



```

80 iter = 3
81   cord_individul_obj[indivial_i,:] = [ 0. 3. 54. 57.]
82   cord_individul_obj[indivial_i,:] = [ 1. 3. 110. 113.]
83   cord_individul_obj[indivial_i,:] = [ 2. 3. 24. 27.]
84   cord_individul_obj[indivial_i,:] = [ 3. 4. 106. 110.]
85   cord_individul_obj[indivial_i,:] = [ 4. 3. 110. 113.]
86   cord_individul_obj[indivial_i,:] = [ 5. 3. 132. 135.]
87   cord_individul_obj[indivial_i,:] = [ 6. 3. 68. 71.]
88   cord_individul_obj[indivial_i,:] = [ 7. 3. 94. 97.]
89   cord_individul_obj[indivial_i,:] = [ 8. 4. 62. 66.]
90   cord_individul_obj[indivial_i,:] = [ 9. 3. 90. 93.]
91
92   min(cord_individul_obj[:, 3]) = 27.0
93   historl_G_best_iter[iter, 3] = 27.0
94   Begin iteration:
95
96   iter = 4
97     cord_individul_obj[indivial_i,:] = [ 0. 4. 54. 58.]
98     cord_individul_obj[indivial_i,:] = [ 1. 3. 146. 149.]
99     cord_individul_obj[indivial_i,:] = [ 2. 4. 94. 98.]
100    cord_individul_obj[indivial_i,:] = [ 3. 4. 68. 72.]
101    cord_individul_obj[indivial_i,:] = [ 4. 3. 120. 123.]
102    cord_individul_obj[indivial_i,:] = [ 5. 3. 24. 27.]
103    cord_individul_obj[indivial_i,:] = [ 6. 3. 32. 35.]
104    cord_individul_obj[indivial_i,:] = [ 7. 4. 76. 80.]
105    cord_individul_obj[indivial_i,:] = [ 8. 4. 62. 66.]
106    cord_individul_obj[indivial_i,:] = [ 9. 4. 128. 132.]
107
108    min(cord_individul_obj[:, 3]) = 27.0
109    historl_G_best_iter[iter, 3] = 27.0
110    Begin iteration:
111
112    iter = 5
113      cord_individul_obj[indivial_i,:] = [ 0. 5. 24. 29.]
114      cord_individul_obj[indivial_i,:] = [ 1. 3. 24. 27.]
115      cord_individul_obj[indivial_i,:] = [ 2. 4. 60. 64.]
116      cord_individul_obj[indivial_i,:] = [ 3. 5. 80. 85.]
117      cord_individul_obj[indivial_i,:] = [ 4. 5. 62. 67.]
118      cord_individul_obj[indivial_i,:] = [ 5. 3. 54. 57.]
119      cord_individul_obj[indivial_i,:] = [ 6. 4. 30. 34.]
120      cord_individul_obj[indivial_i,:] = [ 7. 3. 90. 93.]
121      cord_individul_obj[indivial_i,:] = [ 8. 3. 24. 27.]
122      cord_individul_obj[indivial_i,:] = [ 9. 4. 54. 58.]
123
124      min(cord_individul_obj[:, 3]) = 27.0
125      historl_G_best_iter[iter, 3] = 27.0
126      Begin iteration:
127
128      iter = 6
129        cord_individul_obj[indivial_i,:] = [ 0. 5. 54. 59.]
130        cord_individul_obj[indivial_i,:] = [ 1. 3. 110. 113.]
131        cord_individul_obj[indivial_i,:] = [ 2. 4. 94. 98.]
132        cord_individul_obj[indivial_i,:] = [ 3. 5. 130. 135.]
133        cord_individul_obj[indivial_i,:] = [ 4. 5. 62. 67.]
134        cord_individul_obj[indivial_i,:] = [ 5. 5. 12. 17.]
135        cord_individul_obj[indivial_i,:] = [ 6. 4. 18. 22.]
136        cord_individul_obj[indivial_i,:] = [ 7. 3. 24. 27.]
137        cord_individul_obj[indivial_i,:] = [ 8. 4. 12. 16.]
138        cord_individul_obj[indivial_i,:] = [ 9. 4. 34. 38.]
139
140        min(cord_individul_obj[:, 3]) = 16.0
141        historl_G_best_iter[iter, 3] = 16.0
142        Begin iteration:
143
144        iter = 7
145          cord_individul_obj[indivial_i,:] = [ 0. 5. 12. 17.]
146          cord_individul_obj[indivial_i,:] = [ 1. 4. 12. 16.]
147          cord_individul_obj[indivial_i,:] = [ 2. 3. 32. 35.]
148          cord_individul_obj[indivial_i,:] = [ 3. 4. 12. 16.]
149          cord_individul_obj[indivial_i,:] = [ 4. 5. 12. 17.]
150          cord_individul_obj[indivial_i,:] = [ 5. 5. 8. 13.]
151          cord_individul_obj[indivial_i,:] = [ 6. 4. 24. 28.]
152          cord_individul_obj[indivial_i,:] = [ 7. 4. 48. 52.]
153          cord_individul_obj[indivial_i,:] = [ 8. 3. 24. 27.]
154          cord_individul_obj[indivial_i,:] = [ 9. 4. 12. 16.]
155
156          min(cord_individul_obj[:, 3]) = 13.0
157          historl_G_best_iter[iter, 3] = 13.0
158          Begin iteration:
159
160          iter = 8
161            cord_individul_obj[indivial_i,:] = [ 0. 5. 44. 49.]
162            cord_individul_obj[indivial_i,:] = [ 1. 5. 24. 29.]
163            cord_individul_obj[indivial_i,:] = [ 2. 5. 52. 57.]

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164 cord_individul_obj[indivial_i,:] = [ 3. 4. 24. 28.]
165 cord_individul_obj[indivial_i,:] = [ 4. 4. 38. 42.]
166 cord_individul_obj[indivial_i,:] = [ 5. 4. 24. 28.]
167 cord_individul_obj[indivial_i,:] = [ 6. 5. 24. 29.]
168 cord_individul_obj[indivial_i,:] = [ 7. 5. 8. 13.]
169 cord_individul_obj[indivial_i,:] = [ 8. 5. 24. 29.]
170 cord_individul_obj[indivial_i,:] = [ 9. 5. 32. 37.]
171
172 min(cord_individul_obj[:, 3]) = 13.0
173 historl_G_best_iter[iter, 3] = 13.0
174 Begin iteration:
175
176 iter = 9
177 cord_individul_obj[indivial_i,:] = [ 0. 4. 24. 28.]
178 cord_individul_obj[indivial_i,:] = [ 1. 5. 38. 43.]
179 cord_individul_obj[indivial_i,:] = [ 2. 5. 8. 13.]
180 cord_individul_obj[indivial_i,:] = [ 3. 3. 44. 47.]
181 cord_individul_obj[indivial_i,:] = [ 4. 4. 28. 32.]
182 cord_individul_obj[indivial_i,:] = [ 5. 4. 38. 42.]
183 cord_individul_obj[indivial_i,:] = [ 6. 5. 24. 29.]
184 cord_individul_obj[indivial_i,:] = [ 7. 3. 48. 51.]
185 cord_individul_obj[indivial_i,:] = [ 8. 5. 24. 29.]
186 cord_individul_obj[indivial_i,:] = [ 9. 5. 28. 33.]
187
188 min(cord_individul_obj[:, 3]) = 13.0
189 historl_G_best_iter[iter, 3] = 13.0
190 Begin iteration:
191
192 iter = 10
193 cord_individul_obj[indivial_i,:] = [ 0. 3. 44. 47.]
194 cord_individul_obj[indivial_i,:] = [ 1. 5. 44. 49.]
195 cord_individul_obj[indivial_i,:] = [ 2. 5. 24. 29.]
196 cord_individul_obj[indivial_i,:] = [ 3. 3. 52. 55.]
197 cord_individul_obj[indivial_i,:] = [ 4. 4. 32. 36.]
198 cord_individul_obj[indivial_i,:] = [ 5. 5. 24. 29.]
199 cord_individul_obj[indivial_i,:] = [ 6. 5. 24. 29.]
200 cord_individul_obj[indivial_i,:] = [ 7. 5. 8. 13.]
201 cord_individul_obj[indivial_i,:] = [ 8. 5. 24. 29.]
202 cord_individul_obj[indivial_i,:] = [ 9. 5. 72. 77.]
203
204 min(cord_individul_obj[:, 3]) = 13.0
205 historl_G_best_iter[iter, 3] = 13.0
206 Iteration calculate over
207
208
209
210
211 All item are in Bin and:
212 Bin area = 1080
213 Real_area = 92.0
214 Proportion_of_area = 0.08518518518518518
215 BEST_CHROM =
216 berth: [ 2.5 26. 11. 16.5 6.5 21. ]
217 time: [0. 0. 0. 0. 0. 0.]
218 num_QC: [3. 2. 5. 2. 2. 2.]
219 Objective function values and some other indicators:
220 Obj0 = 5.00 Obj1 = 8.00 Obj0 + Obj1 = 13.00
221 Total movement of crane: 8.00
222 Total waiting time in berth position: 0.00
223 Total index of q during berthing: 586.00
224 Specific arrangement for each vessel:
225 V_id: 0 li: 5.0 xi: 2.5 bow of i: 0.0 tail of i: 5.0 gama_i0: 0.0 gama_i1: 1.0
gama_i1 + 1: 2.0 gama_i1 - gama_i0: 1.0 duration_time_i: 2.0 demand_i: 80.0 work load_i:
80.0 work load gap_i: 0
226 V_id: 1 li: 6.0 xi: 26.0 bow of i: 23.0 tail of i: 29.0 gama_i0: 0.0 gama_i1: 2
gama_i1 + 1: 3.0 gama_i1 - gama_i0: 2.0 duration_time_i: 3.0 demand_i: 120.0 work
load_i: 120.0 work load gap_i: 0
227 V_id: 2 li: 6.0 xi: 11.0 bow of i: 8.0 tail of i: 14.0 gama_i0: 0.0 gama_i1: 2
gama_i1 + 1: 3.0 gama_i1 - gama_i0: 2.0 duration_time_i: 3.0 demand_i: 260.0 work
load_i: 260.0 work load gap_i: 0
228 V_id: 3 li: 5.0 xi: 16.5 bow of i: 14.0 tail of i: 19.0 gama_i0: 0.0 gama_i1: 1
gama_i1 + 1: 2.0 gama_i1 - gama_i0: 1.0 duration_time_i: 2.0 demand_i: 80.0 work
load_i: 80.0 work load gap_i: 0
229 V_id: 4 li: 3.0 xi: 6.5 bow of i: 5.0 tail of i: 8.0 gama_i0: 0.0 gama_i1: 4.0
gama_i1 + 1: 5.0 gama_i1 - gama_i0: 4.0 duration_time_i: 5.0 demand_i: 200.0 work load_i:
200.0 work load gap_i: 0
230 V_id: 5 li: 4.0 xi: 21.0 bow of i: 19.0 tail of i: 23.0 gama_i0: 0.0 gama_i1: 5
gama_i1 + 1: 6.0 gama_i1 - gama_i0: 5.0 duration_time_i: 6.0 demand_i: 220.0 work
load_i: 220.0 work load gap_i: 0
231
232 Algorithm finished and the total CPU time: 51 s
233 End
234

```