


```

80     second level: [ 0. 1. 4. 3. 9. 12. 17. 3. 4. 20. 8. 11.]
81     third level: [2. 4. 4. 4. 2. 2. 3. 8. 2. 4. 3. 4.]
82     The No. 5 iteration is finished!
83
84 Beging the No. 6 iteration:
85     obj[gen-1] = 54.10   temp_best_value_gen = 54.10
86     No, maintain solution and obj[gen] = 54.10 , and the tolerance_counter = 6
87     solution chromosome =
88         first level: [ [ 4.5 12. 17.5 23.5 28. 2.5 2.5 4. 2.5 2.5 4. 3.5]
89         second level: [ 0. 1. 4. 3. 9. 12. 17. 3. 4. 20. 8. 11.]
90         third level: [2. 4. 4. 4. 2. 2. 3. 8. 2. 4. 3. 4.]
91     The No. 6 iteration is finished!
92
93 Beging the No. 7 iteration:
94     obj[gen-1] = 54.10   temp_best_value_gen = 54.10
95     No, maintain solution and obj[gen] = 54.10 , and the tolerance_counter = 7
96     solution chromosome =
97         first level: [ [ 4.5 12. 17.5 23.5 28. 2.5 2.5 4. 2.5 2.5 4. 3.5]
98         second level: [ 0. 1. 4. 3. 9. 12. 17. 3. 4. 20. 8. 11.]
99         third level: [2. 4. 4. 4. 2. 2. 3. 8. 2. 4. 3. 4.]
100    The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
103     obj[gen-1] = 54.10   temp_best_value_gen = 54.10
104     No, maintain solution and obj[gen] = 54.10 , and the tolerance_counter = 8
105     solution chromosome =
106         first level: [ [ 4.5 12. 17.5 23.5 28. 2.5 2.5 4. 2.5 2.5 4. 3.5]
107         second level: [ 0. 1. 4. 3. 9. 12. 17. 3. 4. 20. 8. 11.]
108         third level: [2. 4. 4. 4. 2. 2. 3. 8. 2. 4. 3. 4.]
109    The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112     obj[gen-1] = 54.10   temp_best_value_gen = 54.10
113     No, maintain solution and obj[gen] = 54.10 , and the tolerance_counter = 9
114     solution chromosome =
115         first level: [ [ 4.5 12. 17.5 23.5 28. 2.5 2.5 4. 2.5 2.5 4. 3.5]
116         second level: [ 0. 1. 4. 3. 9. 12. 17. 3. 4. 20. 8. 11.]
117         third level: [2. 4. 4. 4. 2. 2. 3. 8. 2. 4. 3. 4.]
118    The No. 9 iteration is finished!
119
120
121 -----
122 The iteration is terminated and then visulize the solution:
123     solution chromosome =
124         first level: [ [ 4.5 12. 17.5 23.5 28. 2.5 2.5 4. 2.5 2.5 4. 3.5]
125         second level: [ 0. 1. 4. 3. 9. 12. 17. 3. 4. 20. 8. 11.]
126         third level: [2. 4. 4. 4. 2. 2. 3. 8. 2. 4. 3. 4.]
127     Objective function values and some other indicators:
128         Obj0 = 21.00      Obj1 = 142.00      Obj0 + Obj1 = 163.00
129         Total movement of crane: 20.00
130         Total waiting time in berth position: 92.00
131         Total index of q during berthing: 373.00
132     Specific arrangement for each vessel:
133         V_id: 0          li: 9.0          xi: 4.5          bow of i: 0.0          tail of i: 9.0          gama_i0: 0.0          gama_i1: 3.0
134             duration_time_i: 3.0          demand_i: 100.0          work load_i: 100.0          work load gap_i: 0
135         V_id: 1          li: 6.0          xi: 12.0          bow of i: 9.0          tail of i: 15.0          gama_i0: 1.0          gama_i1: 3
136             duration_time_i: 2.0          demand_i: 120.0          work load_i: 120.0          work load gap_i: 0
137         V_id: 2          li: 5.0          xi: 17.5          bow of i: 15.0          tail of i: 20.0          gama_i0: 4.0          gama_i1: 5
138             duration_time_i: 1.0          demand_i: 80.0          work load_i: 80.0          work load gap_i: 0
139         V_id: 3          li: 7.0          xi: 23.5          bow of i: 20.0          tail of i: 27.0          gama_i0: 3.0          gama_i1: 4
140             duration_time_i: 1.0          demand_i: 60.0          work load_i: 60.0          work load gap_i: 0
141         V_id: 4          li: 4.0          xi: 28.0          bow of i: 26.0          tail of i: 30.0          gama_i0: 9.0          gama_i1:
142             duration_time_i: 3.0          demand_i: 120.0          work load_i: 120.0          work load gap_i: 0
143         V_id: 5          li: 5.0          xi: 2.5          bow of i: 0.0          tail of i: 5.0          gama_i0: 12.0          gama_i1: 14.0
144             duration_time_i: 2.0          demand_i: 80.0          work load_i: 80.0          work load gap_i: 0
145         V_id: 6          li: 5.0          xi: 2.5          bow of i: 0.0          tail of i: 5.0          gama_i0: 17.0          gama_i1: 19.0
146             duration_time_i: 2.0          demand_i: 100.0          work load_i: 100.0          work load gap_i: 0
147         V_id: 7          li: 8.0          xi: 4.0          bow of i: 0.0          tail of i: 8.0          gama_i0: 3.0          gama_i1: 4.0
148             duration_time_i: 1.0          demand_i: 140.0          work load_i: 140.0          work load gap_i: 0
149         V_id: 8          li: 5.0          xi: 2.5          bow of i: 0.0          tail of i: 5.0          gama_i0: 4.0          gama_i1: 8.0
150             duration_time_i: 4.0          demand_i: 160.0          work load_i: 160.0          work load gap_i: 0
151         V_id: 9          li: 5.0          xi: 2.5          bow of i: 0.0          tail of i: 5.0          gama_i0: 20.0          gama_i1: 22.0
152             duration_time_i: 2.0          demand_i: 140.0          work load_i: 140.0          work load gap_i: 0
153         V_id: 10         li: 8.0          xi: 4.0          bow of i: 0.0          tail of i: 8.0          gama_i0: 8.0          gama_i1: 11.
154             duration_time_i: 3.0          demand_i: 140.0          work load_i: 140.0          work load gap_i: 0
155         V_id: 11         li: 7.0          xi: 3.5          bow of i: 0.0          tail of i: 7.0          gama_i0: 11.0          gama_i1: 12.
156             duration_time_i: 1.0          demand_i: 80.0          work load_i: 80.0          work load gap_i: 0
157
158 Algorithm finished and the total CPU time: 1294 s
159 End
160

```