


```

80     second level: [ 6. 4. 2. 1. 4. 11. 4. 8. 9. 16. 0. 13. 1. 18.]
81     third level: [3. 3. 5. 8. 3. 4. 3. 3. 2. 3. 7. 3. 2. 2.]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 65.90 temp_best_value_gen = 65.90
86     No, maintain solution and obj[gen] = 65.90 , and the tolerance_counter = 6
87     solution chromosome =
88     first level: [ [ 4. 10.5 17. 25. 28.5 4.5 4. 4. 4. 2. 4. 2.5 2. 3. ]
89     second level: [ 6. 4. 2. 1. 4. 11. 4. 8. 9. 16. 0. 13. 1. 18.]
90     third level: [3. 3. 5. 8. 3. 4. 3. 3. 2. 3. 7. 3. 2. 2.]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 65.90 temp_best_value_gen = 65.90
95     No, maintain solution and obj[gen] = 65.90 , and the tolerance_counter = 7
96     solution chromosome =
97     first level: [ [ 4. 10.5 17. 25. 28.5 4.5 4. 4. 4. 2. 4. 2.5 2. 3. ]
98     second level: [ 6. 4. 2. 1. 4. 11. 4. 8. 9. 16. 0. 13. 1. 18.]
99     third level: [3. 3. 5. 8. 3. 4. 3. 3. 2. 3. 7. 3. 2. 2.]
100    The No. 7 iteration is finished!
101
102    Beging the No. 8 iteration:
103    obj[gen-1] = 65.90 temp_best_value_gen = 65.90
104    No, maintain solution and obj[gen] = 65.90 , and the tolerance_counter = 8
105    solution chromosome =
106    first level: [ [ 4. 10.5 17. 25. 28.5 4.5 4. 4. 4. 2. 4. 2.5 2. 3. ]
107    second level: [ 6. 4. 2. 1. 4. 11. 4. 8. 9. 16. 0. 13. 1. 18.]
108    third level: [3. 3. 5. 8. 3. 4. 3. 3. 2. 3. 7. 3. 2. 2.]
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: [ [ 4. 10.5 17. 25. 28.5 4.5 4. 4. 4. 2. 4. 2.5 2. 3. ]
116    second level: [ 6. 4. 2. 1. 4. 11. 4. 8. 9. 16. 0. 13. 1. 18.]
117    third level: [3. 3. 5. 8. 3. 4. 3. 3. 2. 3. 7. 3. 2. 2.]
118    Objective function values and some other indicators:
119    Obj0 = 21.00 Obj1 = 260.00 Obj0 + Obj1 = 281.00
120    Total movement of crane: 62.00
121    Total waiting time in berth position: 97.00
122    Total index of q during berthing: 293.00
123    Specific arrangement for each vessel:
124    V_id: 0 li: 8.0 xi: 4.0 bow of i: 0.0 tail of i: 8.0 gama_i0: 6.0 gama_i1: 8.0
125    duration_time_i: 2.0 demand_i: 120.0 work load_i: 120.0 work load gap_i: 0
126    V_id: 1 li: 5.0 xi: 10.5 bow of i: 8.0 tail of i: 13.0 gama_i0: 4.0 gama_i1: 6
127    duration_time_i: 2.0 demand_i: 100.0 work load_i: 100.0 work load gap_i: 0
128    V_id: 2 li: 8.0 xi: 17.0 bow of i: 13.0 tail of i: 21.0 gama_i0: 2.0 gama_i1: 3
129    duration_time_i: 1.0 demand_i: 100.0 work load_i: 100.0 work load gap_i: 0
130    V_id: 3 li: 8.0 xi: 25.0 bow of i: 21.0 tail of i: 29.0 gama_i0: 1.0 gama_i1: 2
131    duration_time_i: 1.0 demand_i: 60.0 work load_i: 60.0 work load gap_i: 0
132    V_id: 4 li: 3.0 xi: 28.5 bow of i: 27.0 tail of i: 30.0 gama_i0: 4.0 gama_i1: 5
133    duration_time_i: 1.0 demand_i: 60.0 work load_i: 60.0 work load gap_i: 0
134    V_id: 5 li: 9.0 xi: 4.5 bow of i: 0.0 tail of i: 9.0 gama_i0: 11.0 gama_i1: 13.0
135    duration_time_i: 2.0 demand_i: 140.0 work load_i: 140.0 work load gap_i: 0
136    V_id: 6 li: 8.0 xi: 4.0 bow of i: 0.0 tail of i: 8.0 gama_i0: 4.0 gama_i1: 6.0
137    duration_time_i: 2.0 demand_i: 120.0 work load_i: 120.0 work load gap_i: 0
138    V_id: 7 li: 8.0 xi: 4.0 bow of i: 0.0 tail of i: 8.0 gama_i0: 8.0 gama_i1: 9.0
139    duration_time_i: 1.0 demand_i: 60.0 work load_i: 60.0 work load gap_i: 0
140    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
141    duration_time_i: 2.0 demand_i: 80.0 work load_i: 80.0 work load gap_i: 0
142    V_id: 9 li: 3.0 xi: 2.0 bow of i: 0.5 tail of i: 3.5 gama_i0: 16.0 gama_i1: 17.0
143    duration_time_i: 1.0 demand_i: 60.0 work load_i: 60.0 work load gap_i: 0
144    V_id: 10 li: 8.0 xi: 4.0 bow of i: 0.0 tail of i: 8.0 gama_i0: 0.0 gama_i1: 1.0
145    duration_time_i: 1.0 demand_i: 80.0 work load_i: 80.0 work load gap_i: 0
146    V_id: 11 li: 5.0 xi: 2.5 bow of i: 0.0 tail of i: 5.0 gama_i0: 13.0 gama_i1: 16.
147    duration_time_i: 3.0 demand_i: 160.0 work load_i: 160.0 work load gap_i: 0
148    V_id: 12 li: 4.0 xi: 2.0 bow of i: 0.0 tail of i: 4.0 gama_i0: 1.0 gama_i1: 4.0
149    duration_time_i: 3.0 demand_i: 120.0 work load_i: 120.0 work load gap_i: 0
150    V_id: 13 li: 6.0 xi: 3.0 bow of i: 0.0 tail of i: 6.0 gama_i0: 18.0 gama_i1: 22.
151    duration_time_i: 4.0 demand_i: 140.0 work load_i: 140.0 work load gap_i: 0
152
153    138
154    139 Algorithm finished and the total CPU time: 1315 s
155    140 End
156    141

```