```
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=22064

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_10_7.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 260882 rows, 80570 columns and 770550 nonzeros
Model fingerprint: 0xb226626c
Variable types: 0 continuous, 80570 integer (67900 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 219166 rows and 3592 columns
Presolve time: 0.19s
Presolved: 41716 rows, 76978 columns, 122698 nonzeros
Variable types: 0 continuous, 76978 integer (64318 binary)
Root relaxation presolved: 41553 rows, 77023 columns, 122241 nonzeros

Deterministic concurrent LP optimizer: primal and dual simplex
Showing primal log only...

Concurrent spin time: 0.00s

Solved with dual simplex

Root relaxation: objective 4.359752e+02, 3558 iterations, 0.34 seconds (0.41 work units)

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

     0     0  435.97521    0 2374          -  435.97521      -     -    1s
H    0     0                1194.0000000  435.97521  63.5%     -    1s
H    0     0                 731.0000000  435.97521  40.4%     -    3s
     0     0  452.89461    0 2306  731.00000  452.89461  38.0%     -    4s
     0     0  464.35868    0 2167  731.00000  464.35868  36.5%     -    9s
     0     0  464.38837    0 2368  731.00000  464.38837  36.5%     -    9s
     0     0  468.26505    0 1932  731.00000  468.26505  35.9%     -   10s
     0     0  468.61900    0 2299  731.00000  468.61900  35.9%     -   12s
     0     0  468.66136    0 2298  731.00000  468.66136  35.9%     -   12s
     0     0  468.66928    0 2298  731.00000  468.66928  35.9%     -   12s
     0     0  471.03976    0 1649  731.00000  471.03976  35.6%     -   13s
     0     0  471.31874    0 2085  731.00000  471.31874  35.5%     -   14s
     0     0  471.41991    0 1991  731.00000  471.41991  35.5%     -   14s
     0     0  471.46269    0 2077  731.00000  471.46269  35.5%     -   15s
     0     0  471.46491    0 2066  731.00000  471.46491  35.5%     -   15s
     0     0  472.34365    0 1539  731.00000  472.34365  35.4%     -   16s
     0     0  473.52118    0 1891  731.00000  473.52118  35.2%     -   18s
     0     0  474.00021    0 1796  731.00000  474.00021  35.2%     -   18s
     0     0  474.09693    0 1917  731.00000  474.09693  35.1%     -   18s
     0     0  474.11178    0 1961  731.00000  474.11178  35.1%     -   18s
     0     0  474.56073    0 1816  731.00000  474.56073  35.1%     -   19s
     0     0  474.91804    0 1951  731.00000  474.91804  35.0%     -   21s
     0     0  474.92481    0 1937  731.00000  474.92481  35.0%     -   21s
     0     0  475.20639    0 1509  731.00000  475.20639  35.0%     -   21s
     0     0  475.29274    0 1891  731.00000  475.29274  35.0%     -   23s
     0     0  475.29847    0 1914  731.00000  475.29847  35.0%     -   23s
     0     0  475.70290    0 1810  731.00000  475.70290  34.9%     -   23s
     0     0  475.76009    0 1852  731.00000  475.76009  34.9%     -   25s
     0     0  475.76467    0 1850  731.00000  475.76467  34.9%     -   25s
     0     0  476.03120    0 1781  731.00000  476.03120  34.9%     -   25s
```

```
  0     0  476.03850    0 1728  731.00000  476.03850  34.9%    -   26s
  0     2  476.03850    0 1718  731.00000  476.03850  34.9%    -   32s
 27    28  477.13809    6 1892  731.00000  476.61306  34.8%   178   55s
576   589  481.38116  121 1744  731.00000  476.61306  34.8%  17.5   60s
1022  1048  487.95778  222 1284  731.00000  476.61306  34.8%  48.1   65s
1956  1952  533.00000  427  782  731.00000  476.61306  34.8%  53.1   70s
2555  2586  553.00000  567  728  731.00000  476.61306  34.8%  69.0   75s
3345  3418  620.00000  722  605  731.00000  476.61306  34.8%  73.4   80s
4212  4185  535.95630  101 1195  731.00000  477.12184  34.7%  71.9   85s
4407  4186  704.00000  858 20775  731.00000  477.12184  34.7%  71.2   98s
4409  4187  535.00000  485 1364  731.00000  477.12184  34.7%  71.2  104s
4410  4188  708.00000  544  175  731.00000  708.00000  3.15%  71.1  105s
4421  4198  714.20119  707  469  731.00000  714.20119  2.30%  76.0  110s

Cutting planes:
  Learned: 1
  Gomory: 68
  Cover: 3
  Implied bound: 11
  Clique: 15
  MIR: 78
  StrongCG: 75
  Flow cover: 149
  Zero half: 16
  RLT: 7
  Relax-and-lift: 21

Explored 4431 nodes (359427 simplex iterations) in 112.80 seconds (183.13 work units)
Thread count was 8 (of 8 available processors)

Solution count 3: 731 731 731
No other solutions better than 731

Optimal solution found (tolerance 1.00e-04)
Best objective 7.310000000000e+02, best bound 7.310000000000e+02, gap 0.0000%

Output optimal solution and the Optimal Obj:  731.0


Obj = 731.0

Solutions:
    The total pi =  144.0
    The total duration time in berth stage =  129.0
    The total duration time in quay crane scheduling stage =  26.0
    The total departure time in berth stage=  417.0
    The total departure time in quay crane scheduling stage =  314.0
    The total wasted crane work hour according QC0=  11.066104292151538
    The last depature time in quay crane scheduling stage =  59.0

The specific solution are as follows:
    Vessel i: 0:     li: 7,         pi: 0-7,              ai-di: 33-44,              taoi-deltai: 33-44,              periodi: 11,              taoPi_SP-deltaPi_SP: 33-36,              periodPi: 3,              c_i: 2840843,              dowork: 2900084,              fa_i: 4
    Vessel i: 1:     li: 5,         pi: 9-14,             ai-di: 33-51,              taoi-deltai: 33-49,              periodi: 16,              taoPi_SP-deltaPi_SP: 33-36,              periodPi: 3,              c_i: 4207815,              dowork: 4218304,              fa_i: 4
    Vessel i: 2:     li: 5,         pi: 9-14,             ai-di: 57-67,              taoi-deltai: 57-65,              periodi: 8,              taoPi_SP-deltaPi_SP: 57-59,              periodPi: 2,              c_i: 1986134,              dowork: 3163728,              fa_i: 4
    Vessel i: 3:     li: 5,         pi: 14-19,            ai-di: 15-27,              taoi-deltai: 15-25,              periodi: 10,              taoPi_SP-deltaPi_SP: 15-17,              periodPi: 2,              c_i: 2392173,              dowork: 3163728,              fa_i: 4
    Vessel i: 4:     li: 5,         pi: 14-19,            ai-di: 42-62,              taoi-deltai: 42-60,              periodi: 18,              taoPi_SP-deltaPi_SP: 42-45,              periodPi: 3,              c_i: 4664365,              dowork: 4745592,              fa_i: 4
    Vessel i: 5:     li: 6,         pi: 8-14,             ai-di: 17-40,              taoi-deltai: 17-27,              periodi: 10,              taoPi_SP-deltaPi_SP: 17-19,              periodPi: 2,              c_i: 2545163,              dowork: 2900084,              fa_i: 4
    Vessel i: 6:     li: 5,         pi: 29-34,            ai-di: 21-48,              taoi-deltai: 21-34,              periodi: 13,              taoPi_SP-deltaPi_SP: 21-24,              periodPi: 3,              c_i: 3368785,              dowork: 3427372,              fa_i: 4
    Vessel i: 7:     li: 6,         pi: 18-24,            ai-di: 37-57,              taoi-deltai: 37-41,              periodi: 4,              taoPi_SP-deltaPi_SP: 37-38,              periodPi: 1,              c_i: 1034170,              dowork: 1054576,              fa_i: 4
    Vessel i: 8:     li: 5,         pi: 19-24,            ai-di: 8-41,               taoi-deltai: 8-25,               periodi: 17,              taoPi_SP-deltaPi_SP: 8-11,               periodPi: 3,              c_i: 4472421,              dowork: 4745592,              fa_i: 4
    Vessel i: 9:     li: 5,         pi: 24-29,            ai-di: 25-58,              taoi-deltai: 25-47,              periodi: 22,              taoPi_SP-deltaPi_SP: 25-29,              periodPi: 4,              c_i: 5689847,              dowork: 5800168,              fa_i: 4
TimeSolveModel: 123.000000

TimeAll: 126.000000
```