


```

80     second level: [1. 1.]
81     third level: [4. 3.] ]
82     The No. 5 iteration is finished!
83
84 Beging the No. 6 iteration:
85     obj[gen-1] = 4.00    temp_best_value_gen = 4.00
86     No, maintain solution and obj[gen] = 4.00 , and the tolerance_counter = 2
87     solution chromosome =
88         first level: [ [2. 8.]
89         second level: [1. 1.]
90         third level: [4. 3.] ]
91     The No. 6 iteration is finished!
92
93 Beging the No. 7 iteration:
94     obj[gen-1] = 4.00    temp_best_value_gen = 4.00
95     No, maintain solution and obj[gen] = 4.00 , and the tolerance_counter = 3
96     solution chromosome =
97         first level: [ [2. 8.]
98         second level: [1. 1.]
99         third level: [4. 3.] ]
100    The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
103     obj[gen-1] = 4.00    temp_best_value_gen = 4.00
104     No, maintain solution and obj[gen] = 4.00 , and the tolerance_counter = 4
105     solution chromosome =
106         first level: [ [2. 8.]
107         second level: [1. 1.]
108         third level: [4. 3.] ]
109    The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112     obj[gen-1] = 4.00    temp_best_value_gen = 4.00
113     No, maintain solution and obj[gen] = 4.00 , and the tolerance_counter = 5
114     solution chromosome =
115         first level: [ [2. 8.]
116         second level: [1. 1.]
117         third level: [4. 3.] ]
118    The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121     obj[gen-1] = 4.00    temp_best_value_gen = 4.00
122     No, maintain solution and obj[gen] = 4.00 , and the tolerance_counter = 6
123     solution chromosome =
124         first level: [ [2. 8.]
125         second level: [1. 1.]
126         third level: [4. 3.] ]
127    The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
130     obj[gen-1] = 4.00    temp_best_value_gen = 4.00
131     No, maintain solution and obj[gen] = 4.00 , and the tolerance_counter = 7
132     solution chromosome =
133         first level: [ [2. 8.]
134         second level: [1. 1.]
135         third level: [4. 3.] ]
136    The No. 11 iteration is finished!
137
138 Beging the No. 12 iteration:
139     obj[gen-1] = 4.00    temp_best_value_gen = 4.00
140     No, maintain solution and obj[gen] = 4.00 , and the tolerance_counter = 8
141     solution chromosome =
142         first level: [ [2. 8.]
143         second level: [1. 1.]
144         third level: [4. 3.] ]
145    The No. 12 iteration is finished!
146
147
148 -----
149 The iteration is terminated and then visulize the solution:
150     solution chromosome =
151         first level: [ [2. 8.]
152         second level: [1. 1.]
153         third level: [4. 3.] ]
154     Objective function values and some other indicators:
155         Obj0 = 2.00          Obj1 = 2.00          Obj0 + Obj1 = 4.00
156         Total movement of crane: 0.00
157         Total waiting time in berth position: 2.00
158         Total index of q during berthing: 42.00
159     Specific arrangement for each vessel:
160         V_id: 0             li: 4.0             xi: 2.0             bow of i: 0.0             tail of i: 4.0             gama_i0: 1.0             gama_i1: 3.0
161             duration_time_i: 2.0             demand_i: 160.0             work load_i: 160.0             work load gap_i: 0
162         V_id: 1             li: 8.0             xi: 8.0             bow of i: 4.0             tail of i: 12.0             gama_i0: 1.0             gama_i1: 3.0
163             duration_time_i: 2.0             demand_i: 120.0             work load_i: 120.0             work load gap_i: 0

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unknown

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162
163 Algorithm finished and the total CPU time: 201 s
164 End
165
```