

```

1 "E:\1_00000\3_00000\1_00000\1_00000000\1_LW_000002\6_0000\2 python code\01_My_Python_Code\Scripts\python.
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=50183
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.extend(['E:\1_00000\3_00000\1_00000000\1_00000000\1_LW_000002\6_0000\2 python code\01_My_Python_Code',
  'E:/1_00000\3_00000\1_00000000\1_00000000\1_LW_000002\6_0000\2 python code\01_My_Python_Code'])
5
6 PyDev console: starting.
7
8 Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
9 >>> runfile('E:/1_00000\3_00000\1_00000000\1_00000000\1_LW_000002\6_0000\2 python code\01_My_Python_Code/main_BACASP_offical_PSO_2D_Bin_berth_line.py', wdir='E:/1_00000\3_00000\1_00000000\1_00000000\1_LW_000002\6_0000\2 python code\01_My_Python_Code')
10 Backend TkAgg is interactive backend. Turning interactive mode on.
11 Waiting 1s.....
12
13 This is the R_100_1_standerd_test.xlsx optimization process.
14
15 Start
16   Read basic data
17     V = 100
18     T = 72
19     Q = 23
20     L = 30
21     Max_CPUTime = 3600
22     Coe_Obj1 = 1.9
23     Coe_Obj2 = 0.1
24   PSO parameter setting:
25     Trail = 31
26     maxIter_num = 100
27     W_inertia = 2.0
28     oder_type_num = 25
29     c1 = 1.5
30     c2 = 1.5
31     r1 = 0.6342645023764609
32     r2 = 0.6342645023764609
33 Begin iteration:
34
35 iter = 0
36   cord_individual_obj[indivial_i, :] = [ 0. 70. 3561. 489.1]
37   cord_individual_obj[indivial_i, :] = [1.000e+00 7.000e+01 3.639e+03 4.969e+02]
38   cord_individual_obj[indivial_i, :] = [2.000e+00 6.900e+01 3.302e+03 4.613e+02]
39   cord_individual_obj[indivial_i, :] = [3.000e+00 7.000e+01 3.383e+03 4.713e+02]
40   cord_individual_obj[indivial_i, :] = [ 4. 69. 3559. 487.]
41   cord_individual_obj[indivial_i, :] = [ 5. 71. 3543. 489.2]
42   cord_individual_obj[indivial_i, :] = [ 6. 67. 3346. 461.9]
43   cord_individual_obj[indivial_i, :] = [ 7. 68. 3158. 445.]
44   cord_individual_obj[indivial_i, :] = [ 8. 68. 3280. 457.2]
45   cord_individual_obj[indivial_i, :] = [ 9. 69. 3376. 468.7]
46   cord_individual_obj[indivial_i, :] = [10. 70. 3513. 484.3]
47   cord_individual_obj[indivial_i, :] = [11. 69. 3424. 473.5]
48   cord_individual_obj[indivial_i, :] = [12. 68. 3305. 459.7]
49   cord_individual_obj[indivial_i, :] = [13. 68. 3376. 466.8]
50   cord_individual_obj[indivial_i, :] = [14. 67. 3164. 443.7]
51   cord_individual_obj[indivial_i, :] = [15. 69. 3528. 483.9]
52   cord_individual_obj[indivial_i, :] = [16. 67. 3305. 457.8]
53   cord_individual_obj[indivial_i, :] = [17. 67. 3424. 469.7]
54   cord_individual_obj[indivial_i, :] = [18. 71. 3557. 490.6]
55   cord_individual_obj[indivial_i, :] = [19. 69. 3401. 471.2]
56   cord_individual_obj[indivial_i, :] = [20. 69. 3599. 491.]
57   cord_individual_obj[indivial_i, :] = [21. 69. 3504. 481.5]
58   cord_individual_obj[indivial_i, :] = [22. 69. 3418. 472.9]
59   cord_individual_obj[indivial_i, :] = [23. 69. 3456. 476.7]
60   cord_individual_obj[indivial_i, :] = [24. 69. 3247. 455.8]
61
62   min(cord_individual_obj[:, 3]) = 443.70000000000005
63   historl_G_best_iter[iter, 3] = 443.70000000000005
64 Begin iteration:
65
66 iter = 1
67   cord_individual_obj[indivial_i, :] = [ 0. 71. 3381. 473.]
68   cord_individual_obj[indivial_i, :] = [1.000e+00 6.700e+01 3.164e+03 4.437e+02]
69   cord_individual_obj[indivial_i, :] = [2.000e+00 6.500e+01 3.246e+03 4.481e+02]
70   cord_individual_obj[indivial_i, :] = [3.000e+00 6.700e+01 3.410e+03 4.683e+02]
71   cord_individual_obj[indivial_i, :] = [ 4. 63. 3130. 432.7]
72   cord_individual_obj[indivial_i, :] = [ 5. 63. 3242. 443.9]
73   cord_individual_obj[indivial_i, :] = [ 6. 71. 3549. 489.8]
74   cord_individual_obj[indivial_i, :] = [ 7. 67. 3404. 467.7]
75   cord_individual_obj[indivial_i, :] = [ 8. 68. 3384. 467.6]
76   cord_individual_obj[indivial_i, :] = [ 9. 68. 3411. 470.3]
77   cord_individual_obj[indivial_i, :] = [10. 67. 3481. 475.4]
78   cord_individual_obj[indivial_i, :] = [11. 67. 3403. 467.6]
79   cord_individual_obj[indivial_i, :] = [12. 67. 3411. 468.4]

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80  cord_individual_obj[indivial_i,:] = [ 13. 67. 3529. 480.2]
81  cord_individual_obj[indivial_i,:] = [ 14. 64. 3284. 450.]
82  cord_individual_obj[indivial_i,:] = [ 15. 70. 3467. 479.7]
83  cord_individual_obj[indivial_i,:] = [ 16. 65. 3356. 459.1]
84  cord_individual_obj[indivial_i,:] = [ 17. 69. 3407. 471.8]
85  cord_individual_obj[indivial_i,:] = [ 18. 67. 3401. 467.4]
86  cord_individual_obj[indivial_i,:] = [ 19. 70. 3395. 472.5]
87  cord_individual_obj[indivial_i,:] = [ 20. 67. 3482. 475.5]
88  cord_individual_obj[indivial_i,:] = [ 21. 70. 3575. 490.5]
89  cord_individual_obj[indivial_i,:] = [ 22. 67. 3461. 473.4]
90  cord_individual_obj[indivial_i,:] = [ 23. 67. 3462. 473.5]
91  cord_individual_obj[indivial_i,:] = [ 24. 66. 3415. 466.9]
92
93 min(cord_individual_obj[:,3]) = 432.7
94 historl_G_best_iter[iter,3] = 432.7
95 Begin iteration:
96
97 iter = 2
98  cord_individual_obj[indivial_i,:] = [ 0. 69. 3386. 469.7]
99  cord_individual_obj[indivial_i,:] = [1.000e+00 6.600e+01 3.122e+03 4.376e+02]
100 cord_individual_obj[indivial_i,:] = [2.000e+00 6.700e+01 3.284e+03 4.557e+02]
101 cord_individual_obj[indivial_i,:] = [3.000e+00 6.900e+01 3.355e+03 4.666e+02]
102 cord_individual_obj[indivial_i,:] = [ 4. 67. 3321. 459.4]
103 cord_individual_obj[indivial_i,:] = [ 5. 69. 3238. 454.9]
104 cord_individual_obj[indivial_i,:] = [ 6. 70. 3256. 458.6]
105 cord_individual_obj[indivial_i,:] = [ 7. 65. 3399. 463.4]
106 cord_individual_obj[indivial_i,:] = [ 8. 69. 3373. 468.4]
107 cord_individual_obj[indivial_i,:] = [ 9. 67. 3149. 442.2]
108 cord_individual_obj[indivial_i,:] = [ 10. 64. 3070. 428.6]
109 cord_individual_obj[indivial_i,:] = [ 11. 68. 3292. 458.4]
110 cord_individual_obj[indivial_i,:] = [ 12. 68. 3373. 466.5]
111 cord_individual_obj[indivial_i,:] = [ 13. 69. 3314. 462.5]
112 cord_individual_obj[indivial_i,:] = [ 14. 68. 3235. 452.7]
113 cord_individual_obj[indivial_i,:] = [ 15. 69. 3280. 459.1]
114 cord_individual_obj[indivial_i,:] = [ 16. 68. 3264. 455.6]
115 cord_individual_obj[indivial_i,:] = [ 17. 69. 3316. 462.7]
116 cord_individual_obj[indivial_i,:] = [ 18. 70. 3432. 476.2]
117 cord_individual_obj[indivial_i,:] = [ 19. 67. 3254. 452.7]
118 cord_individual_obj[indivial_i,:] = [ 20. 70. 3267. 459.7]
119 cord_individual_obj[indivial_i,:] = [ 21. 63. 3130. 432.7]
120 cord_individual_obj[indivial_i,:] = [ 22. 66. 3217. 447.1]
121 cord_individual_obj[indivial_i,:] = [ 23. 68. 3197. 448.9]
122 cord_individual_obj[indivial_i,:] = [ 24. 67. 3175. 444.8]
123
124 min(cord_individual_obj[:,3]) = 428.6
125 historl_G_best_iter[iter,3] = 428.6
126 Begin iteration:
127
128 iter = 3
129  cord_individual_obj[indivial_i,:] = [ 0. 67. 3406. 467.9]
130  cord_individual_obj[indivial_i,:] = [1.000e+00 6.500e+01 3.097e+03 4.332e+02]
131  cord_individual_obj[indivial_i,:] = [2.000e+00 6.600e+01 3.130e+03 4.384e+02]
132  cord_individual_obj[indivial_i,:] = [3.000e+00 7.000e+01 3.372e+03 4.702e+02]
133  cord_individual_obj[indivial_i,:] = [ 4. 66. 3342. 459.6]
134  cord_individual_obj[indivial_i,:] = [ 5. 67. 3400. 467.3]
135  cord_individual_obj[indivial_i,:] = [ 6. 67. 3086. 435.9]
136  cord_individual_obj[indivial_i,:] = [ 7. 64. 3143. 435.9]
137  cord_individual_obj[indivial_i,:] = [ 8. 67. 3319. 459.2]
138  cord_individual_obj[indivial_i,:] = [ 9. 68. 3299. 459.1]
139  cord_individual_obj[indivial_i,:] = [ 10. 65. 3102. 433.7]
140  cord_individual_obj[indivial_i,:] = [ 11. 67. 3220. 449.3]
141  cord_individual_obj[indivial_i,:] = [ 12. 70. 3211. 454.1]
142  cord_individual_obj[indivial_i,:] = [ 13. 68. 3136. 442.8]
143  cord_individual_obj[indivial_i,:] = [ 14. 68. 3146. 443.8]
144  cord_individual_obj[indivial_i,:] = [ 15. 65. 3369. 460.4]
145  cord_individual_obj[indivial_i,:] = [ 16. 67. 3218. 449.1]
146  cord_individual_obj[indivial_i,:] = [ 17. 69. 3233. 454.4]
147  cord_individual_obj[indivial_i,:] = [ 18. 64. 3070. 428.6]
148  cord_individual_obj[indivial_i,:] = [ 19. 66. 3150. 440.4]
149  cord_individual_obj[indivial_i,:] = [ 20. 70. 3247. 457.7]
150  cord_individual_obj[indivial_i,:] = [ 21. 66. 3203. 445.7]
151  cord_individual_obj[indivial_i,:] = [ 22. 69. 3422. 473.3]
152  cord_individual_obj[indivial_i,:] = [ 23. 70. 3380. 471.]
153  cord_individual_obj[indivial_i,:] = [ 24. 66. 3304. 455.8]
154
155 min(cord_individual_obj[:,3]) = 428.6
156 historl_G_best_iter[iter,3] = 428.6
157 Begin iteration:
158
159 iter = 4
160  cord_individual_obj[indivial_i,:] = [ 0. 70. 3354. 468.4]
161  cord_individual_obj[indivial_i,:] = [1.000e+00 6.400e+01 3.070e+03 4.286e+02]
162  cord_individual_obj[indivial_i,:] = [2.000e+00 6.800e+01 3.296e+03 4.588e+02]
163  cord_individual_obj[indivial_i,:] = [3.000e+00 6.900e+01 3.335e+03 4.646e+02]

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164 cord_individual_obj[indivial_i,:] = [ 4. 65. 3331. 456.6]
165 cord_individual_obj[indivial_i,:] = [ 5. 68. 3341. 463.3]
166 cord_individual_obj[indivial_i,:] = [ 6. 67. 3327. 460.]
167 cord_individual_obj[indivial_i,:] = [ 7. 66. 3200. 445.4]
168 cord_individual_obj[indivial_i,:] = [ 8. 69. 3275. 458.6]
169 cord_individual_obj[indivial_i,:] = [ 9. 71. 3360. 470.9]
170 cord_individual_obj[indivial_i,:] = [ 10. 64. 3063. 427.9]
171 cord_individual_obj[indivial_i,:] = [ 11. 67. 3145. 441.8]
172 cord_individual_obj[indivial_i,:] = [ 12. 68. 3302. 459.4]
173 cord_individual_obj[indivial_i,:] = [ 13. 71. 3525. 487.4]
174 cord_individual_obj[indivial_i,:] = [ 14. 68. 3172. 446.4]
175 cord_individual_obj[indivial_i,:] = [ 15. 67. 3406. 467.9]
176 cord_individual_obj[indivial_i,:] = [ 16. 65. 3131. 436.6]
177 cord_individual_obj[indivial_i,:] = [ 17. 69. 3476. 478.7]
178 cord_individual_obj[indivial_i,:] = [ 18. 67. 3172. 444.5]
179 cord_individual_obj[indivial_i,:] = [ 19. 70. 3362. 469.2]
180 cord_individual_obj[indivial_i,:] = [ 20. 67. 3212. 448.5]
181 cord_individual_obj[indivial_i,:] = [ 21. 68. 3126. 441.8]
182 cord_individual_obj[indivial_i,:] = [ 22. 64. 3070. 428.6]
183 cord_individual_obj[indivial_i,:] = [ 23. 69. 3371. 468.2]
184 cord_individual_obj[indivial_i,:] = [ 24. 70. 3178. 450.8]
185
186 min(cord_individual_obj[:,3]) = 427.9
187 historl_G_best_iter[iter,3] = 427.9
188 Begin iteration:
189
190 iter = 5
191 cord_individual_obj[indivial_i,:] = [ 0. 69. 3329. 464.]
192 cord_individual_obj[indivial_i,:] = [1.000e+00 6.400e+01 3.243e+03 4.459e+02]
193 cord_individual_obj[indivial_i,:] = [2.000e+00 6.900e+01 3.356e+03 4.667e+02]
194 cord_individual_obj[indivial_i,:] = [3.000e+00 7.000e+01 3.465e+03 4.795e+02]
195 cord_individual_obj[indivial_i,:] = [ 4. 67. 3415. 468.8]
196 cord_individual_obj[indivial_i,:] = [ 5. 67. 3314. 458.7]
197 cord_individual_obj[indivial_i,:] = [ 6. 66. 3333. 458.7]
198 cord_individual_obj[indivial_i,:] = [ 7. 66. 3342. 459.6]
199 cord_individual_obj[indivial_i,:] = [ 8. 65. 3194. 442.9]
200 cord_individual_obj[indivial_i,:] = [ 9. 67. 3365. 463.8]
201 cord_individual_obj[indivial_i,:] = [ 10. 67. 3330. 460.3]
202 cord_individual_obj[indivial_i,:] = [ 11. 68. 3339. 463.1]
203 cord_individual_obj[indivial_i,:] = [ 12. 66. 3299. 455.3]
204 cord_individual_obj[indivial_i,:] = [ 13. 64. 3063. 427.9]
205 cord_individual_obj[indivial_i,:] = [ 14. 68. 3501. 479.3]
206 cord_individual_obj[indivial_i,:] = [ 15. 70. 3442. 477.2]
207 cord_individual_obj[indivial_i,:] = [ 16. 70. 3495. 482.5]
208 cord_individual_obj[indivial_i,:] = [ 17. 67. 3311. 458.4]
209 cord_individual_obj[indivial_i,:] = [ 18. 69. 3447. 475.8]
210 cord_individual_obj[indivial_i,:] = [ 19. 69. 3386. 469.7]
211 cord_individual_obj[indivial_i,:] = [ 20. 65. 3215. 445.]
212 cord_individual_obj[indivial_i,:] = [ 21. 69. 3410. 472.1]
213 cord_individual_obj[indivial_i,:] = [ 22. 69. 3443. 475.4]
214 cord_individual_obj[indivial_i,:] = [ 23. 68. 3288. 458.]
215 cord_individual_obj[indivial_i,:] = [ 24. 69. 3448. 475.9]
216
217 min(cord_individual_obj[:,3]) = 427.9
218 historl_G_best_iter[iter,3] = 427.9
219 Begin iteration:
220
221 iter = 6
222 cord_individual_obj[indivial_i,:] = [ 0. 68. 3475. 476.7]
223 cord_individual_obj[indivial_i,:] = [1.000e+00 6.800e+01 3.154e+03 4.446e+02]
224 cord_individual_obj[indivial_i,:] = [2.000e+00 7.000e+01 3.556e+03 4.886e+02]
225 cord_individual_obj[indivial_i,:] = [3.000e+00 6.700e+01 3.274e+03 4.547e+02]
226 cord_individual_obj[indivial_i,:] = [ 4. 69. 3436. 474.7]
227 cord_individual_obj[indivial_i,:] = [ 5. 65. 3413. 464.8]
228 cord_individual_obj[indivial_i,:] = [ 6. 66. 3217. 447.1]
229 cord_individual_obj[indivial_i,:] = [ 7. 64. 3191. 440.7]
230 cord_individual_obj[indivial_i,:] = [ 8. 64. 3145. 436.1]
231 cord_individual_obj[indivial_i,:] = [ 9. 69. 3308. 461.9]
232 cord_individual_obj[indivial_i,:] = [ 10. 65. 3022. 425.7]
233 cord_individual_obj[indivial_i,:] = [ 11. 70. 3348. 467.8]
234 cord_individual_obj[indivial_i,:] = [ 12. 68. 3291. 458.3]
235 cord_individual_obj[indivial_i,:] = [ 13. 70. 3465. 479.5]
236 cord_individual_obj[indivial_i,:] = [ 14. 67. 3277. 455.]
237 cord_individual_obj[indivial_i,:] = [ 15. 69. 3313. 462.4]
238 cord_individual_obj[indivial_i,:] = [ 16. 64. 3063. 427.9]
239 cord_individual_obj[indivial_i,:] = [ 17. 67. 3218. 449.1]
240 cord_individual_obj[indivial_i,:] = [ 18. 70. 3238. 456.8]
241 cord_individual_obj[indivial_i,:] = [ 19. 68. 3482. 477.4]
242 cord_individual_obj[indivial_i,:] = [ 20. 70. 3318. 464.8]
243 cord_individual_obj[indivial_i,:] = [ 21. 68. 3191. 448.3]
244 cord_individual_obj[indivial_i,:] = [ 22. 67. 3359. 463.2]
245 cord_individual_obj[indivial_i,:] = [ 23. 70. 3474. 480.4]
246 cord_individual_obj[indivial_i,:] = [ 24. 70. 3462. 479.2]
247

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unknown

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248 min(cord_individual_obj[:, 3]) = 425.7
249 historl_G_best_iter[iter, 3] = 425.7
250 Begin iteration:
251
252 iter = 7
253 cord_individual_obj[indivial_i, :] = [ 0. 66. 3206. 446.]
254 cord_individual_obj[indivial_i, :] = [1.000e+00 6.700e+01 3.247e+03 4.520e+02]
255 cord_individual_obj[indivial_i, :] = [2.000e+00 6.500e+01 3.022e+03 4.257e+02]
256 cord_individual_obj[indivial_i, :] = [3.000e+00 6.800e+01 3.255e+03 4.547e+02]
257 cord_individual_obj[indivial_i, :] = [ 4. 69. 3485. 479.6]
258 cord_individual_obj[indivial_i, :] = [ 5. 67. 3187. 446.]
259 cord_individual_obj[indivial_i, :] = [ 6. 68. 3320. 461.2]
260 cord_individual_obj[indivial_i, :] = [ 7. 68. 3303. 459.5]
261 cord_individual_obj[indivial_i, :] = [ 8. 66. 3452. 470.6]
262 cord_individual_obj[indivial_i, :] = [ 9. 67. 3156. 442.9]
263 cord_individual_obj[indivial_i, :] = [10. 68. 3322. 461.4]
264 cord_individual_obj[indivial_i, :] = [11. 68. 3464. 475.6]
265 cord_individual_obj[indivial_i, :] = [12. 70. 3404. 473.4]
266 cord_individual_obj[indivial_i, :] = [13. 69. 3486. 479.7]
267 cord_individual_obj[indivial_i, :] = [14. 65. 3194. 442.9]
268 cord_individual_obj[indivial_i, :] = [15. 69. 3196. 450.7]
269 cord_individual_obj[indivial_i, :] = [16. 67. 3290. 456.3]
270 cord_individual_obj[indivial_i, :] = [17. 66. 3283. 453.7]
271 cord_individual_obj[indivial_i, :] = [18. 69. 3408. 471.9]
272 cord_individual_obj[indivial_i, :] = [19. 69. 3311. 462.2]
273 cord_individual_obj[indivial_i, :] = [20. 69. 3444. 475.5]
274 cord_individual_obj[indivial_i, :] = [21. 69. 3248. 455.9]
275 cord_individual_obj[indivial_i, :] = [22. 68. 3218. 451.]
276 cord_individual_obj[indivial_i, :] = [23. 69. 3240. 455.1]
277 cord_individual_obj[indivial_i, :] = [24. 68. 3366. 465.8]
278
279 min(cord_individual_obj[:, 3]) = 425.7
280 historl_G_best_iter[iter, 3] = 425.7
281 Begin iteration:
282
283 iter = 8
284 cord_individual_obj[indivial_i, :] = [ 0. 66. 3355. 460.9]
285 cord_individual_obj[indivial_i, :] = [1.000e+00 6.700e+01 3.325e+03 4.598e+02]
286 cord_individual_obj[indivial_i, :] = [2.000e+00 6.900e+01 3.384e+03 4.695e+02]
287 cord_individual_obj[indivial_i, :] = [3.000e+00 6.500e+01 3.278e+03 4.513e+02]
288 cord_individual_obj[indivial_i, :] = [ 4. 68. 3320. 461.2]
289 cord_individual_obj[indivial_i, :] = [ 5. 68. 3221. 451.3]
290 cord_individual_obj[indivial_i, :] = [ 6. 68. 3382. 467.4]
291 cord_individual_obj[indivial_i, :] = [ 7. 63. 3051. 424.8]
292 cord_individual_obj[indivial_i, :] = [ 8. 66. 3116. 437.]
293 cord_individual_obj[indivial_i, :] = [ 9. 67. 3160. 443.3]
294 cord_individual_obj[indivial_i, :] = [10. 67. 3247. 452.]
295 cord_individual_obj[indivial_i, :] = [11. 69. 3404. 471.5]
296 cord_individual_obj[indivial_i, :] = [12. 71. 3354. 470.3]
297 cord_individual_obj[indivial_i, :] = [13. 65. 3022. 425.7]
298 cord_individual_obj[indivial_i, :] = [14. 67. 3382. 465.5]
299 cord_individual_obj[indivial_i, :] = [15. 67. 3287. 456.]
300 cord_individual_obj[indivial_i, :] = [16. 66. 3316. 457.]
301 cord_individual_obj[indivial_i, :] = [17. 67. 3162. 443.5]
302 cord_individual_obj[indivial_i, :] = [18. 71. 3384. 473.3]
303 cord_individual_obj[indivial_i, :] = [19. 71. 3473. 482.2]
304 cord_individual_obj[indivial_i, :] = [20. 69. 3393. 470.4]
305 cord_individual_obj[indivial_i, :] = [21. 65. 3084. 431.9]
306 cord_individual_obj[indivial_i, :] = [22. 69. 3467. 477.8]
307 cord_individual_obj[indivial_i, :] = [23. 67. 3324. 459.7]
308 cord_individual_obj[indivial_i, :] = [24. 71. 3408. 475.7]
309
310 min(cord_individual_obj[:, 3]) = 424.8
311 historl_G_best_iter[iter, 3] = 424.8
312 Begin iteration:
313
314 iter = 9
315 cord_individual_obj[indivial_i, :] = [ 0. 64. 3204. 442.]
316 cord_individual_obj[indivial_i, :] = [1.00e+00 7.00e+01 3.52e+03 4.85e+02]
317 cord_individual_obj[indivial_i, :] = [2.000e+00 6.600e+01 3.254e+03 4.508e+02]
318 cord_individual_obj[indivial_i, :] = [3.000e+00 6.500e+01 3.223e+03 4.458e+02]
319 cord_individual_obj[indivial_i, :] = [ 4. 65. 3102. 433.7]
320 cord_individual_obj[indivial_i, :] = [ 5. 68. 3397. 468.9]
321 cord_individual_obj[indivial_i, :] = [ 6. 69. 3306. 461.7]
322 cord_individual_obj[indivial_i, :] = [ 7. 70. 3341. 467.1]
323 cord_individual_obj[indivial_i, :] = [ 8. 67. 3238. 451.1]
324 cord_individual_obj[indivial_i, :] = [ 9. 67. 3257. 453.]
325 cord_individual_obj[indivial_i, :] = [10. 67. 3483. 475.6]
326 cord_individual_obj[indivial_i, :] = [11. 66. 3362. 461.6]
327 cord_individual_obj[indivial_i, :] = [12. 68. 3347. 463.9]
328 cord_individual_obj[indivial_i, :] = [13. 68. 3217. 450.9]
329 cord_individual_obj[indivial_i, :] = [14. 69. 3239. 455.]
330 cord_individual_obj[indivial_i, :] = [15. 68. 3238. 453.]
331 cord_individual_obj[indivial_i, :] = [16. 65. 3199. 443.4]
```

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332 cord_individual_obj[indivial_i,:] = [ 17. 66. 3108. 436.2]
333 cord_individual_obj[indivial_i,:] = [ 18. 71. 3346. 469.5]
334 cord_individual_obj[indivial_i,:] = [ 19. 63. 3051. 424.8]
335 cord_individual_obj[indivial_i,:] = [ 20. 70. 3341. 467.1]
336 cord_individual_obj[indivial_i,:] = [ 21. 68. 3478. 477.]
337 cord_individual_obj[indivial_i,:] = [ 22. 67. 3344. 461.7]
338 cord_individual_obj[indivial_i,:] = [ 23. 69. 3516. 482.7]
339 cord_individual_obj[indivial_i,:] = [ 24. 68. 3193. 448.5]
340
341 min(cord_individual_obj[:, 3]) = 424.8
342 historl_G_best_iter[iter, 3] = 424.8
343 Iteration calculate over
344
345
346
347
348 All item are in Bin and:
349 Bin area = 2160
350 Real_area = 1637.0
351 Proportion_of_area = 0.7578703703703704
352 BEST_CHROM =
353   berth: [11.5 28. 8.5 3. 4.5 22. 17. 18. 21.5 25. 17.5 26. 22.5 24.5
354 7. 9. 27.5 2.5 4.5 27.5 3. 6.5 19. 15. 13.5 4. 16.5 20.5
355 22.5 24.5 23. 12.5 27.5 26.5 12. 24. 4. 12.5 12.5 11.5 9.5 2.
356 27.5 12.5 2. 12.5 15. 3.5 4. 4.5 20. 4. 22. 7. 12. 24.5
357 13.5 11.5 2. 19.5 18. 27.5 18.5 4.5 20.5 27.5 24. 3.5 27.5 21.5
358 11. 14. 24.5 17.5 27.5 12. 7.5 20. 12.5 1.5 2.5 25. 15. 27.5
359 4.5 4.5 3. 11.5 10. 17.5 19. 20.5 25.5 23.5 17.5 25. 19. 11.
360 19.5 4.5]
361   time: [41. 53. 28. 61. 45. 42. 41. 62. 56. 35. 31. 46. 40. 20. 19. 33. 33. 17.
362 0. 31. 9. 23. 44. 17. 26. 40. 33. 58. 31. 10. 4. 2. 37. 24. 39. 8.
363 59. 20. 52. 37. 12. 19. 28. 56. 12. 0. 12. 29. 49. 15. 52. 47. 37. 26.
364 7. 22. 46. 50. 27. 17. 0. 58. 4. 6. 24. 10. 6. 38. 39. 28. 32. 22.
365 16. 51. 14. 10. 9. 46. 24. 23. 33. 45. 35. 42. 57. 56. 34. 4. 61. 14.
366 19. 49. 50. 0. 7. 18. 10. 15. 39. 3.]
367   num_QC: [2. 2. 2. 2. 3. 3. 3. 2. 2. 2. 2. 2. 2. 3. 3. 3. 3. 3. 2. 2.
368 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 3. 3. 2. 2. 2. 3. 3. 2.
369 2. 3. 2. 3. 2. 2. 2. 2. 3. 3. 3. 2. 3. 2. 3. 2. 3. 2. 2. 3. 2.
370 3. 3. 2. 2. 3. 3. 2. 3. 2. 2. 3. 2. 3. 3. 2. 3. 2. 2. 3. 2. 2. 3. 2.
371 2. 2. 4. 3.]
372 Objective function values and some other indicators:
373 Obj0 = 63.00          Obj1 = 3051.00          Obj0 + Obj1 = 3114.00
374 Total movement of crane: 130.00
375 Total waiting time in berth position: 2921.00
376 Total index of q during berthing: 6290.00
377 Specific arrangement for each vessel:
378   V_id: 0           li: 7.0           xi: 11.5           bow of i: 8.0           tail of i: 15.0           gama_i0: 41.0           gama_i1:
379   load_i: 160.0      gama_i1 + 1: 45.0      gama_i1 - gama_i0: 3.0           duration_time_i: 4.0           demand_i: 160.0           work
380   V_id: 1           li: 4.0           xi: 28.0           bow of i: 26.0           tail of i: 30.0           gama_i0: 53.0           gama_i1:
381   load_i: 160.0      gama_i1 + 1: 57.0      gama_i1 - gama_i0: 3.0           duration_time_i: 4.0           demand_i: 160.0           work
382   V_id: 2           li: 3.0           xi: 8.5           bow of i: 7.0           tail of i: 10.0           gama_i0: 28.0           gama_i1: 31.
383   load_i: 160.0      gama_i1 + 1: 32.0      gama_i1 - gama_i0: 3.0           duration_time_i: 4.0           demand_i: 160.0           work
384   V_id: 3           li: 6.0           xi: 3.0           bow of i: 0.0           tail of i: 6.0           gama_i0: 61.0           gama_i1: 62.0
385   load_i: 80.0       gama_i1 + 1: 63.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 80.0           work
386   V_id: 4           li: 9.0           xi: 4.5           bow of i: 0.0           tail of i: 9.0           gama_i0: 45.0           gama_i1: 46.0
387   load_i: 120.0      gama_i1 + 1: 47.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 120.0           work
388   V_id: 5           li: 6.0           xi: 22.0           bow of i: 19.0           tail of i: 25.0           gama_i0: 42.0           gama_i1:
389   load_i: 80.0       gama_i1 + 1: 44.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 80.0           work
390   V_id: 6           li: 4.0           xi: 17.0           bow of i: 15.0           tail of i: 19.0           gama_i0: 41.0           gama_i1:
391   load_i: 100.0      gama_i1 + 1: 43.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 100.0           work
392   V_id: 7           li: 8.0           xi: 18.0           bow of i: 14.0           tail of i: 22.0           gama_i0: 62.0           gama_i1:
393   load_i: 120.0      gama_i1 + 1: 64.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 120.0           work
394   V_id: 8           li: 9.0           xi: 21.5           bow of i: 17.0           tail of i: 26.0           gama_i0: 56.0           gama_i1:
395   load_i: 100.0      gama_i1 + 1: 58.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 100.0           work
396   V_id: 9           li: 8.0           xi: 25.0           bow of i: 21.0           tail of i: 29.0           gama_i0: 35.0           gama_i1:
397   load_i: 80.0       gama_i1 + 1: 37.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 80.0           work
398   V_id: 10          li: 5.0           xi: 17.5           bow of i: 15.0           tail of i: 20.0           gama_i0: 31.0           gama_i1:
399   load_i: 80.0       gama_i1 + 1: 33.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 80.0           work
400   V_id: 11          li: 6.0           xi: 26.0           bow of i: 23.0           tail of i: 29.0           gama_i0: 46.0           gama_i1:
401   load_i: 160.0      gama_i1 + 1: 50.0      gama_i1 - gama_i0: 3.0           duration_time_i: 4.0           demand_i: 160.0           work
402   V_id: 12          li: 7.0           xi: 22.5           bow of i: 19.0           tail of i: 26.0           gama_i0: 40.0           gama_i1:
403   load_i: 41.0       gama_i1 + 1: 42.0      gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 60.0           work

```



418	load_i: 100.0	work load gap_i: 0					
419	V_id: 41	li: 4.0	xi: 2.0	bow of i: 0.0	tail of i: 4.0	gama_i0: 19.0	gama_i1: 22. work
0	gama_i1 + 1: 23.0	gama_i1 - gama_i0: 3.0				demand_i: 160.0	
load_i: 160.0	work load gap_i: 0						
420	V_id: 42	li: 3.0	xi: 27.5	bow of i: 26.0	tail of i: 29.0	gama_i0: 28.0	gama_i1 work
: 30.0	gama_i1 + 1: 31.0	gama_i1 - gama_i0: 2.0				demand_i: 120.0	
load_i: 120.0	work load gap_i: 0						
421	V_id: 43	li: 7.0	xi: 12.5	bow of i: 9.0	tail of i: 16.0	gama_i0: 56.0	gama_i1 work
: 59.0	gama_i1 + 1: 60.0	gama_i1 - gama_i0: 3.0				demand_i: 160.0	
load_i: 160.0	work load gap_i: 0						
422	V_id: 44	li: 4.0	xi: 2.0	bow of i: 0.0	tail of i: 4.0	gama_i0: 12.0	gama_i1: 14. work
0	gama_i1 + 1: 15.0	gama_i1 - gama_i0: 2.0				demand_i: 160.0	
load_i: 160.0	work load gap_i: 0						
423	V_id: 45	li: 7.0	xi: 12.5	bow of i: 9.0	tail of i: 16.0	gama_i0: 0.0	gama_i1 work
: 1.0	gama_i1 + 1: 2.0	gama_i1 - gama_i0: 1.0				demand_i: 100.0	
load_i: 100.0	work load gap_i: 0						
424	V_id: 46	li: 4.0	xi: 15.0	bow of i: 13.0	tail of i: 17.0	gama_i0: 12.0	gama_i1 work
: 13.0	gama_i1 + 1: 14.0	gama_i1 - gama_i0: 1.0				demand_i: 100.0	
load_i: 100.0	work load gap_i: 0						
425	V_id: 47	li: 7.0	xi: 3.5	bow of i: 0.0	tail of i: 7.0	gama_i0: 29.0	gama_i1: 32. work
0	gama_i1 + 1: 33.0	gama_i1 - gama_i0: 3.0				demand_i: 160.0	
load_i: 160.0	work load gap_i: 0						
426	V_id: 48	li: 8.0	xi: 4.0	bow of i: 0.0	tail of i: 8.0	gama_i0: 49.0	gama_i1: 52. work
0	gama_i1 + 1: 53.0	gama_i1 - gama_i0: 3.0				demand_i: 140.0	
load_i: 140.0	work load gap_i: 0						
427	V_id: 49	li: 9.0	xi: 4.5	bow of i: 0.0	tail of i: 9.0	gama_i0: 15.0	gama_i1: 16. work
0	gama_i1 + 1: 17.0	gama_i1 - gama_i0: 1.0				demand_i: 120.0	
load_i: 120.0	work load gap_i: 0						
428	V_id: 50	li: 6.0	xi: 20.0	bow of i: 17.0	tail of i: 23.0	gama_i0: 52.0	gama_i1 work
: 55.0	gama_i1 + 1: 56.0	gama_i1 - gama_i0: 3.0				demand_i: 160.0	
load_i: 160.0	work load gap_i: 0						
429	V_id: 51	li: 8.0	xi: 4.0	bow of i: 0.0	tail of i: 8.0	gama_i0: 47.0	gama_i1: 48. work
0	gama_i1 + 1: 49.0	gama_i1 - gama_i0: 1.0				demand_i: 80.0	
load_i: 80.0	work load gap_i: 0						
430	V_id: 52	li: 8.0	xi: 22.0	bow of i: 18.0	tail of i: 26.0	gama_i0: 37.0	gama_i1 work
: 38.0	gama_i1 + 1: 39.0	gama_i1 - gama_i0: 1.0				demand_i: 80.0	
load_i: 80.0	work load gap_i: 0						
431	V_id: 53	li: 6.0	xi: 7.0	bow of i: 4.0	tail of i: 10.0	gama_i0: 26.0	gama_i1: work
27.0	gama_i1 + 1: 28.0	gama_i1 - gama_i0: 1.0				demand_i: 80.0	
load_i: 80.0	work load gap_i: 0						
432	V_id: 54	li: 6.0	xi: 12.0	bow of i: 9.0	tail of i: 15.0	gama_i0: 7.0	gama_i1 work
: 9.0	gama_i1 + 1: 10.0	gama_i1 - gama_i0: 2.0				demand_i: 100.0	
load_i: 100.0	work load gap_i: 0						
433	V_id: 55	li: 7.0	xi: 24.5	bow of i: 21.0	tail of i: 28.0	gama_i0: 22.0	gama_i1 work
: 23.0	gama_i1 + 1: 24.0	gama_i1 - gama_i0: 1.0				demand_i: 80.0	
load_i: 80.0	work load gap_i: 0						
434	V_id: 56	li: 9.0	xi: 13.5	bow of i: 9.0	tail of i: 18.0	gama_i0: 46.0	gama_i1 work
: 49.0	gama_i1 + 1: 50.0	gama_i1 - gama_i0: 3.0				demand_i: 160.0	
load_i: 160.0	work load gap_i: 0						
435	V_id: 57	li: 7.0	xi: 11.5	bow of i: 8.0	tail of i: 15.0	gama_i0: 50.0	gama_i1 work
: 51.0	gama_i1 + 1: 52.0	gama_i1 - gama_i0: 1.0				demand_i: 120.0	
load_i: 120.0	work load gap_i: 0						
436	V_id: 58	li: 4.0	xi: 2.0	bow of i: 0.0	tail of i: 4.0	gama_i0: 27.0	gama_i1: 28. work
0	gama_i1 + 1: 29.0	gama_i1 - gama_i0: 1.0				demand_i: 100.0	
load_i: 100.0	work load gap_i: 0						
437	V_id: 59	li: 5.0	xi: 19.5	bow of i: 17.0	tail of i: 22.0	gama_i0: 17.0	gama_i1 work
: 18.0	gama_i1 + 1: 19.0	gama_i1 - gama_i0: 1.0				demand_i: 120.0	
load_i: 120.0	work load gap_i: 0						
438	V_id: 60	li: 4.0	xi: 18.0	bow of i: 16.0	tail of i: 20.0	gama_i0: 0.0	gama_i1 work
: 2.0	gama_i1 + 1: 3.0	gama_i1 - gama_i0: 2.0				demand_i: 120.0	
load_i: 120.0	work load gap_i: 0						
439	V_id: 61	li: 5.0	xi: 27.5	bow of i: 25.0	tail of i: 30.0	gama_i0: 58.0	gama_i1 work
: 59.0	gama_i1 + 1: 60.0	gama_i1 - gama_i0: 1.0				demand_i: 120.0	
load_i: 120.0	work load gap_i: 0						
440	V_id: 62	li: 5.0	xi: 18.5	bow of i: 16.0	tail of i: 21.0	gama_i0: 4.0	gama_i1 work
: 6.0	gama_i1 + 1: 7.0	gama_i1 - gama_i0: 2.0				demand_i: 120.0	
load_i: 120.0	work load gap_i: 0						
441	V_id: 63	li: 9.0	xi: 4.5	bow of i: 0.0	tail of i: 9.0	gama_i0: 6.0	gama_i1: 8.0
140.0	gama_i1 + 1: 9.0	gama_i1 - gama_i0: 2.0				demand_i: 140.0	work load_i:
load_i: 120.0	work load gap_i: 0						
442	V_id: 64	li: 5.0	xi: 20.5	bow of i: 18.0	tail of i: 23.0	gama_i0: 24.0	gama_i1 work
: 26.0	gama_i1 + 1: 27.0	gama_i1 - gama_i0: 2.0				demand_i: 120.0	
load_i: 120.0	work load gap_i: 0						
443	V_id: 65	li: 3.0	xi: 27.5	bow of i: 26.0	tail of i: 29.0	gama_i0: 10.0	gama_i1 work
: 13.0	gama_i1 + 1: 14.0	gama_i1 - gama_i0: 3.0				demand_i: 140.0	
load_i: 140.0	work load gap_i: 0						
444	V_id: 66	li: 6.0	xi: 24.0	bow of i: 21.0	tail of i: 27.0	gama_i0: 6.0	gama_i1 work
: 7.0	gama_i1 + 1: 8.0	gama_i1 - gama_i0: 1.0				demand_i: 80.0	
load_i: 80.0	work load gap_i: 0						
445	V_id: 67	li: 7.0	xi: 3.5	bow of i: 0.0	tail of i: 7.0	gama_i0: 38.0	gama_i1: 39. work
0	gama_i1 + 1: 40.0	gama_i1 - gama_i0: 1.0				demand_i: 80.0	
load_i: 80.0	work load gap_i: 0						
446	V_id: 68	li: 3.0	xi: 27.5	bow of i: 26.0	tail of i: 29.0	gama_i0: 39.0	gama_i1 work
: 41.0	gama_i1 + 1: 42.0	gama_i1 - gama_i0: 2.0				demand_i: 120.0	

446	load_i: 120.0 V_id: 69 : 30.0	work load gap_i: 0 li: 9.0 gama_i1 + 1: 31.0 gama_i1 - gama_i0: 2.0 bow of i: 17.0 tail of i: 26.0 duration_time_i: 3.0 gama_i0: 28.0 demand_i: 120.0 gama_i1 work
447	load_i: 120.0 V_id: 70 : 32.0	work load gap_i: 0 li: 8.0 gama_i1 + 1: 33.0 gama_i1 - gama_i0: 0.0 bow of i: 7.0 tail of i: 15.0 duration_time_i: 1.0 gama_i0: 32.0 demand_i: 60.0 gama_i1 work
448	load_i: 60.0 V_id: 71 : 23.0	work load gap_i: 0 li: 8.0 gama_i1 + 1: 24.0 gama_i1 - gama_i0: 1.0 bow of i: 10.0 tail of i: 18.0 duration_time_i: 2.0 gama_i0: 22.0 demand_i: 60.0 gama_i1 work
449	load_i: 60.0 V_id: 72 : 17.0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 18.0 gama_i1 - gama_i0: 1.0 bow of i: 22.0 tail of i: 27.0 duration_time_i: 2.0 gama_i0: 16.0 demand_i: 100.0 gama_i1 work
450	load_i: 100.0 V_id: 73 : 51.0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 52.0 gama_i1 - gama_i0: 0.0 bow of i: 15.0 tail of i: 20.0 duration_time_i: 1.0 gama_i0: 51.0 demand_i: 60.0 gama_i1 work
451	load_i: 60.0 V_id: 74 : 15.0	work load gap_i: 0 li: 3.0 gama_i1 + 1: 16.0 gama_i1 - gama_i0: 1.0 bow of i: 26.0 tail of i: 29.0 duration_time_i: 2.0 gama_i0: 14.0 demand_i: 60.0 gama_i1 work
452	load_i: 60.0 V_id: 75 : 11.0	work load gap_i: 0 li: 6.0 gama_i1 + 1: 12.0 gama_i1 - gama_i0: 1.0 bow of i: 9.0 tail of i: 15.0 duration_time_i: 2.0 gama_i0: 10.0 demand_i: 60.0 gama_i1 work
453	V_id: 76 0	work load gap_i: 0 li: 3.0 gama_i1 + 1: 11.0 gama_i1 - gama_i0: 1.0 bow of i: 6.0 tail of i: 9.0 duration_time_i: 2.0 gama_i0: 9.0 demand_i: 80.0 gama_i1: 10. work
454	load_i: 80.0 V_id: 77 : 48.0	work load gap_i: 0 li: 4.0 gama_i1 + 1: 49.0 gama_i1 - gama_i0: 2.0 bow of i: 18.0 tail of i: 22.0 duration_time_i: 3.0 gama_i0: 46.0 demand_i: 140.0 gama_i1 work
455	load_i: 140.0 V_id: 78 : 25.0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 26.0 gama_i1 - gama_i0: 1.0 bow of i: 10.0 tail of i: 15.0 duration_time_i: 2.0 gama_i0: 24.0 demand_i: 120.0 gama_i1 work
456	load_i: 120.0 V_id: 79 0	work load gap_i: 0 li: 3.0 gama_i1 + 1: 27.0 gama_i1 - gama_i0: 3.0 bow of i: 0.0 tail of i: 3.0 duration_time_i: 4.0 gama_i0: 23.0 demand_i: 140.0 gama_i1: 26. work
457	load_i: 140.0 V_id: 80 0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 34.0 gama_i1 - gama_i0: 0.0 bow of i: 0.0 tail of i: 5.0 duration_time_i: 1.0 gama_i0: 33.0 demand_i: 60.0 gama_i1: 33. work
458	load_i: 60.0 V_id: 81 : 45.0	work load gap_i: 0 li: 4.0 gama_i1 + 1: 46.0 gama_i1 - gama_i0: 0.0 bow of i: 23.0 tail of i: 27.0 duration_time_i: 1.0 gama_i0: 45.0 demand_i: 60.0 gama_i1 work
459	load_i: 60.0 V_id: 82 : 36.0	work load gap_i: 0 li: 6.0 gama_i1 + 1: 37.0 gama_i1 - gama_i0: 1.0 bow of i: 12.0 tail of i: 18.0 duration_time_i: 2.0 gama_i0: 35.0 demand_i: 60.0 gama_i1 work
460	load_i: 120.0 V_id: 83 : 44.0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 45.0 gama_i1 - gama_i0: 2.0 bow of i: 25.0 tail of i: 30.0 duration_time_i: 3.0 gama_i0: 42.0 demand_i: 120.0 gama_i1 work
461	load_i: 80.0 V_id: 84 0	work load gap_i: 0 li: 9.0 gama_i1 + 1: 59.0 gama_i1 - gama_i0: 1.0 bow of i: 0.0 tail of i: 9.0 duration_time_i: 2.0 gama_i0: 57.0 demand_i: 80.0 gama_i1: 58. work
462	load_i: 60.0 V_id: 85 0	work load gap_i: 0 li: 9.0 gama_i1 + 1: 57.0 gama_i1 - gama_i0: 0.0 bow of i: 0.0 tail of i: 9.0 duration_time_i: 1.0 gama_i0: 56.0 demand_i: 60.0 gama_i1: 56. work
463	load_i: 160.0 V_id: 86 0	work load gap_i: 0 li: 6.0 gama_i1 + 1: 38.0 gama_i1 - gama_i0: 3.0 bow of i: 0.0 tail of i: 6.0 duration_time_i: 4.0 gama_i0: 34.0 demand_i: 160.0 gama_i1: 37. work
464	load_i: 160.0 V_id: 87 : 6.0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 7.0 gama_i1 - gama_i0: 2.0 bow of i: 9.0 tail of i: 14.0 duration_time_i: 3.0 gama_i0: 4.0 demand_i: 160.0 gama_i1 work
465	load_i: 160.0 V_id: 88 : 62.0	work load gap_i: 0 li: 8.0 gama_i1 + 1: 63.0 gama_i1 - gama_i0: 1.0 bow of i: 6.0 tail of i: 14.0 duration_time_i: 2.0 gama_i0: 61.0 demand_i: 100.0 gama_i1 work
466	load_i: 100.0 V_id: 89 : 16.0	work load gap_i: 0 li: 9.0 gama_i1 + 1: 17.0 gama_i1 - gama_i0: 2.0 bow of i: 13.0 tail of i: 22.0 duration_time_i: 3.0 gama_i0: 14.0 demand_i: 160.0 gama_i1 work
467	load_i: 160.0 V_id: 90 : 21.0	work load gap_i: 0 li: 4.0 gama_i1 + 1: 22.0 gama_i1 - gama_i0: 2.0 bow of i: 17.0 tail of i: 21.0 duration_time_i: 3.0 gama_i0: 19.0 demand_i: 100.0 gama_i1 work
468	load_i: 100.0 V_id: 91 : 50.0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 51.0 gama_i1 - gama_i0: 1.0 bow of i: 18.0 tail of i: 23.0 duration_time_i: 2.0 gama_i0: 49.0 demand_i: 120.0 gama_i1 work
469	load_i: 120.0 V_id: 92 : 52.0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 53.0 gama_i1 - gama_i0: 2.0 bow of i: 23.0 tail of i: 28.0 duration_time_i: 3.0 gama_i0: 50.0 demand_i: 120.0 gama_i1 work
470	load_i: 120.0 V_id: 93 : 3.0	work load gap_i: 0 li: 7.0 gama_i1 + 1: 4.0 gama_i1 - gama_i0: 3.0 bow of i: 20.0 tail of i: 27.0 duration_time_i: 4.0 gama_i0: 0.0 demand_i: 140.0 gama_i1 work
471	load_i: 140.0 V_id: 94 : 8.0	work load gap_i: 0 li: 5.0 gama_i1 + 1: 9.0 gama_i1 - gama_i0: 1.0 bow of i: 15.0 tail of i: 20.0 duration_time_i: 2.0 gama_i0: 7.0 demand_i: 120.0 gama_i1 work
472	load_i: 120.0 V_id: 95 : 19.0	work load gap_i: 0 li: 6.0 gama_i1 + 1: 20.0 gama_i1 - gama_i0: 1.0 bow of i: 22.0 tail of i: 28.0 duration_time_i: 2.0 gama_i0: 18.0 demand_i: 80.0 gama_i1 work
473	load_i: 80.0 V_id: 96 : 11.0	work load gap_i: 0 li: 8.0 gama_i1 + 1: 12.0 gama_i1 - gama_i0: 1.0 bow of i: 15.0 tail of i: 23.0 duration_time_i: 2.0 gama_i0: 10.0 demand_i: 80.0 gama_i1 work

unknown

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474 load_i: 80.0          work load gap_i: 0
475   V_id: 97           li: 4.0           xi: 11.0           bow of i: 9.0           tail of i: 13.0           gama_i0: 15.0           gama_i1
: 17.0      gama_i1 + 1: 18.0       gama_i1 - gama_i0: 2.0           duration_time_i: 3.0           demand_i: 100.0           work
load_i: 100.0
476   V_id: 98           li: 7.0           xi: 19.5           bow of i: 16.0           tail of i: 23.0           gama_i0: 39.0           gama_i1
: 39.0      gama_i1 + 1: 40.0       gama_i1 - gama_i0: 0.0           duration_time_i: 1.0           demand_i: 80.0           work
load_i: 80.0
477   V_id: 99           li: 9.0           xi: 4.5           bow of i: 0.0           tail of i: 9.0           gama_i0: 3.0           gama_i1: 5.0
160.0      gama_i1 + 1: 6.0       gama_i1 - gama_i0: 2.0           duration_time_i: 3.0           demand_i: 160.0           work load_i:
478
479 Algorithm finished and the total CPU time: 3631 s
480 End
481
```