```
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=46218

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_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 171112 rows, 64136 columns and 503224 nonzeros
Model fingerprint: 0x52a77634
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 135677 rows and 2564 columns
Presolve time: 0.27s
Presolved: 35435 rows, 61572 columns, 103928 nonzeros
Variable types: 0 continuous, 61572 integer (51444 binary)
Root relaxation presolved: 35407 rows, 61600 columns, 103871 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 3.983293e+02, 3087 iterations, 0.29 seconds (0.44 work units)

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

     0     0  398.32928    0 2209          -  398.32928      -     -    0s
H    0     0                     646.0000000  398.32928  38.3%     -    2s
     0     0  417.41163    0 2213  646.00000  417.41163  35.4%     -    3s
H    0     0                     645.0000000  424.00549  34.3%     -   11s
     0     0  426.00000    0 2120  645.00000  426.00000  34.0%     -   11s
     0     0  426.00000    0 2211  645.00000  426.00000  34.0%     -   11s
     0     0  427.18861    0 1951  645.00000  427.18861  33.8%     -   12s
     0     0  427.45833    0 2149  645.00000  427.45833  33.7%     -   18s
     0     0  427.46458    0 2150  645.00000  427.46458  33.7%     -   18s
     0     0  429.97507    0 1734  645.00000  429.97507  33.3%     -   19s
     0     0  431.15734    0 1891  645.00000  431.15734  33.2%     -   21s
     0     0  431.42657    0 1985  645.00000  431.42657  33.1%     -   21s
     0     0  431.46058    0 2004  645.00000  431.46058  33.1%     -   22s
     0     0  431.46058    0 2013  645.00000  431.46058  33.1%     -   22s
     0     0  432.60125    0 1618  645.00000  432.60125  32.9%     -   23s
     0     0  433.12430    0 1883  645.00000  433.12430  32.8%     -   24s
     0     0  433.24346    0 1945  645.00000  433.24346  32.8%     -   24s
     0     0  433.24596    0 1946  645.00000  433.24596  32.8%     -   25s
     0     0  433.49659    0 1601  645.00000  433.49659  32.8%     -   25s
     0     0  433.54606    0 1905  645.00000  433.54606  32.8%     -   27s
     0     0  433.54627    0 1909  645.00000  433.54627  32.8%     -   27s
     0     0  433.81662    0 1868  645.00000  433.81662  32.7%     -   28s
     0     0  433.81817    0 1867  645.00000  433.81817  32.7%     -   28s
     0     2  433.85060    0 1867  645.00000  433.85060  32.7%     -   33s
    27    32  434.04721    8 1859  645.00000  434.04721  32.7%  56.7   50s
  1002  1038  462.23567  208 1690  645.00000  436.23698  32.4%  10.6   55s
  2902  2941  515.19583  685 1274  645.00000  436.23698  32.4%  11.6   60s
  4346  4303  565.00000 1006  735  645.00000  436.23698  32.4%  21.9   65s
  5319  4622  530.81052  304 1867  645.00000  436.23698  32.4%  35.1   78s
  5321  4623  610.00000  478 1654  645.00000  610.00000  5.43%  35.1   85s
```

81	5322	4624	610.00000	420	1549	645.00000	610.00000	5.43%	35.1	92s
82	5326	4627	610.00000	531	1603	645.00000	610.00000	5.43%	35.1	95s
83	5328	4628	612.00000	763	1635	645.00000	612.00000	5.12%	35.1	100s
84	5332	4631	613.00000	363	1662	645.00000	613.00000	4.96%	35.0	108s
85	5335	4633	617.00000	321	1656	645.00000	617.00000	4.34%	35.0	110s
86	5336	4633	617.00000	708	1590	645.00000	617.00000	4.34%	35.0	115s
87	5341	4637	617.00000	541	1526	645.00000	617.00000	4.34%	35.0	121s
88	5346	4640	618.74718	530	1576	645.00000	618.74718	4.07%	34.9	130s
89	5350	4643	619.98775	401	1718	645.00000	619.98775	3.88%	34.9	138s
90	5353	4645	620.00000	689	1524	645.00000	620.00000	3.88%	34.9	140s
91	5354	4645	620.00000	400	1567	645.00000	620.00000	3.88%	34.9	146s
92	5359	4649	620.00000	1053	1636	645.00000	620.00000	3.88%	34.9	185s
93	5364	4652	620.00000	644	1626	645.00000	620.00000	3.88%	34.8	192s
94	5365	4653	620.00000	170	1590	645.00000	620.00000	3.88%	34.8	206s
95	5369	4655	620.00000	72	1622	645.00000	620.00000	3.88%	34.8	215s
96	5370	4656	620.00000	641	1619	645.00000	620.00000	3.88%	34.8	239s
97	5371	4657	620.00000	154	1601	645.00000	620.00000	3.88%	34.8	240s
98	5375	4659	620.00000	113	1786	645.00000	620.00000	3.88%	34.8	249s
99	5376	4660	620.00000	543	1744	645.00000	620.00000	3.88%	34.8	325s
100	5381	4663	620.00000	322	1794	645.00000	620.00000	3.88%	34.7	335s
101	5382	4664	620.00000	319	1760	645.00000	620.00000	3.88%	34.7	378s
102	5384	4665	620.00000	97	1695	645.00000	620.00000	3.88%	34.7	380s
103	5386	4667	620.00000	611	1768	645.00000	620.00000	3.88%	34.7	387s
104	5387	4667	620.00000	289	1769	645.00000	620.00000	3.88%	34.7	420s
105	5392	4671	620.00000	232	1606	645.00000	620.00000	3.88%	34.6	430s
106	5393	4671	620.00000	256	1687	645.00000	620.00000	3.88%	34.6	464s
107	5396	4673	620.00000	293	1717	645.00000	620.00000	3.88%	34.6	465s
108	5399	4675	620.00000	168	1737	645.00000	620.00000	3.88%	34.6	478s
109	5404	4679	620.00000	189	1786	645.00000	620.00000	3.88%	34.6	480s
110	5410	4683	620.00000	612	1904	645.00000	620.00000	3.88%	34.5	492s
111	5418	4688	620.00000	127	1879	645.00000	620.00000	3.88%	34.5	496s
112	5419	4689	620.00000	304	1866	645.00000	620.00000	3.88%	34.5	515s
113	5427	4694	620.00000	146	1869	645.00000	620.00000	3.88%	34.4	536s
114	5433	4698	620.00000	366	1885	645.00000	620.00000	3.88%	34.4	561s
115	5439	4702	620.00000	369	1900	645.00000	620.00000	3.88%	34.3	566s
116	5440	4703	620.00000	125	1804	645.00000	620.00000	3.88%	34.3	579s
117	5444	4705	620.00000	207	1759	645.00000	620.00000	3.88%	34.3	580s
118	5446	4707	620.00000	530	1848	645.00000	620.00000	3.88%	34.3	593s
119	5451	4710	620.00000	512	1905	645.00000	620.00000	3.88%	34.3	597s
120	5452	4711	620.00000	243	1870	645.00000	620.00000	3.88%	34.3	614s
121	5453	4711	620.00000	689	1893	645.00000	620.00000	3.88%	34.3	615s
122	5456	4713	620.00000	432	1850	645.00000	620.00000	3.88%	34.2	623s
123	5457	4714	620.00000	663	1893	645.00000	620.00000	3.88%	34.2	739s
124	5458	4715	620.00000	647	1845	645.00000	620.00000	3.88%	34.2	740s
125	5464	4719	620.00000	644	1941	645.00000	620.00000	3.88%	34.2	745s
126	5465	4719	620.00000	170	1928	645.00000	620.00000	3.88%	34.2	761s
127	5466	4720	620.00000	171	1889	645.00000	620.00000	3.88%	34.2	893s
128	H 5466	4482				644.0000000	620.00000	3.73%	34.2	894s
129	5469	4484	620.00000	72	245	644.00000	620.00000	3.73%	34.2	897s
130	5470	4485	620.00000	641	147	644.00000	620.00000	3.73%	34.2	901s
131	5472	4486	620.00000	1045	251	644.00000	620.00000	3.73%	34.1	905s
132	5474	4487	620.00000	181	137	644.00000	620.00000	3.73%	34.1	911s
133	5476	4489	620.00000	543	465	644.00000	620.00000	3.73%	34.1	917s
134	5481	4492	620.00000	322	879	644.00000	620.00000	3.73%	34.1	920s
135	5487	4496	620.00000	289	889	644.00000	620.00000	3.73%	34.0	926s
136	5489	4497	620.00000	539	859	644.00000	620.00000	3.73%	34.0	938s
137	5493	4500	620.00000	256	904	644.00000	620.00000	3.73%	34.0	941s
138	5494	4501	620.00000	922	843	644.00000	620.00000	3.73%	34.0	948s
139	5495	4501	620.00000	53	880	644.00000	620.00000	3.73%	34.0	951s
140	5496	4502	620.00000	293	812	644.00000	620.00000	3.73%	34.0	959s
141	5497	4503	620.00000	439	861	644.00000	620.00000	3.73%	34.0	963s
142	5498	4503	620.00000	596	810	644.00000	620.00000	3.73%	34.0	976s
143	5503	4507	620.00000	322	905	644.00000	620.00000	3.73%	33.9	987s
144	5505	4508	620.00000	355	909	644.00000	620.00000	3.73%	33.9	991s
145	5506	4509	620.00000	350	833	644.00000	620.00000	3.73%	33.9	998s
146	5507	4509	620.00000	253	861	644.00000	620.00000	3.73%	33.9	1001s
147	5508	4510	620.00000	464	890	644.00000	620.00000	3.73%	33.9	1008s
148	5513	4288	620.00000	141	309	644.00000	620.00000	3.73%	62.5	1011s
149	5518	4078	620.00000	127	338	644.00000	620.00000	3.73%	64.6	1016s
150	5519	4079	620.00000	304	440	644.00000	620.00000	3.73%	64.6	1022s
151	5520	4080	620.76335	784	764	644.00000	620.76335	3.61%	64.5	1028s
152	5521	4080	620.76335	478	725	644.00000	620.76335	3.61%	64.5	1031s
153	5522	4081	620.76335	420	750	644.00000	620.76335	3.61%	64.5	1036s
154	5523	4082	622.96935	341	910	644.00000	622.96935	3.27%	64.5	1047s
155	5528	4085	623.29083	763	1102	644.00000	623.29083	3.22%	64.4	1058s
156	5529	4086	623.38546	322	1084	644.00000	623.38546	3.20%	64.4	1073s
157	5531	4087	623.60562	195	1085	644.00000	623.60562	3.17%	64.4	1086s
158	5532	4088	623.74524	363	1038	644.00000	623.74524	3.15%	64.4	1108s
159	5533	4088	623.80228	366	1044	644.00000	623.80228	3.14%	64.4	1112s
160	5534	4089	623.81154	195	1046	644.00000	623.81154	3.13%	64.4	1121s
161	5535	4090	623.81186	321	982	644.00000	623.81186	3.13%	64.4	1135s
162	5537	4091	623.82561	152	986	644.00000	623.82561	3.13%	64.3	1142s
163	5538	4092	623.82561	238	930	644.00000	623.82561	3.13%	64.3	1154s
164	5539	4092	623.84015	369	950	644.00000	623.84015	3.13%	64.3	1160s

```
 5540  4093  623.84025  125  910  644.00000  623.84025  3.13%  64.3 1167s
 5541  4094  623.84025  541  908  644.00000  623.84025  3.13%  64.3 1172s
 5543  4096 infeasible   38       644.00000  623.84025  3.13%  69.3 1179s
 5545  4095  623.84025   39  835  644.00000  623.84025  3.13%  69.4 1182s
 5547  4097  623.84025   40  826  644.00000  623.84025  3.13%  69.4 1186s
 5549  4098 infeasible   41       644.00000  623.84025  3.13%  69.5 1194s
 5553  4099  623.84025   42  779  644.00000  623.84025  3.13%  69.8 1198s
 5557  4098  623.84025   43  742  644.00000  623.84025  3.13%  69.9 1200s

Cutting planes:
  Learned: 12
  Gomory: 25
  Implied bound: 113
  MIR: 482
  Mixing: 1
  StrongCG: 19
  Flow cover: 3425
  Zero half: 56
  RLT: 151
  Relax-and-lift: 4034

Explored 5560 nodes (399541 simplex iterations) in 1200.18 seconds (620.30 work units)
Thread count was 8 (of 8 available processors)

Solution count 3: 644 645 645

Time limit reached
Best objective 6.440000000000e+02, best bound 6.240000000000e+02, gap 3.1056%

Output one feasible solution with limited computation time

Optimization was stopped with status 9

Number of solution stored: 3
   644  645  645

Obj = 644.0

Solutions:
    The total pi =  113.0
    The total duration time in berth stage =  160.0
    The total duration time in quay crane scheduling stage =  48.0
    The total departure time in berth stage=  378.0
    The total departure time in quay crane scheduling stage =  266.0
    The total wasted crane work hour according QC0=  3.8681138201514162
    The last depature time in quay crane scheduling stage =  52.0

The specific solution are as follows:
    Vessel i: 0:     li: 6,          pi: 28-34,              ai-di: 24-42,              taoi-deltai: 24-42,              periodi: 18,              taoPi_SP-deltaPi_SP: 24-29,              periodPi: 5,              c_i: 4508441,              dowork: 4613770,              fa_i: 2
    Vessel i: 1:     li: 5,          pi: 9-14,               ai-di: 36-55,              taoi-deltai: 36-55,              periodi: 19,              taoPi_SP-deltaPi_SP: 36-41,              periodPi: 5,              c_i: 4907076,              dowork: 5009236,              fa_i: 3
    Vessel i: 2:     li: 6,          pi: 14-20,              ai-di: 47-73,              taoi-deltai: 47-73,              periodi: 26,              taoPi_SP-deltaPi_SP: 47-52,              periodPi: 5,              c_i: 6632534,              dowork: 6722922,              fa_i: 4
    Vessel i: 3:     li: 6,          pi: 8-14,               ai-di: 14-33,              taoi-deltai: 14-33,              periodi: 19,              taoPi_SP-deltaPi_SP: 14-22,              periodPi: 8,              c_i: 4878594,              dowork: 5009236,              fa_i: 2
    Vessel i: 4:     li: 5,          pi: 20-25,              ai-di: 21-31,              taoi-deltai: 21-31,              periodi: 10,              taoPi_SP-deltaPi_SP: 21-23,              periodPi: 2,              c_i: 2411686,              dowork: 2504618,              fa_i: 4
    Vessel i: 5:     li: 6,          pi: 14-20,              ai-di: 14-44,              taoi-deltai: 14-39,              periodi: 25,              taoPi_SP-deltaPi_SP: 14-19,              periodPi: 5,              c_i: 6437196,              dowork: 6459278,              fa_i: 3
    Vessel i: 6:     li: 6,          pi: 0-6,                ai-di: 25-53,              taoi-deltai: 25-51,              periodi: 26,              taoPi_SP-deltaPi_SP: 25-38,              periodPi: 13,              c_i: 6773675,              dowork: 6854744,              fa_i: 2
    Vessel i: 7:     li: 4,          pi: 20-24,              ai-di: 37-55,              taoi-deltai: 37-54,              periodi: 17,              taoPi_SP-deltaPi_SP: 37-42,              periodPi: 5,              c_i: 4218567,              dowork: 4613770,              fa_i: 2
TimeSolveModel: 1208.000000

TimeAll: 1212.000000
```