```
D:\Python\Python\setroute\python.exe "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=52222

import sys; print('Python %s on %s' % (sys.version, sys.platform))
sys.path.extend(['E:\\1 □□□□\\3 □□□□□\\1 □□□□□□□\\1 □□□□□□□□□\\1_□□□□□□_□□□□\\1_LW _□□□□1\\4 □□□□\\3 python_code\\9 Code for this paper', 'E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□1/4 □□□□/3 python_code/9 Code for this paper'])

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
>>> runfile('E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□1/4 □□□□/3 python_code/9 Code for this paper/main_DM.py', wdir='E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□1/4 □□□□/3 python_code/9 Code for this paper')
Backend TkAgg is interactive backend. Turning interactive mode on.
Waiting 5s.....

Optimize the  ./R_8_4.xlsx  instance

Set parameter TimeLimit to value 1200

Set parameter PoolSolutions to value 3
Set parameter PoolGap to value 0.05
Set parameter PoolSearchMode to value 2
Gurobi Optimizer version 11.0.0 build v11.0.0rc2 (win64 - Windows 10.0 (19045.2))

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

Optimize a model with 171112 rows, 64136 columns and 503224 nonzeros
Model fingerprint: 0xaa2d0593
Variable types: 0 continuous, 64136 integer (54000 binary)
Coefficient statistics:
  Matrix range     [1e+00, 5e+05]
  Objective range  [1e+00, 1e+00]
  Bounds range     [1e+00, 1e+00]
  RHS range        [1e+00, 6e+06]
Presolve removed 149765 rows and 3026 columns
Presolve time: 0.11s
Presolved: 21347 rows, 61110 columns, 61546 nonzeros
Variable types: 0 continuous, 61110 integer (50982 binary)
Found heuristic solution: objective 846.0000000

Root relaxation: objective 3.908317e+02, 2335 iterations, 0.10 seconds (0.19 work units)

    Nodes    |    Current Node    |     Objective Bounds      |     Work
 Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time

     0     0  390.83174    0 1745  846.00000  390.83174  53.8%     -    0s
H    0     0                       654.0000000  390.83174  40.2%     -    1s
     0     0  407.08256    0 1749  654.00000  407.08256  37.8%     -    2s
     0     0  425.36321    0 1506  654.00000  425.36321  35.0%     -    5s
     0     0  425.36321    0 1744  654.00000  425.36321  35.0%     -    5s
     0     0  426.89236    0 1378  654.00000  426.89236  34.7%     -    6s
     0     0  427.00000    0 1674  654.00000  427.00000  34.7%     -    7s
     0     0  427.00000    0 1673  654.00000  427.00000  34.7%     -    7s
     0     0  427.00000    0 1306  654.00000  427.00000  34.7%     -    7s
     0     0  427.00000    0 1224  654.00000  427.00000  34.7%     -    8s
     0     2  439.00000    0 1196  654.00000  439.00000  32.9%     -   10s
  1516  1596  549.07228  333  775  654.00000  439.00000  32.9%  25.9   15s
  4037  3872  617.00000  451 10625  654.00000  439.00000  32.9%  23.3   22s
H 4038  3679                       653.0000000  644.00000  1.38%  23.3   24s
  4039  3679  644.00000  130 1180  653.00000  644.00000  1.38%  23.3   25s
H 4039  3495                       652.0000000  644.00000  1.23%  23.3   25s
H 4046  2851                       651.0000000  648.00000  0.46%  23.2   26s

Cutting planes:
  Learned: 1
  Gomory: 11
  Cover: 2
  StrongCG: 1
  Flow cover: 39
  Zero half: 21
  RLT: 3
  Relax-and-lift: 25

Explored 4069 nodes (123913 simplex iterations) in 29.82 seconds (44.70 work units)
Thread count was 8 (of 8 available processors)

Solution count 3: 651 651 651
No other solutions better than 651

Optimal solution found (tolerance 1.00e-04)
Best objective 6.510000000000e+02, best bound 6.510000000000e+02, gap 0.0000%
```

Output optimal solution and the Optimal Obj:  651.0

Obj = 651.0

Solutions:
    The total pi =  120.0
    The total duration time in berth stage =  115.0
    The total duration time in quay crane scheduling stage =  22.0
    The total departure time in berth stage=  372.0
    The total departure time in quay crane scheduling stage =  279.0
    The total wasted crane work hour according QC0=  7.068911107402406
    The last depature time in quay crane scheduling stage =  67.0

The specific solution are as follows:
    Vessel i: 0:  li: 5,  pi: 9-14,  ai-di: 35-55,  taoi-deltai: 35-55,  periodi: 20,  taoPi_SP-deltaPi_SP: 35-40,  periodPi: 5,  c_i: 5034915,  dowork: 5272880,  fa_i: 5
    Vessel i: 1:  li: 7,  pi: 27-34,  ai-di: 35-46,  taoi-deltai: 35-46,  periodi: 11,  taoPi_SP-deltaPi_SP: 35-39,  periodPi: 4,  c_i: 2775624,  dowork: 2900084,  fa_i: 2
    Vessel i: 2:  li: 6,  pi: 8-14,  ai-di: 5-14,  taoi-deltai: 5-14,  periodi: 9,  taoPi_SP-deltaPi_SP: 5-7,  periodPi: 2,  c_i: 2161001,  dowork: 2240974,  fa_i: 3
    Vessel i: 3:  li: 6,  pi: 14-20,  ai-di: 36-46,  taoi-deltai: 36-46,  periodi: 10,  taoPi_SP-deltaPi_SP: 36-38,  periodPi: 2,  c_i: 2554319,  dowork: 2636440,  fa_i: 4
    Vessel i: 4:  li: 6,  pi: 14-20,  ai-di: 10-34,  taoi-deltai: 10-34,  periodi: 24,  taoPi_SP-deltaPi_SP: 10-13,  periodPi: 3,  c_i: 6132769,  dowork: 6327456,  fa_i: 6
    Vessel i: 5:  li: 7,  pi: 6-13,  ai-di: 65-80,  taoi-deltai: 65-75,  periodi: 10,  taoPi_SP-deltaPi_SP: 65-67,  periodPi: 2,  c_i: 2503846,  dowork: 2636440,  fa_i: 6
    Vessel i: 6:  li: 6,  pi: 22-28,  ai-di: 47-68,  taoi-deltai: 47-60,  periodi: 13,  taoPi_SP-deltaPi_SP: 47-49,  periodPi: 2,  c_i: 3334365,  dowork: 4218304,  fa_i: 6
    Vessel i: 7:  li: 7,  pi: 20-27,  ai-di: 24-52,  taoi-deltai: 24-42,  periodi: 18,  taoPi_SP-deltaPi_SP: 24-26,  periodPi: 2,  c_i: 4617655,  dowork: 4745592,  fa_i: 7
TimeSolveModel: 38.000000

TimeAll: 41.000000