```
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=40701
  2
  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.....
       Optimize the ./R 9 10.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 213639 rows, 72324 columns and 629811 nonzeros
25
26
       Model fingerprint: 0x91593a0e
        Variable types: 0 continuous, 72324 integer (60921 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
32
          RHS range
                                         [1e+00, 7e+06]
33
       Presolve removed 186443 rows and 3189 columns
       Presolve time: 0.16s
        Presolved: 27196 rows, 69135 columns, 78956 nonzeros
35
36
        Variable types: 0 continuous, 69135 integer (57741 binary)
       Root relaxation: objective 4.779521e+02, 2962 iterations, 0.16 seconds (0.26 work units)
38
39
40
             Nodes | Current Node | Objective Bounds
41
         Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
42
43
                      0 477.95207 0 2174
                                                                                - 477.95207
                                                     832.0000000 477.95207 42.6% -
44
       Η
              0
                         0
45
      H = 0
                                                      791.0000000 497.64065 37.1%
                        0
                      0 497.64065 0 1756 791.00000 497.64065 37.1%
46
              0
47
       Η
                         0
                                                      790.0000000 497.64701 37.0% -
                      0 508.62815  0 2081 790.00000 508.62815 35.6% -
48
                      49
50
              0
                      0 514.87520
                                                   0 1626 790.00000 514.87520 34.8%
51
                      0 518.85350 0 1925 790.00000 518.85350 34.3%
52
                      0 518.85350 0 1922 790.00000 518.85350 34.3%
53
                      0 519,00000 0 1601 790,00000 519,00000 34,3%
                                                                                                                                       - 10s
              0
54
                      0\ 519.00000\ 0\ 1557\ 790.00000\ 519.00000\ 34.3\%
                       2 520.00000 0 1557 790.00000 520.00000 34.2%
55
              0
           335 349 522.09954 84 1852 790.00000 520.00000 34.2% 11.3 15s
56
                                                          788.0000000 520.00000 34.0% 10.8 34s
57
      H 593 592
58
           686 713 526.97677 170 1779 788.00000 520.00000 34.0% 9.7 35s
                                                          787.0000000 520.00000 33.9% 9.1 35s
      H 761 783
          1518 1541 588.16772 394 1585 787.00000 520.00000 33.9% 19.8 40s
60
          2455 2485 658.59709 567 1422 787.00000 520.00000 33.9% 32.7 45s
61
          2795 2392 592.84146 279 13527 787.00000 520.00000 33.9% 31.4 52s
63
      H 2796 2273
                                                             786.0000000 520.00000 33.8% 31.4 58s
      H 2796 2160
                                                             785 0000000 770 00000 1 91% 31 4 58s
64
65 H 2797 2052
                                                             784.0000000 770.00000 1.79% 31.4 60s
          2809 1859 771.81329 66 623 784.00000 771.81329 1.55% 31.3 65s
66
                                                             783.0000000 773.98132 1.15% 31.2 70s
      H 2812 1768
67
68
69
        Cutting planes:
70
         Learned: 346
71
          Gomory: 65
          Lift-and-project: 1
          Implied bound: 13
74
          Projected implied bound: 3
75
          Clique: 6
76
          MIR: 318
          StrongCG: 235
          Flow cover: 192
78
79
          Zero half: 16
80
          RLT: 40
```

```
unknown
  81
       Relax-and-lift: 433
  82
      Explored 2820 nodes (117882 simplex iterations) in 74.81 seconds (69.79 work units)
  83
  84
      Thread count was 8 (of 8 available processors)
  86
      Solution count 3: 783 783 783
      No other solutions better than 783
  87
  88
  89
      Optimal solution found (tolerance 1.00e-04)
  90 Best objective 7.830000000000e+02, best bound 7.83000000000e+02, gap 0.0000%
  91
  92
      Output optimal solution and the Optimal Obj: 783.0
  93
  94
  95 Obj = 783.0
  96
  97
      Solutions:
 98
         The total pi = 158.0
  99
         The total duration time in berth stage = 157.0
 100
         The total duration time in quay crane scheduling stage = 34.0
         The total departure time in berth stage= 453.0
101
         The total departure time in quay crane scheduling stage = 330.0
102
103
         The total wasted crane work hour according QC0= 7.8219341232874635
104
         The last depature time in quay crane scheduling stage = 67.0
105
106 The specific solution are as follows:
         Vessel i: 0:
                                                             ai-di: 53-68,
                                                                                      taoi-deltai: 53-68,
                                                                                                                       periodi: 15,
107
                       li: 4,
                                    pi: 18-22,
                                                                                                                                                     taoPi SP-
                                            periodPi: 3,
      deltaPi SP: 53-56,
                                                                               c i: 3714886,
                                                                                                                    dowork: 3954660,
                                                                                                                                                                  fa_i: 4
                                                                                                                       periodi: 26,
                                                                                                                                                     taoPi_SP-
108
         Vessel i: 1: li: 4,
                                    pi: 22-26,
                                                             ai-di: 39-65,
                                                                                      taoi-deltai: 39-65,
                                           periodPi: 5,
      deltaPi_SP: 39-44,
                                                                               c i: 6679903,
                                                                                                                     dowork: 6722922,
                                                                                                                                                                  fa_i: 4
109
         Vessel i: 2:
                      li: 5,
                                    pi: 26-31,
                                                             ai-di: 45-67,
                                                                                      taoi-deltai: 45-67,
                                                                                                                       periodi: 22,
                                                                                                                                                     taoPi SP-
      deltaPi SP: 45-50,
                                           periodPi: 5,
                                                                               c i: 5664094.
                                                                                                                    dowork: 5800168,
                                                                                                                                                                  fa i: 3
110
         Vessel i: 3:
                       li: 7,
                                    pi: 7-14,
                                                           ai-di: 58-77,
                                                                                    taoi-deltai: 58-77,
                                                                                                                    periodi: 19,
                                                                                                                                                   taoPi_SP-deltaPi_SP
                                 periodPi: 3,
                                                                     c_i: 4750315,
                                                                                                           dowork: 4877414,
       58-61,
                                                                                                                                                       fa_i: 5
                                                                                                                       periodi: 17,
111
         Vessel i: 4:
                       li: 4.
                                    pi: 28-32,
                                                             ai-di: 11-28,
                                                                                      taoi-deltai: 11-28,
                                                                                                                                                     taoPi_SP-
                                           periodPi: 5,
                                                                               c_i: 4376832.
                                                                                                                    dowork: 4481948,
      deltaPi_SP: 11-16,
                                                                                                                                                                  fa i: 2
                                                             ai-di: 7-34,
112
         Vessel i: 5:
                                    pi: 14-20,
                                                                                    taoi-deltai: 7-29,
                                                                                                                    periodi: 22,
                                                                                                                                                   taoPi_SP-deltaPi_SP
                                 periodPi: 5,
                                                                     c i: 5609404,
                                                                                                           dowork: 5800168,
                                                                                                                                                        fa i: 3
      : 7-12,
                                                                                                                    periodi: 9.
                                    pi: 7-14,
                                                           ai-di: 17-28,
         Vessel i: 6:
                                                                                    taoi-deltai: 17-26,
                                                                                                                                                taoPi_SP-deltaPi_SP:
                       li: 7,
      17-20,
                                  periodPi: 3,
                                                                     c_i: 2265480,
                                                                                                           dowork: 2372796,
                                                                                                                                                        fa_i: 2
         Vessel i: 7:
                        li: 6,
                                    pi: 22-28,
                                                             ai-di: 1-29,
                                                                                    taoi-deltai: 1-19,
                                                                                                                    periodi: 18,
                                                                                                                                                   taoPi_SP-deltaPi_SP
      : 1-4,
                               periodPi: 3,
                                                                  c i: 4734427,
                                                                                                        dowork: 5668346,
                                                                                                                                                     fa_i: 6
                                    pi: 14-18,
                                                                                                                       periodi: 9,
                                                                                                                                                   taoPi SP-deltaPi SP
        Vessel i: 8:
                                                             ai-di: 65-81,
                                                                                      taoi-deltai: 65-74,
                       li: 4,
      : 65-67,
                                 periodPi: 2,
                                                                     c_i: 2193671,
                                                                                                           dowork: 2372796,
                                                                                                                                                        fa_i: 3
     TimeSolveModel: 84.000000
117
      TimeAll: 88.000000
118
119
120
```