```
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=7231
  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.....
13
        Optimize the ./R_7_4.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: 0x9f26ecca
         Variable types: 0 continuous, 56000 integer (47131 binary)
       Coefficient statistics:
28
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, 6e+06]
33
        Presolve removed 106235 rows and 2071 columns
        Presolve time: 0.19s
        Presolved: 27066 rows, 53929 columns, 78647 nonzeros
35
36
        Variable types: 0 continuous, 53929 integer (45067 binary)
38
        Root relaxation: objective 3.297620e+02, 2714 iterations, 0.11 seconds (0.28 work units)
39
40
             Nodes | Current Node | Objective Bounds
41
         Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
42
43
                       0 329.76201 0 2097
                                                                                  - 329.76201
44
       Η
              0
                                                       926.0000000 329.76201 64.4%
45
       H = 0
                                                       513.0000000 329.76201 35.7%
                         0
46
       H = 0
                         0
                                                       512.0000000 329.76201 35.6%
47
                       0\ 377.00000\ 0\ 2019\ 512.00000\ 377.00000\ 26.4\%
48
49
              0
                       0 377.00444 0 2095 512.00000 377.00444 26.4%
                                                                                                                                                 8s
                                                    0 2095 512.00000 377.02177 26.4%
50
              0
                       0 377.02177
51
                       0 377.10004 0 1691 512.00000 377.10004 26.3%
52
                       0 378.00000
                                                    0 2012 512.00000 378.00000 26.2%
                                                                                                                                           - 12s
53
                       0 378.00000 0 2033 512.00000 378.00000 26.2%
              0
54
                       0\ 378.07690\quad 0\ 1730\ 512.00000\ 378.07690\ 26.2\%
                                                                                                                                          - 13s
55
                       0 378.07690
                                                      0 1729 512.00000 378.07690 26.2%
56
                       2 378.07690  0 1729 512.00000 378.07690 26.2%
                                                                                                                                             15s
57
           1404 1418 422.05838 335 1344 512.00000 378.07690 26.2% 10.4
58
           2782 2296 467.44007 365 1729 512.00000 378.07690 26.2% 20.7
           2784 2297 494.00000 353 1224 512.00000 494.00000 3.52% 20.6 30s
60 H 2784 2183
                                                              511.0000000 494.00000 3.33% 20.6 31s
61
        H 2790 1875
                                                               510.0000000 498.81174 2.19% 20.6 34s
           2792 1877 504.10113 352 97 510.00000 504.10113 1.16% 20.6 35s
63
        Optimal solution found at node 2802 - now completing solution pool...
64
65
66
        Explored 2802 nodes (89557 simplex iterations) in 37.24 seconds (52.80 work units)
        Thread count was 8 (of 8 available processors)
67
68
69
         Solution count 3: 510 510 510
70
        No other solutions better than 510
72
        Optimal solution found (tolerance 1.00e-04)
        Best objective 5.100000000000e+02, best bound 5.10000000000e+02, gap 0.0000%
        Output optimal solution and the Optimal Obj: 510.0
75
76
78 Obj = 510.0
79
80
        Solutions
```

```
unknown
  81
         The total pi = 113.0
  82
         The total duration time in berth stage = 148.0
  83
         The total duration time in quay crane scheduling stage = 30.0
 84
         The total departure time in berth stage= 314.0
  85
         The total departure time in quay crane scheduling stage = 196.0
  86
         The total wasted crane work hour according QC0= 2.644198237016583
  87
         The last depature time in quay crane scheduling stage = 53.0
  88
  89
     The specific solution are as follows:
        Vessel i: 0: li: 7,
                                    pi: 14-21,
                                                                                      taoi-deltai: 38-58,
                                                                                                                       periodi: 20,
  90
                                                             ai-di: 38-58,
                                                                                                                                                     taoPi SP-
                                           periodPi: 4,
                                                                              c_i: 5109254,
      deltaPi_SP: 38-42,
                                                                                                                    dowork: 5141058,
                                                                                                                                                                  fa i: 3
                                                                                                                                                   taoPi_SP-deltaPi_SP
  91
         Vessel i: 1:
                      li: 4,
                                    pi: 20-24,
                                                             ai-di: 7-31,
                                                                                    taoi-deltai: 7-31,
                                                                                                                    periodi: 24,
                                 periodPi: 4,
                                                                     c i: 6280473,
                                                                                                          dowork: 6327456,
      : 7-11,
                                                                                                                                                       fa i: 4
  92
        Vessel i: 2:
                       li: 4,
                                                                                      taoi-deltai: 48-69,
                                                                                                                       periodi: 21,
                                                                                                                                                     taoPi_SP-
                                    pi: 22-26,
                                                             ai-di: 48-69,
      deltaPi_SP: 48-53,
                                                                                                                    dowork: 5404702,
                                           periodPi: 5,
                                                                               c_i: 5302051,
                                                                                                                                                                  fa_i: 3
         Vessel i: 3:
                                    pi: 27-34,
                                                             ai-di: 0-23,
                                                                                    taoi-deltai: 0-23,
                                                                                                                    periodi: 23,
                                                                                                                                                   taoPi_SP-deltaPi_SP
                                                                                                        dowork: 5931990,
                                                                  c_i: 5897603,
                                                                                                                                                  fa_i: 2
taoPi_SP-deltaPi_SP
      : 0-7,
                               periodPi: 7,
                                    pi: 9-14,
        Vessel i: 4:
                       li: 5,
                                                           ai-di: 20-38,
                                                                                    taoi-deltai: 20-38,
                                                                                                                    periodi: 18,
      : 20-23,
                                 periodPi: 3,
                                                                     c_i: 4491204,
                                                                                                          dowork: 4745592,
                                                                                                                                                       fa_i: 5
        Vessel i: 5:
                       li: 7,
                                    pi: 7-14,
                                                           ai-di: 40-61,
                                                                                    taoi-deltai: 40-60,
                                                                                                                    periodi: 20,
                                                                                                                                                   taoPi SP-deltaPi SP
                                                                                                                                                      fa_i: 5
                                 periodPi: 4,
                                                                    c_i: 5209900,
      : 40-44,
                                                                                                          dowork: 5272880,
                       li: 6,
                                                                                      taoi-deltai: 13-35,
                                                                                                                       periodi: 22,
                                                                                                                                                     taoPi_SP-
        Vessel i: 6:
                                    pi: 14-20,
                                                             ai-di: 13-42,
      deltaPi_SP: 13-16,
                                           periodPi: 3,
                                                                              c_i: 5768056,
                                                                                                                    dowork: 5931990,
                                                                                                                                                                  fa_i: 6
      TimeSolveModel: 45.000000
  98
 99
     TimeAll: 48.000000
100
101
```