```
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=24818
 3
     import sys; print('Python %s on %s' % (sys.version, sys.platform))
      sys.path.extend(['E:\\1 ] _ _ \\3 | 0 _ _ | \\1 | 0 | 0 | 0 | \\1 | 0 | 0 | 0 | \\1 | 0 | 0 | 0 | \\1 | 0 | 0 | 0 | \\1 | 0 | 0 | 0 | \\1 | 0 | 0 | 0 | \\1 | 0 | 0 | \\1 | 0 | 0 | \\1 | 0 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\1 | 0 | \\\  | 0 | \\1 | 0 | \\\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | \\  | 0 | 
       6
      PyDev console: starting.
  8 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 = 1 = 3 = 0 = 0/1 = 0 = 0 = 0/1 = 0 = 0 = 0/1 = 0 = 0/1 = 0 = 0/1 = 0 = 0/1 = 0 = 0/1 = 0 = 0/1 = 0 = 0/1 = 0/1 = 0 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/1 = 0/
       main RO BDC.py', wdir='E:/1 0000/3 00000/1 0000000/1 0000000/1 0000000/1 LW 00001/4 0000/3 python code/9 Code for
10 Backend TkAgg is interactive backend. Turning interactive mode on.
11
      Waiting 5s.....
13 Optimize the ./R 18 5.xlsx instance by BDC
14
15
               Master protblem status = 2, is Optimal
16
              sol MP obj = 835.0
     The initial lb = -inf
                                              ub = inf
17
18
19
       The current iteration cnt = 0
20
              Dual problem status = 2, is Optimal
21
               Add optimal cut
22
               Master protblem status = 2, is Optimal
               Deterministic Sub problem Status= 2, is Optimal
                                                                                ub = 881.2098871462583
24
               1b = 881.2098871462583
              MPObj = 881.2098871462583 MPObj_Remove_Hua = 869.0 DualSPObj = 12.209887146258367 Hua = 12.209887146258366
2.5
       Deterministic\_SP\_SPObj = 672.0
26
      ub - 1b = 0.0
27
28
29
      Iteration cycle stopped by termination criterion 1: Because ub - lb \le eps, the iteration stop, and cnt = 0
30
           i: 0.0 1 i: 4.0 p i: 30.0 aI i: 48.0 sol a i: 48.0 sol g i: 0.0 d i: 59.0 sol taoi: 48.0 sol deltai: 62.0 sol deltai - sol taoi: 14.0 sol taoP
         48.0 sol_deltaP: 52.0 sol_deltaP - sol_taoP: 4.0 cl_i: 3676266.0
                                                                                                                                sol_c_i: 3676266.0 sol_gp_i: 0.0 total work: 3691016.0 wasted work: 0.
       05594665533825917
31
           i: 1.0 1 i: 5.0 p i: 6.0 aI i: 33.0
                                                                                sol a i: 33.0 sol g i: 0.0 d i: 43.0 sol taoi: 33.0 sol deltai: 46.0 sol deltai - sol taoi: 13.0 sol taoP:
                  sol_deltaP: 38.0 sol_deltaP - sol_taoP: 5.0 cl_i: 3220010.0 sol_e_i: 3220010.0 sol_gp_i: 0.0 total work: 3954660.0 wasted work: 2.
       33.0
       786522735203532
                                                                                     sol_a_i: 2.0 sol_g_i: 0.0 d_i: 16.0 sol_taoi: 2.0 sol_deltai: 20.0 sol_deltai - sol_taoi: 18.0 sol_taoP: 2
          i: 2.0 1_i: 5.0 p_i: 13.0 aI_i: 2.0
               sol deltaP: 8.0 sol deltaP - sol taoP: 6.0 cI i: 4544344.0 sol c i: 4544344.0 sol gp i: 0.0 total work: 4745592.0 wasted work: 0.
       7633323724416259
33
           i: 3.0 1_i: 5.0 p_i: 1.0 aI_i: 55.0
                                                                                sol a i: 55.0 sol g i: 0.0 d i: 68.0 sol taoi: 55.0 sol deltai: 72.0 sol deltai - sol taoi: 17.0 sol taoP:
       55.0 sol_deltaP: 61.0 sol_deltaP - sol_taoP: 6.0 cl_i: 4352300.0 sol_c i: 4352300.0 sol_gp_i: 0.0 total work: 4481948.0 wasted work: 0.
       49175403195217793
                                                                                  sol_a_i: 31.0 sol_g_i: 0.0 d_i: 39.0 sol_taoi: 31.0 sol_deltai: 42.0 sol_deltai - sol_taoi: 11.0 sol_taoP
34
           i: 4.0 1_i: 5.0 p_i: 11.0 aI_i: 31.0
          31.0 sol_deltaP: 33.0 sol_deltaP - sol_taoP: 2.0 cl_i: 2816559.0 sol_c_i: 2816559.0 sol_gp_i: 0.0 total work: 2900084.0 wasted work: 0.
       31680978895783707
                                                                                   sol_a_i: 57.0 sol_g_i: 0.0 d_i: 69.0 sol_taoi: 57.0 sol_deltai: 73.0 sol_deltai - sol taoi: 16.0 sol taoP
           i: 5.0 l_i: 5.0 p_i: 14.0 al_i: 57.0
         57.0 sol deltaP: 64.0 sol deltaP - sol taoP: 7.0 cI i: 4160344.0 sol c i: 4160344.0 sol gp i: 0.0 total work: 4218304.0 wasted work: 0.
           i: 6.0 l_i: 6.0 p_i: 6.0 al_i: 49.0 sol_a_i: 49.0 sol_g_i: 0.0 d_i: 65.0 sol_taoi: 49.0 sol_deltai: 70.0 sol_deltai: 70.0 sol_deltai - sol_taoi: 21.0 sol_0.0 sol_deltaP - sol_taoP: 6.0 el_i: 5510827.0 sol_c_i: 5510827.0 sol_gp_i: 0.0 total work: 5536524.0 wasted work: 0.
                                                                             sol a i: 49.0 sol g i: 0.0 d i: 65.0 sol taoi: 49.0 sol deltai: 70.0 sol deltai - sol taoi: 21.0 sol taoP:
36
       09746855608320311\\
           i: 7.0 1 i: 5.0 p i: 29.0 aI i: 57.0
                                                                                    sol a i: 57.0 sol g i: 0.0 d i: 72.0 sol taoi: 63.0 sol deltai: 82.0 sol deltai - sol taoi: 19.0 sol taoP
         63.0 sol deltaP: 67.0 sol deltaP - sol taoP: 4.0 cl i: 4918991.0 sol c i: 4918991.0 sol gp i: 0.0 total work: 5272880.0 wasted work: 1.
       3422987058305897
         i: 8.0\ l_{\_i}: 5.0\ p_{\_i}: 16.0\ al_{\_i}: 24.0\ sol_{\_a}: 24.0\ sol_{\_g}: 0.0\ d_{\_i}: 38.0\ sol_{\_a}: 24.0\ sol_{\_d}: 
                                                                                    sol_a_i: 24.0 sol_g_i: 0.0 d_i: 38.0 sol_taoi: 24.0 sol_deltai: 42.0 sol_deltai - sol_taoi: 18.0 sol_taoP
       7128476278618137
           i: 9.0 1_i: 5.0 p_i: 4.0 aI_i: 19.0
39
                                                                             sol_a_i: 19.0 sol_g_i: 0.0 d_i: 25.0 sol_taoi: 19.0 sol_deltai: 27.0 sol_deltai - sol_taoi: 8.0 sol_taoP:
                  sol deltaP: 21.0 sol deltaP - sol taoP: 2.0 cI i: 2049802.0 sol c i: 2049802.0 sol gp i: 0.0 total work: 2109152.0 wasted work: 0.
       22511416910682588
                                                                                         sol_a_i: 14.0 sol_g_i: 0.0 d_i: 31.0 sol_taoi: 14.0 sol_deltai: 36.0 sol_deltai - sol_taoi: 22.0
           sol_taoP: 14.0 sol_deltaP: 18.0 sol_deltaP - sol_taoP: 4.0 cl_i: 5630440.0 sol_c_i: 5630440.0 sol_gp_i: 0.0 total work: 5668346.0 wasted work
       : 0.1437772147289527
                                                                                  sol_a_i: 16.0 sol_g_i: 0.0 d_i: 33.0 sol_taoi: 16.0 sol_deltai: 38.0 sol deltai - sol taoi: 22.0 sol taoP
           16.0 sol deltaP: 26.0 sol deltaP - sol taoP: 10.0 cl i: 5685943.0 sol c i: 5685943.0 sol gp i: 0.0 total work: 5800168.0 wasted work: 0.
       43325469193306126
                                                                                         sol_a_i: 49.4 sol_g_i: 0.8 d_i: 64.0 sol_taoi: 50.0 sol_deltai: 74.0 sol_deltai - sol_taoi: 24.0
           i: 12.0    1_i: 5.0    p_i: 24.0    aI_i: 43.0
       sol_taoP: 50.0 sol_deltaP: 63.0 sol_deltaP - sol_taoP: 13.0 cl_i: 6148730.0 sol_c_i: 7994238.0 sol_gp_i: 1.0 total work: 8041142.0 wasted
       work: 0.1779065709820819
          i: 13.0 1 i: 4.0 p i: 25.0 aI i: 10.0
                                                                                        sol_a_i: 20.0 sol_g_i: 1.0 d_i: 25.0 sol_taoi: 20.0 sol_deltai: 37.0 sol_deltai - sol_taoi: 17.0
       sol_taoP: 20.0 sol_deltaP: 23.0 sol_deltaP - sol_taoP: 3.0 cl_i: 4259705.0 sol_c_i: 4259705.0 sol_gp_i: 0.0 total work: 4481948.0 wasted work
       : 0.8429662727010666
           sol_a_i: 11.2 sol_g_i: 0.6 d_i: 22.0 sol_taoi: 12.0 sol_deltai: 24.0 sol_deltai - sol_taoi: 12.0 sol_taoP
         12.0 sol_deltaP: 18.0 sol_deltaP - sol_taoP: 6.0 cl_i: 3009945.0 sol_c_i: 3800877.0 sol_gp_i: 0.6 total work: 3822838.0 wasted work: 0.
       08329793205989895
45
           sol_a_i: 23.0 sol_g_i: 0.0 d_i: 34.0 sol_taoi: 23.0 sol_deltai: 37.0 sol_deltai - sol_taoi: 14.0
                                   sol deltaP: 30.0 sol deltaP - sol taoP: 7.0 cl i: 3554496.0 sol c i: 5663648.0 sol gp i: 1.0 total work: 5668346.0 wasted work
       sol_taoP: 23.0
       : 0.017819483849433326
           sol_a_i: 6.0 sol_g_i: 1.0 d_i: 10.0 sol_taoi: 6.0 sol_deltai: 16.0 sol_deltai - sol_taoi: 10.0 sol_taoP
                   sol_deltaP: 9.0 sol_deltaP - sol_taoP: 3.0 cI_i: 2501602.0
                                                                                                                            sol_c_i: 3028890.0 sol_gp_i: 0.4 total work: 3031906.0 wasted work: 0.
         6.0
```

```
46 011439668644080653
     i: 17.0 li: 5.0 p_i: 19.0 al_i: 43.0 sol_a_i: 48.4 sol_g_i: 0.6 d_i: 64.0 sol_taoi: 49.0 sol_deltai: 71.0 sol_deltai - sol_taoi: 22.0 sol_taoP: 49.0 sol_deltaP - sol_taoP: 8.0 cl_i: 5719528.0 sol_c_i: 7828680.0 sol_gp_i: 1.0 total work: 7909320.0 wasted work: 0.30586700247303183
49 Optimal objective = 1541.0
50
51 Time: 742.000000
52
53
54
55
```