


```

80     second level: [4. 4. 3. 4. 2. 5. 1.]
81     third level: [2. 1. 2. 8. 2. 2. 8.] ]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 17.60 temp_best_value_gen = 17.60
86     No, maintain solution and obj[gen] = 17.60 , and the tolerance_counter = 6
87     solution chromosome =
88     first level: [ [ 1.5 4.5 9.5 17. 25.5 28. 4. ]
89     second level: [4. 4. 3. 4. 2. 5. 1.]
90     third level: [2. 1. 2. 8. 2. 2. 8.] ]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 17.60 temp_best_value_gen = 17.60
95     No, maintain solution and obj[gen] = 17.60 , and the tolerance_counter = 7
96     solution chromosome =
97     first level: [ [ 1.5 4.5 9.5 17. 25.5 28. 4. ]
98     second level: [4. 4. 3. 4. 2. 5. 1.]
99     third level: [2. 1. 2. 8. 2. 2. 8.] ]
100    The No. 7 iteration is finished!
101
102
103    -----
104    The iteration is terminated and then visulize the solution:
105    solution chromosome =
106    first level: [ [ 1.5 4.5 9.5 17. 25.5 28. 4. ]
107    second level: [4. 4. 3. 4. 2. 5. 1.]
108    third level: [2. 1. 2. 8. 2. 2. 8.] ]
109    Objective function values and some other indicators:
110    Obj0 = 7.00 Obj1 = 43.00 Obj0 + Obj1 = 50.00
111    Total movement of crane: 20.00
112    Total waiting time in berth position: 23.00
113    Total index of q during berthing: 404.00
114    Specific arrangement for each vessel:
115    V_id: 0 li: 3.0 xi: 1.5 bow of i: 0.0 tail of i: 3.0 gama_i0: 4.0 gama_i1: 7.0
116    duration_time_i: 3.0 demand_i: 120.0 work load_i: 120.0 work load gap_i: 0
117    V_id: 1 li: 3.0 xi: 4.5 bow of i: 3.0 tail of i: 6.0 gama_i0: 4.0 gama_i1: 8.0
118    duration_time_i: 4.0 demand_i: 80.0 work load_i: 80.0 work load gap_i: 0
119    V_id: 2 li: 7.0 xi: 9.5 bow of i: 6.0 tail of i: 13.0 gama_i0: 3.0 gama_i1: 6.0
120    duration_time_i: 3.0 demand_i: 100.0 work load_i: 100.0 work load gap_i: 0
121    V_id: 3 li: 8.0 xi: 17.0 bow of i: 13.0 tail of i: 21.0 gama_i0: 4.0 gama_i1: 5
122    duration_time_i: 1.0 demand_i: 120.0 work load_i: 120.0 work load gap_i: 0
123    V_id: 4 li: 9.0 xi: 25.5 bow of i: 21.0 tail of i: 30.0 gama_i0: 2.0 gama_i1: 5
124    duration_time_i: 3.0 demand_i: 120.0 work load_i: 120.0 work load gap_i: 0
125    V_id: 5 li: 4.0 xi: 28.0 bow of i: 26.0 tail of i: 30.0 gama_i0: 5.0 gama_i1: 8
126    duration_time_i: 3.0 demand_i: 120.0 work load_i: 120.0 work load gap_i: 0
127    V_id: 6 li: 8.0 xi: 4.0 bow of i: 0.0 tail of i: 8.0 gama_i0: 1.0 gama_i1: 2.0
128    duration_time_i: 1.0 demand_i: 80.0 work load_i: 80.0 work load gap_i: 0
129
130    Algorithm finished and the total CPU time: 1406 s
131    End
132

```