```
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=51283

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_10.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: 0x0c0faac3
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, 7e+06]
Presolve removed 145470 rows and 2908 columns
Presolve time: 0.24s
Presolved: 25642 rows, 61228 columns, 74689 nonzeros
Variable types: 0 continuous, 61228 integer (51100 binary)

Root relaxation: objective 4.952876e+02, 2594 iterations, 0.12 seconds (0.27 work units)

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

     0     0  495.28762    0 1864          -  495.28762      -     -    0s
H    0     0                1064.0000000  495.28762  53.5%     -    0s
H    0     0                820.0000000  495.28762  39.6%     -    1s
     0     0  528.72731    0 1864  820.00000  528.72731  35.5%     -    2s
     0     0  541.70206    0 1852  820.00000  541.70206  33.9%     -   10s
     0     0  541.71886    0 1852  820.00000  541.71886  33.9%     -   10s
     0     0  541.86121    0 1544  820.00000  541.86121  33.9%     -   11s
     0     0  542.70138    0 1779  820.00000  542.70138  33.8%     -   15s
     0     0  542.71467    0 1801  820.00000  542.71467  33.8%     -   15s
     0     0  542.71783    0 1802  820.00000  542.71783  33.8%     -   15s
     0     0  546.38169    0 1611  820.00000  546.38169  33.4%     -   16s
     0     0  546.75812    0 1551  820.00000  546.75812  33.3%     -   16s
     0     0  547.53664    0 1491  820.00000  547.53664  33.2%     -   19s
     0     0  547.63739    0 1635  820.00000  547.63739  33.2%     -   19s
     0     0  547.63754    0 1619  820.00000  547.63754  33.2%     -   19s
     0     0  548.57477    0 1503  820.00000  548.57477  33.1%     -   20s
     0     0  553.42016    0 1479  820.00000  553.42016  32.5%     -   23s
     0     0  554.75327    0 1596  820.00000  554.75327  32.3%     -   23s
     0     0  554.83786    0 1650  820.00000  554.83786  32.3%     -   23s
     0     0  555.03325    0 1656  820.00000  555.03325  32.3%     -   23s
     0     0  555.03340    0 1649  820.00000  555.03340  32.3%     -   23s
     0     0  556.20294    0 1534  820.00000  556.20294  32.2%     -   24s
     0     0  556.27470    0 1607  820.00000  556.27470  32.2%     -   26s
     0     0  556.29088    0 1578  820.00000  556.29088  32.2%     -   26s
     0     0  556.75420    0 1472  820.00000  556.75420  32.1%     -   27s
     0     0  556.76143    0 1472  820.00000  556.76143  32.1%     -   27s
     0     1  556.76170    0 1472  820.00000  556.76170  32.1%     -   29s
    28    28  558.49761    9 1388  820.00000  557.11722  32.1%   112   35s
H   29    28                819.0000000  557.11722  32.0%   108   35s
   930   956 infeasible  236       819.00000  557.11722  32.0%  40.2   40s
  2399  2403  698.00000  667  665  819.00000  557.11722  32.0%  35.5   45s
  3457  3367  734.00000  891  537  819.00000  557.11722  32.0%  45.3   50s
  4314  4329  610.00000   97  997  819.00000  557.17482  32.0%  57.4   55s
  5007  4718  665.00000  350 1472  819.00000  557.17482  32.0%  55.3   65s
  5010  4720  791.71194  804  353  819.00000  791.71194  3.33%  55.2   77s
  5016  4725  798.47077  725  408  819.00000  798.47077  2.51%  58.3   80s
  5030  4734  806.95558  494  477  819.00000  806.95558  1.47%  58.1   85s
H 5041  4504                817.0000000  812.87597  0.50%  58.0   88s
```

```
  5046  4507  812.95408  305  167  817.00000  812.95408  0.50%  57.9   90s
  5067  4079  813.24937  664  133  817.00000  813.24937  0.46%  57.7   95s
  5093  4096  813.98186  103  129  817.00000  813.98186  0.37%  57.4  100s
  5125  4118  814.18884   16   97  817.00000  814.18884  0.34%  57.0  105s

Cutting planes:
  Gomory: 21
  Lift-and-project: 2
  Implied bound: 1
  MIR: 9
  StrongCG: 4
  Flow cover: 60
  Zero half: 5
  Relax-and-lift: 64

Explored 5146 nodes (341636 simplex iterations) in 110.13 seconds (115.47 work units)
Thread count was 8 (of 8 available processors)

Solution count 3: 817 817 817
No other solutions better than 817

Optimal solution found (tolerance 1.00e-04)
Best objective 8.170000000000e+02, best bound 8.170000000000e+02, gap 0.0000%

Output optimal solution and the Optimal Obj:  817.0


Obj = 817.0

Solutions:
    The total pi =  146.0
    The total duration time in berth stage =  147.0
    The total duration time in quay crane scheduling stage =  30.0
    The total departure time in berth stage=  467.0
    The total departure time in quay crane scheduling stage =  350.0
    The total wasted crane work hour according QC0=  2.9060816859097875
    The last depature time in quay crane scheduling stage =  65.0

The specific solution are as follows:
    Vessel i: 0     li: 4,      pi: 14-18,      ai-di: 17-35,      taoi-deltai: 17-35,      periodi: 18,      taoPi_SP-deltaPi_SP: 17-21,      periodPi: 4,      c_i: 4586869,      dowork: 4745592,      fa_i: 3
    Vessel i: 1     li: 5,      pi: 29-34,      ai-di: 24-38,      taoi-deltai: 24-38,      periodi: 14,      taoPi_SP-deltaPi_SP: 24-27,      periodPi: 3,      c_i: 3561568,      dowork: 3954660,      fa_i: 3
    Vessel i: 2     li: 7,      pi: 7-14,      ai-di: 34-59,      taoi-deltai: 34-59,      periodi: 25,      taoPi_SP-deltaPi_SP: 34-41,      periodPi: 7,      c_i: 6445186,      dowork: 6459278,      fa_i: 2
    Vessel i: 3     li: 7,      pi: 15-22,      ai-di: 47-69,      taoi-deltai: 47-69,      periodi: 22,      taoPi_SP-deltaPi_SP: 47-51,      periodPi: 4,      c_i: 5640981,      dowork: 5668346,      fa_i: 6
    Vessel i: 4     li: 5,      pi: 29-34,      ai-di: 46-60,      taoi-deltai: 46-60,      periodi: 14,      taoPi_SP-deltaPi_SP: 46-49,      periodPi: 3,      c_i: 3510268,      dowork: 3559194,      fa_i: 3
    Vessel i: 5     li: 7,      pi: 22-29,      ai-di: 29-49,      taoi-deltai: 29-49,      periodi: 20,      taoPi_SP-deltaPi_SP: 29-33,      periodPi: 4,      c_i: 5106601,      dowork: 5141058,      fa_i: 3
    Vessel i: 6     li: 7,      pi: 22-29,      ai-di: 60-83,      taoi-deltai: 60-85,      periodi: 25,      taoPi_SP-deltaPi_SP: 60-63,      periodPi: 3,      c_i: 6519152,      dowork: 6591100,      fa_i: 7
    Vessel i: 7     li: 7,      pi: 8-15,      ai-di: 63-82,      taoi-deltai: 63-72,      periodi: 9,      taoPi_SP-deltaPi_SP: 63-65,      periodPi: 2,      c_i: 2223406,      dowork: 2240974,      fa_i: 4
TimeSolveModel: 118.000000

TimeAll: 122.000000
```