```
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=56919

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_2.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: 0xfa8b2845
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 150588 rows and 3068 columns
Presolve time: 0.10s
Presolved: 20524 rows, 61068 columns, 59348 nonzeros
Variable types: 0 continuous, 61068 integer (50940 binary)

Root relaxation: objective 4.076468e+02, 2310 iterations, 0.08 seconds (0.15 work units)

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

     0     0  407.64680    0 1703          -  407.64680      -     -    0s
H    0     0                       672.0000000  407.64680  39.3%     -    1s
     0     0  431.06527    0 1618  672.00000  431.06527  35.9%     -    2s
     0     0  465.45534    0 1651  672.00000  465.45534  30.7%     -    5s
     0     0  465.48468    0 1691  672.00000  465.48468  30.7%     -    5s
     0     0  466.02917    0 1518  672.00000  466.02917  30.7%     -    5s
     0     0  467.00000    0 1643  672.00000  467.00000  30.5%     -    6s
     0     0  467.00000    0 1643  672.00000  467.00000  30.5%     -    6s
     0     0  467.00000    0 1270  672.00000  467.00000  30.5%     -    6s
H    0     0                       671.0000000  467.00000  30.4%     -    7s
     0     0  467.00000    0 1248  671.00000  467.00000  30.4%     -    7s
     0     0  467.00000    0 1432  671.00000  467.00000  30.4%     -    8s
     0     0  467.00000    0 1479  671.00000  467.00000  30.4%     -    8s
     0     0  467.00000    0 1517  671.00000  467.00000  30.4%     -    8s
     0     0  467.00000    0 1515  671.00000  467.00000  30.4%     -    8s
     0     0  467.00000    0 1353  671.00000  467.00000  30.4%     -    8s
     0     0  467.00000    0 1278  671.00000  467.00000  30.4%     -    9s
     0     1  467.00000    0 1259  671.00000  467.00000  30.4%     -   11s
   887   928  467.00000  216 1144  671.00000  467.00000  30.4%  32.7   15s
  1098   928  653.00000  175 1438  671.00000  653.00000  2.68%  28.5   24s

Cutting planes:
  Learned: 246
  Gomory: 101
  Implied bound: 6
  Projected implied bound: 6
  Clique: 23
  MIR: 610
  StrongCG: 524
  Flow cover: 12
  Zero half: 53
  RLT: 317
  Relax-and-lift: 1425

Explored 1098 nodes (50882 simplex iterations) in 24.23 seconds (33.16 work units)
Thread count was 8 (of 8 available processors)

Solution count 3: 671 671 671
```

No other solutions better than 671

Optimal solution found (tolerance 1.00e-04)
Best objective 6.710000000000e+02, best bound 6.710000000000e+02, gap 0.0000%

Output optimal solution and the Optimal Obj: 671.0

Obj = 671.0

Solutions:
    The total pi = 126.0
    The total duration time in berth stage = 128.0
    The total duration time in quay crane scheduling stage = 31.0
    The total departure time in berth stage= 384.0
    The total departure time in quay crane scheduling stage = 287.0
    The total wasted crane work hour according QC0= 8.810073432355752
    The last depature time in quay crane scheduling stage = 69.0

The specific solution are as follows:
    Vessel i: 0: li: 7, pi: 24-31, ai-di: 36-49, taoi-deltai: 36-49, periodi: 13, taoPi_SP-deltaPi_SP: 36-39, periodPi: 3, c_i: 3231032, dowork: 3559194, fa_i: 4
    Vessel i: 1: li: 5, pi: 22-27, ai-di: 18-27, taoi-deltai: 18-27, periodi: 9, taoPi_SP-deltaPi_SP: 18-21, periodPi: 3, c_i: 2264047, dowork: 2372796, fa_i: 2
    Vessel i: 2: li: 4, pi: 21-25, ai-di: 63-84, taoi-deltai: 63-84, periodi: 21, taoPi_SP-deltaPi_SP: 63-69, periodPi: 6, c_i: 5503347, dowork: 5536524, fa_i: 2
    Vessel i: 3: li: 4, pi: 14-18, ai-di: 7-28, taoi-deltai: 7-28, periodi: 21, taoPi_SP-deltaPi_SP: 7-12, periodPi: 5, c_i: 5380388, dowork: 5404702, fa_i: 3
    Vessel i: 4: li: 6, pi: 8-14, ai-di: 44-69, taoi-deltai: 44-69, periodi: 25, taoPi_SP-deltaPi_SP: 44-52, periodPi: 8, c_i: 6546024, dowork: 6591100, fa_i: 2
    Vessel i: 5: li: 5, pi: 13-18, ai-di: 29-43, taoi-deltai: 29-40, periodi: 11, taoPi_SP-deltaPi_SP: 29-31, periodPi: 2, c_i: 2721701, dowork: 3691016, fa_i: 5
    Vessel i: 6: li: 7, pi: 6-13, ai-di: 26-44, taoi-deltai: 26-38, periodi: 12, taoPi_SP-deltaPi_SP: 26-28, periodPi: 2, c_i: 3111183, dowork: 3691016, fa_i: 6
    Vessel i: 7: li: 6, pi: 18-24, ai-di: 33-56, taoi-deltai: 33-49, periodi: 16, taoPi_SP-deltaPi_SP: 33-35, periodPi: 2, c_i: 3984207, dowork: 4218304, fa_i: 6
TimeSolveModel: 33.000000

TimeAll: 36.000000