```
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=37779
 2
 3
     import sys; print('Python %s on %s' % (sys.version, sys.platform))
      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.....
     Optimize the ./R 6 8.xlsx instance
13
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 100206 rows, 47910 columns and 292506 nonzeros
25
26
     Model fingerprint: 0x882ddfa9
      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]
                               [1e+00, 7e+06]
32
       RHS range
33
     Presolve removed 85585 rows and 2167 columns
     Presolve time: 0.18s
      Presolved: 14621 rows, 45743 columns, 42013 nonzeros
35
36
      Variable types: 0 continuous, 45743 integer (38147 binary)
      Found heuristic solution: objective 640.0000000
38
39
     Root relaxation: objective 2.755741e+02, 1741 iterations, 0.07 seconds (0.15 work units)
40
41
          Nodes | Current Node | Objective Bounds
42
       Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
43
44
                0 275.57412  0 1405 640.00000 275.57412 56.9%
45
     H \quad 0 \quad 0
                                        451.0000000 275.57412 38.9% - 1s
                                        450.0000000 275.57412 38.8%
46
     Н
          0
                  0
                 47
                 0\ 323.00000\ 0\ 1398\ 450.00000\ 323.00000\ 28.2\%
48
49
                 0 323.00000 0 1398 450.00000 323.00000 28.2%
          0
                                                                                                            7s
                                      0 1376 450.00000 323.00000 28.2%
50
          0
                 0 323.00000
51
                 52
                 0 325.00000
                                      0 1363 450.00000 325.00000 27.8%
                                                                                                       - 12s
53
                 - 12s
          0
54
                 0 325.00000 0 1071 450.00000 325.00000 27.8%
                                                                                                      - 13s
55
                 0 327.32402
                                        0 1012 450.00000 327.32402 27.3%
56
                 0 327.32402
                                       0 1055 450.00000 327.32402 27.3%
          0
                                                                                                      - 14s
57
                 0 327.32402
                                       0 1057 450.00000 327.32402 27.3%
          0
                                                                                                      - 14s
                                                                                                     - 15s
58
          0
                 0 327.32402
                                        0 977 450.00000 327.32402 27.3%
                                      0 720 450.00000 327.32402 27.3%
                0 327.32402
60
                 - 17s
       1786 1797 412.54085 416 302 450.00000 327.32402 27.3% 6.8
61
       1993 1898 435.00000 207 180 450.00000 435.00000 3.33% 6.8 25s
63
     Cutting planes:
64
65
       Learned: 190
66
       Gomory: 10
       Implied bound: 8
67
68
       Clique: 2
69
       MIR: 16
70
       StrongCG: 15
71
       Flow cover: 48
72
       Zero half: 2
       RLT: 25
74
       Relax-and-lift: 145
75
       BOP: 23
76
      Explored 2011 nodes (41542 simplex iterations) in 28.18 seconds (31.57 work units)
     Thread count was 8 (of 8 available processors)
80
     Solution count 3: 450 450 450
```

```
unknown
 81 No other solutions better than 450
  82
     Optimal solution found (tolerance 1.00e-04)
  83
      Best objective 4.500000000000e+02, best bound 4.50000000000e+02, gap 0.0000%
  84
      Output optimal solution and the Optimal Obj: 450.0
  86
  87
  88
  89
     Obj = 450.0
  90
  91 Solutions:
  92
         The total pi = 86.0
  93
         The total duration time in berth stage = 100.0
  94
         The total duration time in quay crane scheduling stage = 26.0
  95
         The total departure time in berth stage= 262.0
  96
         The total departure time in quay crane scheduling stage = 188.0
  97
         The total wasted crane work hour according QC0= 9.820705193366813
 98
         The last depature time in quay crane scheduling stage = 56.0
  99
 100
     The specific solution are as follows:
                                   pi: 25-29,
101
        Vessel i: 0:
                                                            ai-di: 1-29,
                                                                                   taoi-deltai: 1-27,
                                                                                                                   periodi: 26,
                                                                                                                                                 taoPi_SP-deltaPi_SP
                       li: 4,
                                                                  c_i: 6681262,
                                                                                                       dowork: 7909320,
      : 1-7,
                               periodPi: 6,
                                                                                                                                                    fa_i: 3
102
        Vessel i: 1:
                       li: 6,
                                   pi: 8-14,
                                                          ai-di: 42-54,
                                                                                   taoi-deltai: 42-52,
                                                                                                                   periodi: 10,
                                                                                                                                                 taoPi_SP-deltaPi_SP
       42-44,
                                 periodPi: 2,
                                                                    c i: 2426435,
                                                                                                         dowork: 3163728,
                                                                                                                                                      fa i: 4
103
                                   pi: 8-13,
                                                          ai-di: 25-42,
                                                                                   taoi-deltai: 25-40,
                                                                                                                   periodi: 15,
                                                                                                                                                 taoPi_SP-deltaPi_SP
        Vessel i: 2:
                       li: 5,
      : 25-31,
                                 periodPi: 6,
                                                                    c_i: 3919107,
                                                                                                         dowork: 3954660,
                                                                                                                                                      fa_i: 2
        Vessel i: 3:
                       li: 5,
                                                            ai-di: 27-41,
                                                                                     taoi-deltai: 27-39,
                                                                                                                      periodi: 12,
                                                                                                                                                    taoPi_SP-
                                   pi: 13-18,
                                           periodPi: 2,
                                                                              c_i: 3028217,
      deltaPi SP: 27-29,
                                                                                                                   dowork: 3163728,
                                                                                                                                                                fa_i: 4
105
        Vessel i: 4:
                                                            ai-di: 18-34,
                                                                                      taoi-deltai: 18-32,
                                                                                                                      periodi: 14,
                                                                                                                                                    taoPi_SP-
                      li: 7,
                                    pi: 18-25,
      deltaPi_SP: 18-21,
                                           periodPi: 3,
                                                                              c_i: 3588314,
                                                                                                                   dowork: 3954660,
                                                                                                                                                                fa_i: 3
106
        Vessel i: 5:
                      li: 7,
                                   pi: 14-21,
                                                            ai-di: 49-77,
                                                                                     taoi-deltai: 49-72,
                                                                                                                      periodi: 23,
                                                                                                                                                    taoPi SP-
                                                                                                                   dowork: 5931990,
      deltaPi SP: 49-56,
                                           periodPi: 7,
                                                                                                                                                                fa_i: 2
                                                                              c i: 5845581,
     TimeSolveModel: 35.000000
107
108
109 TimeAll: 38.000000
110
111
```