


```

80     second level: [ 2. 5. 0. 3. 0. 2. 0. 7. 9. 4. 11. 14. 16.]
81     third level: [2. 2. 3. 3. 3. 3. 2. 4. 2. 5. 2. 2. 6.] ]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 50.00   temp_best_value_gen = 50.00
86     No, maintain solution and obj[gen] = 50.00 , and the tolerance_counter = 6
87     solution chromosome =
88     first level: [ [ 3.5 11.5 18. 23. 28. 26. 3. 3.5 4. 3.5 4.5 4.5 4.5]
89     second level: [ 2. 5. 0. 3. 0. 2. 0. 7. 9. 4. 11. 14. 16.]
90     third level: [2. 2. 3. 3. 3. 3. 2. 4. 2. 5. 2. 2. 6.] ]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 50.00   temp_best_value_gen = 50.00
95     No, maintain solution and obj[gen] = 50.00 , and the tolerance_counter = 7
96     solution chromosome =
97     first level: [ [ 3.5 11.5 18. 23. 28. 26. 3. 3.5 4. 3.5 4.5 4.5 4.5]
98     second level: [ 2. 5. 0. 3. 0. 2. 0. 7. 9. 4. 11. 14. 16.]
99     third level: [2. 2. 3. 3. 3. 3. 2. 4. 2. 5. 2. 2. 6.] ]
100    The No. 7 iteration is finished!
101
102    Beging the No. 8 iteration:
103    obj[gen-1] = 50.00   temp_best_value_gen = 50.00
104    No, maintain solution and obj[gen] = 50.00 , and the tolerance_counter = 8
105    solution chromosome =
106    first level: [ [ 3.5 11.5 18. 23. 28. 26. 3. 3.5 4. 3.5 4.5 4.5 4.5]
107    second level: [ 2. 5. 0. 3. 0. 2. 0. 7. 9. 4. 11. 14. 16.]
108    third level: [2. 2. 3. 3. 3. 3. 2. 4. 2. 5. 2. 2. 6.] ]
109    The No. 8 iteration is finished!
110
111
112    -----
113    The iteration is terminated and then visulize the solution:
114    solution chromosome =
115    first level: [ [ 3.5 11.5 18. 23. 28. 26. 3. 3.5 4. 3.5 4.5 4.5 4.5]
116    second level: [ 2. 5. 0. 3. 0. 2. 0. 7. 9. 4. 11. 14. 16.]
117    third level: [2. 2. 3. 3. 3. 3. 2. 4. 2. 5. 2. 2. 6.] ]
118    Objective function values and some other indicators:
119    Obj0 = 16.00      Obj1 = 196.00      Obj0 + Obj1 = 212.00
120    Total movement of crane: 36.00
121    Total waiting time in berth position: 73.00
122    Total index of q during berthing: 452.00
123    Specific arrangement for each vessel:
124
125    V_id: 0      li: 7.0      xi: 3.5      bow of i: 0.0      tail of i: 7.0      gama_i0: 2.0      gama_i1: 4.0
126    duration_time_i: 2.0      demand_i: 80.0      work load_i: 80.0      work load gap_i: 0
127    V_id: 1      li: 9.0      xi: 11.5      bow of i: 7.0      tail of i: 16.0      gama_i0: 5.0      gama_i1: 8
128    duration_time_i: 3.0      demand_i: 100.0      work load_i: 100.0      work load gap_i: 0
129    V_id: 2      li: 4.0      xi: 18.0      bow of i: 16.0      tail of i: 20.0      gama_i0: 0.0      gama_i1: 3
130    duration_time_i: 3.0      demand_i: 160.0      work load_i: 160.0      work load gap_i: 0
131    V_id: 3      li: 6.0      xi: 23.0      bow of i: 20.0      tail of i: 26.0      gama_i0: 3.0      gama_i1: 5
132    duration_time_i: 2.0      demand_i: 80.0      work load_i: 80.0      work load gap_i: 0
133    V_id: 4      li: 4.0      xi: 28.0      bow of i: 26.0      tail of i: 30.0      gama_i0: 0.0      gama_i1: 2
134    duration_time_i: 2.0      demand_i: 100.0      work load_i: 100.0      work load gap_i: 0
135    V_id: 5      li: 8.0      xi: 26.0      bow of i: 22.0      tail of i: 30.0      gama_i0: 2.0      gama_i1: 3
136    duration_time_i: 1.0      demand_i: 60.0      work load_i: 60.0      work load gap_i: 0
137    V_id: 6      li: 6.0      xi: 3.0      bow of i: 0.0      tail of i: 6.0      gama_i0: 0.0      gama_i1: 2.0
138    duration_time_i: 2.0      demand_i: 60.0      work load_i: 60.0      work load gap_i: 0
139    V_id: 7      li: 7.0      xi: 3.5      bow of i: 0.0      tail of i: 7.0      gama_i0: 7.0      gama_i1: 9.0
140    duration_time_i: 2.0      demand_i: 160.0      work load_i: 160.0      work load gap_i: 0
141    V_id: 8      li: 8.0      xi: 4.0      bow of i: 0.0      tail of i: 8.0      gama_i0: 9.0      gama_i1: 11.0
142    duration_time_i: 2.0      demand_i: 60.0      work load_i: 60.0      work load gap_i: 0
143    V_id: 9      li: 7.0      xi: 3.5      bow of i: 0.0      tail of i: 7.0      gama_i0: 4.0      gama_i1: 5.0
144    duration_time_i: 1.0      demand_i: 60.0      work load_i: 60.0      work load gap_i: 0
145    V_id: 10     li: 9.0      xi: 4.5      bow of i: 0.0      tail of i: 9.0      gama_i0: 11.0      gama_i1: 14.
146    duration_time_i: 3.0      demand_i: 100.0      work load_i: 100.0      work load gap_i: 0
147    V_id: 11     li: 9.0      xi: 4.5      bow of i: 0.0      tail of i: 9.0      gama_i0: 14.0      gama_i1: 16.
148    duration_time_i: 2.0      demand_i: 60.0      work load_i: 60.0      work load gap_i: 0
149    V_id: 12     li: 9.0      xi: 4.5      bow of i: 0.0      tail of i: 9.0      gama_i0: 16.0      gama_i1: 17.
150    duration_time_i: 1.0      demand_i: 80.0      work load_i: 80.0      work load gap_i: 0
151
152    137
153    138 Algorithm finished and the total CPU time: 1279 s
154    139 End
155    140

```