


```

80  obj[gen-1]=91.25  temp_best_value_gen=91.25
81  No, maintain solution and obj[gen]=91.25 , and the tolerance_counter = 4
82  solution chromosome =
83    first level: [ [ 4.84 4.99 2.23 2.59 5.59 3.06 1.84 4.67 6.64 4.48 4.51 6.45
84  3.8 4.99 3.81 12.5 4.33 11. ]
85    second level: [ 6. 23. 1. 2. 9. 13. 9. 15. 17. 18. 20. 25. 5. 27. 30. 4. 8. 1.]
86    third level: [5. 3. 3. 2. 2. 4. 3. 5. 4. 4. 5. 5. 4. 2. 2. 2. 6. 2.] ]
87  The No. 5 iteration is finished!
88
89  Beging the No. 6 iteration:
90  obj[gen-1]=91.25  temp_best_value_gen=91.25
91  No, maintain solution and obj[gen]=91.25 , and the tolerance_counter = 5
92  solution chromosome =
93    first level: [ [ 4.84 4.99 2.23 2.59 5.59 3.06 1.84 4.67 6.64 4.48 4.51 6.45
94  3.8 4.99 3.81 12.5 4.33 11. ]
95    second level: [ 6. 23. 1. 2. 9. 13. 9. 15. 17. 18. 20. 25. 5. 27. 30. 4. 8. 1.]
96    third level: [5. 3. 3. 2. 2. 4. 3. 5. 4. 4. 5. 5. 4. 2. 2. 2. 6. 2.] ]
97  The No. 6 iteration is finished!
98
99
100 -----
101 The iteration is terminated and then visulize the solution:
102 solution chromosome =
103   first level: [ [ 4.84 4.99 2.23 2.59 5.59 3.06 1.84 4.67 6.64 4.48 4.51 6.45
104  3.8 4.99 3.81 12.5 4.33 11. ]
105   second level: [ 6. 23. 1. 2. 9. 13. 9. 15. 17. 18. 20. 25. 5. 27. 30. 4. 8. 1.]
106   third level: [5. 3. 3. 2. 2. 4. 3. 5. 4. 4. 5. 5. 4. 2. 2. 2. 6. 2.] ]
107 Objective function values and some other indicators:
108 Obj0 = 33.00      Obj1 = 285.48      Obj0 + Obj1 = 318.48
109 Total movement of crane: 52.48
110 Total waiting time in berth position: 233.00
111 Total index of q during berthing: 295.00
112 Specific arrangement for each vessel:
113   V_id: 0      li: 9.0      xi: 4.8      bow of i: 0.3      tail of i: 9.3      gama_i0: 6.0      gama_i1: 8.0
114           duration_time_i: 2.0      demand_i: 120.0      work load_i: 120.0      work load gap_i: 0
115   V_id: 1      li: 9.0      xi: 5.0      bow of i: 0.5      tail of i: 9.5      gama_i0: 23.0      gama_i1: 25.0
116           duration_time_i: 2.0      demand_i: 100.0      work load_i: 100.0      work load gap_i: 0
117   V_id: 2      li: 3.0      xi: 2.2      bow of i: 0.7      tail of i: 3.7      gama_i0: 1.0      gama_i1: 2.0
118           duration_time_i: 1.0      demand_i: 60.0      work load_i: 60.0      work load gap_i: 0
119   V_id: 3      li: 4.0      xi: 2.6      bow of i: 0.6      tail of i: 4.6      gama_i0: 2.0      gama_i1: 5.0
120           duration_time_i: 3.0      demand_i: 120.0      work load_i: 120.0      work load gap_i: 0
121   V_id: 4      li: 3.0      xi: 5.6      bow of i: 4.1      tail of i: 7.1      gama_i0: 9.0      gama_i1: 13.0
122           duration_time_i: 4.0      demand_i: 140.0      work load_i: 140.0      work load gap_i: 0
123   V_id: 5      li: 4.0      xi: 3.1      bow of i: 1.1      tail of i: 5.1      gama_i0: 13.0      gama_i1: 15.0
124           duration_time_i: 2.0      demand_i: 100.0      work load_i: 100.0      work load gap_i: 0
125   V_id: 6      li: 3.0      xi: 1.8      bow of i: 0.3      tail of i: 3.3      gama_i0: 9.0      gama_i1: 10.0
126           duration_time_i: 1.0      demand_i: 60.0      work load_i: 60.0      work load gap_i: 0
127   V_id: 7      li: 5.0      xi: 4.7      bow of i: 2.2      tail of i: 7.2      gama_i0: 15.0      gama_i1: 17.0
128           duration_time_i: 2.0      demand_i: 140.0      work load_i: 140.0      work load gap_i: 0
129   V_id: 8      li: 7.0      xi: 6.6      bow of i: 3.1      tail of i: 10.1      gama_i0: 17.0      gama_i1: 18.
130           duration_time_i: 1.0      demand_i: 60.0      work load_i: 60.0      work load gap_i: 0
131   V_id: 9      li: 7.0      xi: 4.5      bow of i: 1.0      tail of i: 8.0      gama_i0: 18.0      gama_i1: 20.0
132           duration_time_i: 2.0      demand_i: 120.0      work load_i: 120.0      work load gap_i: 0
133   V_id: 10     li: 5.0      xi: 4.5      bow of i: 2.0      tail of i: 7.0      gama_i0: 20.0      gama_i1: 22.
134           duration_time_i: 2.0      demand_i: 120.0      work load_i: 120.0      work load gap_i: 0
135   V_id: 11     li: 5.0      xi: 6.4      bow of i: 3.9      tail of i: 8.9      gama_i0: 25.0      gama_i1: 27.
136           duration_time_i: 2.0      demand_i: 120.0      work load_i: 120.0      work load gap_i: 0
137   V_id: 12     li: 7.0      xi: 3.8      bow of i: 0.3      tail of i: 7.3      gama_i0: 5.0      gama_i1: 6.0
138           duration_time_i: 1.0      demand_i: 80.0      work load_i: 80.0      work load gap_i: 0
139   V_id: 13     li: 6.0      xi: 5.0      bow of i: 2.0      tail of i: 8.0      gama_i0: 27.0      gama_i1: 30.
140           duration_time_i: 3.0      demand_i: 100.0      work load_i: 100.0      work load gap_i: 0
141   V_id: 14     li: 5.0      xi: 3.8      bow of i: 1.3      tail of i: 6.3      gama_i0: 30.0      gama_i1: 34.
142           duration_time_i: 4.0      demand_i: 140.0      work load_i: 140.0      work load gap_i: 0
143   V_id: 15     li: 6.0      xi: 12.5      bow of i: 9.5      tail of i: 15.5      gama_i0: 4.0      gama_i1
144 : 8.0      duration_time_i: 4.0      demand_i: 140.0      work load_i: 140.0      work load gap_i: 0
145   V_id: 16     li: 7.0      xi: 4.3      bow of i: 0.8      tail of i: 7.8      gama_i0: 8.0      gama_i1: 9.0
146           duration_time_i: 1.0      demand_i: 100.0      work load_i: 100.0      work load gap_i: 0
147   V_id: 17     li: 7.0      xi: 11.0      bow of i: 7.5      tail of i: 14.5      gama_i0: 1.0      gama_i1
148 : 4.0      duration_time_i: 3.0      demand_i: 100.0      work load_i: 100.0      work load gap_i: 0
149
150 Algorithm finished and the total CPU time: 1264 s
151 End
152

```