```
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=55148
 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 5 6.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 71827 rows, 39860 columns and 208375 nonzeros
25
26
      Model fingerprint: 0x0fd2edee
      Variable types: 0 continuous, 39860 integer (33525 binary)
     Coefficient statistics:
28
29
        Matrix range [1e+00, 5e+05]
30
        Objective range [1e+00, 1e+00]
31
        Bounds range [1e+00, 1e+00]
                                [1e+00, 6e+06]
32
        RHS range
33
      Presolve removed 59361 rows and 1810 columns
      Presolve time: 0.09s
      Presolved: 12466 rows, 38050 columns, 35842 nonzeros
35
36
      Variable types: 0 continuous, 38050 integer (31720 binary)
      Found heuristic solution: objective 772.0000000
      Found heuristic solution: objective 732.0000000
38
39
40
      Root relaxation: objective 3.237045e+02, 1400 iterations, 0.06 seconds (0.15 work units)
41
42
          Nodes | Current Node | Objective Bounds

↓ Work

       Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
43
44
45
                 46
                                          548.0000000 323.70453 40.9% - 1s
      H 0 0
                 47
                 0\ \ 356.00000\quad 0\ 1172\ \ 548.00000\ \ 356.00000\ \ 35.0\%
49
                 0 356.00000 0 1172 548.00000 356.00000 35.0%
                 0 356.00000 0 956 548.00000 356.00000 35.0%
50
           0
51
                 0 358.00000 0 1132 548.00000 358.00000 34.7%
52
                 0 358.00000 0 1132 548.00000 358.00000 34.7%
53
           0
                 0 358,00000 0 986 548,00000 358,00000 34.7%
54
                 0 358.00000 0 986 548.00000 358.00000 34.7%
55
                  2 368.00000 0 986 548.00000 368.00000 32.8%
        2122 1962 390.00000 137 986 548.00000 368.00000 32.8% 24.5 16s
56
57
        2139 1973 541.24378 264 110 548.00000 541.24378 1.23% 24.3 20s
58
      Cutting planes:
60
       Learned: 230
61
        Gomory: 30
        Implied bound: 6
63
        MIR: 44
        StrongCG: 16
64
65
        Flow cover: 102
66
        Zero half: 1
        RLT: 2
67
68
        Relax-and-lift: 232
70
      Explored 2141 nodes (76837 simplex iterations) in 21.06 seconds (26.21 work units)
      Thread count was 8 (of 8 available processors)
      Solution count 3: 548 548 548
74
      No other solutions better than 548
76
      Optimal solution found (tolerance 1.00e-04)
      Best objective 5.480000000000e+02, best bound 5.48000000000e+02, gap 0.0000%
78
79
      Output optimal solution and the Optimal Obj: 548.0
80
```

```
unknown
  82
     Obj = 548.0
  83
 84
      Solutions:
         The total pi = 91.0
         The total duration time in berth stage = 84.0
 86
 87
         The total duration time in quay crane scheduling stage = 18.0
 88
         The total departure time in berth stage= 307.0
  89
         The total departure time in quay crane scheduling stage = 241.0
         The total wasted crane work hour according QC0= 2.6837667460666657
  90
 91
         The last depature time in quay crane scheduling stage = 62.0
 92
  93 The specific solution are as follows:
 94
        Vessel i: 0:
                      li: 7,
                                   pi: 19-26,
                                                            ai-di: 30-56,
                                                                                     taoi-deltai: 30-54,
                                                                                                                      periodi: 24,
                                                                                                                                                    taoPi_SP-
      deltaPi_SP: 30-37,
                                           periodPi: 7,
                                                                              c_i: 6236568,
                                                                                                                   dowork: 6327456,
                                                                                                                                                                fa_i: 2
        Vessel i: 1: li: 5,
                                   pi: 14-19,
                                                            ai-di: 37-63,
                                                                                     taoi-deltai: 37-61,
                                                                                                                      periodi: 24,
                                                                                                                                                    taoPi_SP-
      deltaPi_SP: 37-41,
Vessel i: 2: li: 4,
                                           periodPi: 4,
                                                                                                                   dowork: 6591100,
                                                                              c i: 6271478,
                                                                                                                                                                fa_i: 5
                                                                                     taoi-deltai: 40-50,
                                                                                                                      periodi: 10,
                                                                                                                                                    taoPi_SP-
                                    pi: 26-30,
                                                            ai-di: 40-52,
      deltaPi_SP: 40-42,
                                           periodPi: 2,
                                                                              c_i: 2466250,
                                                                                                                   dowork: 2636440,
                                                                                                                                                                fa_i: 3
        Vessel i: 3: li: 4,
                                    pi: 22-26,
                                                            ai-di: 56-79,
                                                                                     taoi-deltai: 56-74,
                                                                                                                      periodi: 18,
                                                                                                                                                    taoPi_SP-
                                                                                                                                                                fa_i: 4
                                                                                                                   dowork: 4613770,
      deltaPi_SP: 56-59,
                                           periodPi: 3,
                                                                              c_i: 4513516,
                                   pi: 10-14,
                                                                                                                                                 taoPi_SP-deltaPi_SP
        Vessel i: 4: li: 4,
                                                            ai-di: 60-70,
                                                                                     taoi-deltai: 60-68,
                                                                                                                      periodi: 8,
       60-62,
                                 periodPi: 2,
                                                                    c_i: 2082547,
                                                                                                          dowork: 2109152,
                                                                                                                                                      fa_i: 4
     TimeSolveModel: 27.000000
 100
101 TimeAll: 31.000000
102
103
```