: 20,
                                                                                                                                                  taoPi SP-deltaPi SP
                                 periodPi: 6,
                                                                    c_i: 5263637,
                                                                                                          dowork: 5404702,
      : 16-22,
                                                                                                                                                       fa_i: 2
                                                                                      taoi-deltai: 28-44,
                                                                                                                      periodi: 16,
121
        Vessel i: 5:
                       li: 6,
                                   pi: 14-20,
                                                             ai-di: 28-50,
                                                                                                                                                    taoPi_SP-
                                           periodPi: 4,
                                                                                                                    dowork: 4350126,
      deltaPi_SP: 28-32,
                                                                              c_i: 4201228,
                                                                                                                                                                 fa_i: 3
        Vessel i: 6:
                      li: 4,
                                    pi: 20-24,
                                                             ai-di: 10-32,
                                                                                      taoi-deltai: 10-26,
                                                                                                                      periodi: 16,
                                                                                                                                                    taoPi_SP-
      deltaPi SP: 10-16,
                                           periodPi: 6,
                                                                              c i: 4169576,
                                                                                                                    dowork: 4218304,
                                                                                                                                                                 fa i: 2
     TimeSolveModel: 115.000000
123
124
125
     TimeAll: 118.000000
126
127
```