```
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=59471

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_5_9.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 71827 rows, 39860 columns and 208375 nonzeros
Model fingerprint: 0xa13db4a6
Variable types: 0 continuous, 39860 integer (33525 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 58471 rows and 1508 columns
Presolve time: 0.09s
Presolved: 13356 rows, 38352 columns, 37881 nonzeros
Variable types: 0 continuous, 38352 integer (32022 binary)
Found heuristic solution: objective 608.0000000
Found heuristic solution: objective 574.0000000

Root relaxation: objective 2.453464e+02, 1737 iterations, 0.07 seconds (0.19 work units)

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

     0     0  245.34642    0 1466  574.00000  245.34642  57.3%     -    0s
H    0     0                393.0000000  245.34642  37.6%     -    1s
     0     0  255.58473    0 1472  393.00000  255.58473  35.0%     -    1s
     0     0  260.65300    0 1465  393.00000  260.65300  33.7%     -    5s
     0     0  260.65300    0 1465  393.00000  260.65300  33.7%     -    6s
     0     0  264.79093    0 1278  393.00000  264.79093  32.6%     -    6s
     0     0  265.49103    0 1243  393.00000  265.49103  32.4%     -    9s
     0     0  265.55799    0 1431  393.00000  265.55799  32.4%     -    9s
     0     0  265.55799    0 1432  393.00000  265.55799  32.4%     -    9s
     0     0  266.10319    0 1091  393.00000  266.10319  32.3%     -    9s
     0     0  266.33799    0 1130  393.00000  266.33799  32.2%     -   11s
     0     0  266.42353    0 1081  393.00000  266.42353  32.2%     -   11s
     0     0  266.59496    0 1181  393.00000  266.59496  32.2%     -   11s
     0     0  267.96328    0 1060  393.00000  267.96328  31.8%     -   12s
     0     0  267.97348    0 1060  393.00000  267.97348  31.8%     -   12s
     0     2  292.00000    0 1060  393.00000  292.00000  25.7%     -   13s
   477   481  292.00000  119 1005  393.00000  292.00000  25.7%   8.9   15s
  2366  2096  385.00000  157  975  393.00000  385.00000  2.04%   7.1   20s
H 2371  1994                     392.0000000  392.00000  0.00%   7.1   21s

Optimal solution found at node 2371 - now completing solution pool...

Cutting planes:
  Learned: 169
  Implied bound: 1
  MIR: 2
  Flow cover: 15
  Zero half: 70
  RLT: 22
  Relax-and-lift: 283
  BQP: 14
  PSD: 1

Explored 2371 nodes (33256 simplex iterations) in 21.90 seconds (27.59 work units)
Thread count was 8 (of 8 available processors)
```

```
Solution count 3: 392 392 392
No other solutions better than 392

Optimal solution found (tolerance 1.00e-04)
Best objective 3.920000000000e+02, best bound 3.920000000000e+02, gap 0.0000%

Output optimal solution and the Optimal Obj:  392.0


Obj = 392.0

Solutions:
    The total pi =  66.0
    The total duration time in berth stage =  97.0
    The total duration time in quay crane scheduling stage =  21.0
    The total departure time in berth stage=  234.0
    The total departure time in quay crane scheduling stage =  158.0
    The total wasted crane work hour according QC0=  1.4519389783192487
    The last depature time in quay crane scheduling stage =  61.0

The specific solution are as follows:
    Vessel i: 0:    li: 6,    pi: 8-14,    ai-di: 31-59,    taoi-deltai: 31-57,    periodi: 26,    taoPi_SP-deltaPi_SP: 31-35,    periodPi: 4,    c_i: 6677502,    dowork: 6722922,    fa_i: 6
    Vessel i: 1:    li: 4,    pi: 14-18,    ai-di: 56-73,    taoi-deltai: 56-71,    periodi: 15,    taoPi_SP-deltaPi_SP: 56-61,    periodPi: 5,    c_i: 3800163,    dowork: 3822838,    fa_i: 2
    Vessel i: 2:    li: 6,    pi: 8-14,    ai-di: 2-32,    taoi-deltai: 2-30,    periodi: 28,    taoPi_SP-deltaPi_SP: 2-7,    periodPi: 5,    c_i: 7295016,    dowork: 7382032,    fa_i: 4
    Vessel i: 3:    li: 4,    pi: 14-18,    ai-di: 33-57,    taoi-deltai: 33-51,    periodi: 18,    taoPi_SP-deltaPi_SP: 33-37,    periodPi: 4,    c_i: 4525244,    dowork: 4745592,    fa_i: 3
    Vessel i: 4:    li: 7,    pi: 22-29,    ai-di: 15-32,    taoi-deltai: 15-25,    periodi: 10,    taoPi_SP-deltaPi_SP: 15-18,    periodPi: 3,    c_i: 2629104,    dowork: 2636440,    fa_i: 2
TimeSolveModel: 28.000000

TimeAll: 32.000000


```