```
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=2571

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_6_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 100206 rows, 47910 columns and 292506 nonzeros
Model fingerprint: 0x9a1e74a7
Variable types: 0 continuous, 47910 integer (40308 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 89437 rows and 2385 columns
Presolve time: 0.12s
Presolved: 10769 rows, 45525 columns, 30429 nonzeros
Variable types: 0 continuous, 45525 integer (37929 binary)
Found heuristic solution: objective 806.0000000
Found heuristic solution: objective 754.0000000

Root relaxation: objective 3.384911e+02, 1474 iterations, 0.05 seconds (0.10 work units)

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

     0     0  338.49114    0 1188  754.00000  338.49114  55.1%     -    0s
H    0     0                       577.0000000  338.49114  41.3%     -    1s
     0     0  360.83586    0 1194  577.00000  360.83586  37.5%     -    1s
     0     0  377.34307    0 1194  577.00000  377.34307  34.6%     -    5s
     0     0  377.34307    0 1194  577.00000  377.34307  34.6%     -    5s
     0     0  378.09710    0  955  577.00000  378.09710  34.5%     -    5s
     0     0  379.00000    0 1147  577.00000  379.00000  34.3%     -    7s
     0     0  379.00000    0 1148  577.00000  379.00000  34.3%     -    7s
     0     0  379.00000    0 1147  577.00000  379.00000  34.3%     -    7s
     0     0  379.00000    0 1026  577.00000  379.00000  34.3%     -    7s
     0     0  379.00000    0  951  577.00000  379.00000  34.3%     -    8s
     0     2  381.00000    0  925  577.00000  381.00000  34.0%     -   10s
  2909  2856  492.08085  275  550  577.00000  381.00000  34.0%  20.6   15s
  3744  3447  558.00000  450  103  577.00000  558.00000  3.29%  22.0   20s

Cutting planes:
  Learned: 198
  Gomory: 7
  Lift-and-project: 1
  Implied bound: 10
  MIR: 6
  StrongCG: 8
  Flow cover: 21
  Zero half: 6
  RLT: 12
  Relax-and-lift: 239

Explored 3766 nodes (108107 simplex iterations) in 23.78 seconds (32.61 work units)
Thread count was 8 (of 8 available processors)

Solution count 3: 577 577 577
No other solutions better than 577

Optimal solution found (tolerance 1.00e-04)
Best objective 5.770000000000e+02, best bound 5.770000000000e+02, gap 0.0000%

```

Output optimal solution and the Optimal Obj: 577.0

Obj = 577.0

Solutions:
    The total pi = 79.0
    The total duration time in berth stage = 85.0
    The total duration time in quay crane scheduling stage = 20.0
    The total departure time in berth stage= 321.0
    The total departure time in quay crane scheduling stage = 256.0
    The total wasted crane work hour according QC0= 11.838342613524297
    The last depature time in quay crane scheduling stage = 63.0

The specific solution are as follows:
    Vessel i: 0: li: 5, pi: 17-22, ai-di: 44-61, taoi-deltai: 44-59, periodi: 15, taoPi_SP-deltaPi_SP: 44-47, periodPi: 3, c_i: 3837138, dowork: 4218304, fa_i: 5
    Vessel i: 1: li: 7, pi: 6-13, ai-di: 58-68, taoi-deltai: 58-66, periodi: 8, taoPi_SP-deltaPi_SP: 58-60, periodPi: 2, c_i: 2083988, dowork: 3295550, fa_i: 6
    Vessel i: 2: li: 4, pi: 13-17, ai-di: 58-76, taoi-deltai: 58-74, periodi: 16, taoPi_SP-deltaPi_SP: 58-63, periodPi: 5, c_i: 4006263, dowork: 4218304, fa_i: 2
    Vessel i: 3: li: 7, pi: 14-21, ai-di: 16-28, taoi-deltai: 16-26, periodi: 10, taoPi_SP-deltaPi_SP: 16-19, periodPi: 3, c_i: 2408241, dowork: 2504618, fa_i: 2
    Vessel i: 4: li: 7, pi: 22-29, ai-di: 40-71, taoi-deltai: 40-68, periodi: 28, taoPi_SP-deltaPi_SP: 40-45, periodPi: 5, c_i: 7232415, dowork: 7250210, fa_i: 4
    Vessel i: 5: li: 7, pi: 7-14, ai-di: 20-38, taoi-deltai: 20-28, periodi: 8, taoPi_SP-deltaPi_SP: 20-22, periodPi: 2, c_i: 1961561, dowork: 3163728, fa_i: 4
TimeSolveModel: 31.000000

TimeAll: 34.000000