```
 1 C:\Users\yusuf\anaconda3\python.exe "C:\Users\yusuf\Desktop\
   Computational Logistics\main\src\ga_15hops\
   tdvrp_genetic_algorithm_15_shops.py"
 2 100%|████████| 12/12 [00:00<00:00, 143.24it/s]
 3 Generating random population with size:   500
 4 Generating random population with size:   500
 5 Generating random population with size:   500
 6 Generating random population with size:   500
 7 Generating random population with size:   500
 8 Generating random population with size:   500
 9 Generating random population with size:   500
10 Generating random population with size:   500
11 Generating random population with size:   500
12 Generating random population with size:   500
13 Generating random population with size:   500
14 Generating random population with size:   500
15 100%|████████| 12/12 [00:00<00:00, 2405.68it/s]
16 Thread: 1 and Current Average: 221.87687341650405
17 ----------------------------------------
18 Thread: 2 and Current Average: 301.1261633888239
19 ----------------------------------------
20 Thread: 3 and Current Average: 284.33514482937846
21 ----------------------------------------
22 Thread: 4 and Current Average: 289.8934264609944
23 ----------------------------------------
24 Thread: 5 and Current Average: 171.96257199789255
25 ----------------------------------------
26 Thread: 6 and Current Average: 298.99620827550456
27 ----------------------------------------
28 Thread: 7 and Current Average: 274.5663083058715
29 ----------------------------------------
30 Thread: 8 and Current Average: 293.769335090050684
31 ----------------------------------------
32 Thread: 9 and Current Average: 300.8639429515215
33 ----------------------------------------
34 Thread: 10 and Current Average: 269.9466749786155
35 ----------------------------------------
36 Thread: 11 and Current Average: 284.1831708746436
37 ----------------------------------------
38 Thread: 12 and Current Average: 271.5459691353993
39 ----------------------------------------
40 100%|████████| 12/12 [00:00<00:00, 6117.86it/s]
41 ******************************************
42 ******************************************
43 ******************************************
44 Number of Iterations Done:  1
45 ******************************************
46 ******************************************
47 ******************************************
48 Thread: 1 and Current Average: 245.21970481890386
49 ----------------------------------------
50 Thread: 2 and Current Average: 267.44542180611023
51 ----------------------------------------
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 52  Thread: 3 and Current Average: 262.66058743176046
 53  ----------------------------------------
 54  Thread: 4 and Current Average: 216.99689223159876
 55  ----------------------------------------
 56  Thread: 5 and Current Average: 271.2692420515031
 57  ----------------------------------------
 58  Thread: 6 and Current Average: 279.9763681520304
 59  ----------------------------------------
 60  Thread: 7 and Current Average: 298.6601517924466
 61  ----------------------------------------
 62  Thread: 8 and Current Average: 243.03454300064221
 63  ----------------------------------------
 64  Thread: 9 and Current Average: 318.6154942256109
 65  ----------------------------------------
 66  Thread: 10 and Current Average: 277.38110550925387
 67  ----------------------------------------
 68  Thread: 11 and Current Average: 262.3768454385461
 69  ----------------------------------------
 70  Thread: 12 and Current Average: 288.53855006153236
 71  ----------------------------------------
 72  *******************************************
 73  *******************************************
 74  *******************************************
 75  Number of Iterations Done:  2
 76  *******************************************
 77  *******************************************
 78  *******************************************
 79  100%|          | 12/12 [00:00<00:00, 11762.48it/s]
 80  Thread: 1 and Current Average: 259.4212212718529
 81  ----------------------------------------
 82  Thread: 2 and Current Average: 272.30009409718286
 83  ----------------------------------------
 84  Thread: 3 and Current Average: 285.97273152016106
 85  ----------------------------------------
 86  Thread: 4 and Current Average: 338.758737664646
 87  ----------------------------------------
 88  Thread: 5 and Current Average: 298.2181220678428
 89  ----------------------------------------
 90  Thread: 6 and Current Average: 0.0
 91  ----------------------------------------
 92  Thread: 7 and Current Average: 0.0
 93  ----------------------------------------
 94  Thread: 8 and Current Average: 243.42218443881734
 95  ----------------------------------------
 96  Thread: 9 and Current Average: 294.3651737714881
 97  ----------------------------------------
 98  Thread: 10 and Current Average: 286.14342891345285
 99  ----------------------------------------
100  Thread: 11 and Current Average: 270.0584618138486
101  ----------------------------------------
102  Thread: 12 and Current Average: 278.7088179751394
103  ----------------------------------------
104  100%|          | 12/12 [00:00<00:00, 6014.78it/s]
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105 *******************************************
106 *******************************************
107 *******************************************
108 Number of Iterations Done:   3
109 *******************************************
110 *******************************************
111 *******************************************
112 Thread: 1 and Current Average: 244.0131499992869
113 -----------------------------------------
114 Thread: 2 and Current Average: 253.48191007123657
115 -----------------------------------------
116 Thread: 3 and Current Average: 306.8961835443513
117 -----------------------------------------
118 Thread: 4 and Current Average: 232.90295766159238
119 -----------------------------------------
120 Thread: 5 and Current Average: 0.0
121 -----------------------------------------
122 Thread: 6 and Current Average: 0.0
123 -----------------------------------------
124 Thread: 7 and Current Average: 0.0
125 -----------------------------------------
126 Thread: 8 and Current Average: 207.1889326399548
127 -----------------------------------------
128 Thread: 9 and Current Average: 239.88968280552507
129 -----------------------------------------
130 Thread: 10 and Current Average: 215.5968799621606
131 -----------------------------------------
132 Thread: 11 and Current Average: 284.9760583515637
133 -----------------------------------------
134 Thread: 12 and Current Average: 0.0
135 -----------------------------------------
136 *******************************************
137 *******************************************
138 *******************************************
139 Number of Iterations Done:   4
140 *******************************************
141 *******************************************
142 *******************************************
143 100%|█████████| 12/12 [00:00<00:00, 12489.24it/s]
144 Thread: 1 and Current Average: 248.98112015948362
145 -----------------------------------------
146 Thread: 2 and Current Average: 0.0
147 -----------------------------------------
148 Thread: 3 and Current Average: 193.35088805427006
149 -----------------------------------------
150 Thread: 4 and Current Average: 215.31114899133868
151 -----------------------------------------
152 Thread: 5 and Current Average: 0.0
153 -----------------------------------------
154 Thread: 6 and Current Average: 0.0
155 -----------------------------------------
156 Thread: 7 and Current Average: 0.0
157 -----------------------------------------
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158 Thread: 8 and Current Average: 0.0
159 -----------------------------------------
160 Thread: 9 and Current Average: 254.1472573221579
161 -----------------------------------------
162 Thread: 10 and Current Average: 195.72168579181547
163 -----------------------------------------
164 Thread: 11 and Current Average: 256.5585787950778
165 -----------------------------------------
166 Thread: 12 and Current Average: 0.0
167 -----------------------------------------
168 *******************************************
169 *******************************************
170 *******************************************
171 Number of Iterations Done:  5
172 *******************************************
173 *******************************************
174 *******************************************
175 100%|███████| 12/12 [00:00<00:00, 11702.31it/s]
176 Thread: 1 and Current Average: 251.43150669576465
177 -----------------------------------------
178 Thread: 2 and Current Average: 0.0
179 -----------------------------------------
180 Thread: 3 and Current Average: 268.06048723968263
181 -----------------------------------------
182 Thread: 4 and Current Average: 257.2791622286768
183 -----------------------------------------
184 Thread: 5 and Current Average: 308.820586257915
185 -----------------------------------------
186 Thread: 6 and Current Average: 0.0
187 -----------------------------------------
188 Thread: 7 and Current Average: 0.0
189 -----------------------------------------
190 Thread: 8 and Current Average: 0.0
191 -----------------------------------------
192 Thread: 9 and Current Average: 237.26781839394644
193 -----------------------------------------
194 Thread: 10 and Current Average: 177.91700078600247
195 -----------------------------------------
196 Thread: 11 and Current Average: 351.6151917701512
197 -----------------------------------------
198 Thread: 12 and Current Average: 230.78171436960153
199 -----------------------------------------
200 100%|███████| 12/12 [00:00<00:00, 12029.55it/s]
201 *******************************************
202 *******************************************
203 *******************************************
204 Number of Iterations Done:  6
205 *******************************************
206 *******************************************
207 *******************************************
208 Thread: 1 and Current Average: 304.4737976992821
209 -----------------------------------------
210 Thread: 2 and Current Average: 0.0
```

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211 ----------------------------------------
212 Thread: 3 and Current Average: 0.0
213 ----------------------------------------
214 Thread: 4 and Current Average: 219.5920677213781
215 ----------------------------------------
216 Thread: 5 and Current Average: 288.3945000477649
217 ----------------------------------------
218 Thread: 6 and Current Average: 280.0078197470662
219 ----------------------------------------
220 Thread: 7 and Current Average: 0.0
221 ----------------------------------------
222 Thread: 8 and Current Average: 0.0
223 ----------------------------------------
224 Thread: 9 and Current Average: 280.9026701409091
225 ----------------------------------------
226 Thread: 10 and Current Average: 233.58132579763452
227 ----------------------------------------
228 Thread: 11 and Current Average: 295.4788235397256
229 ----------------------------------------
230 Thread: 12 and Current Average: 0.0
231 ----------------------------------------
232 100%|████████| 12/12 [00:00<00:00, 12421.43it/s]
233 ********************************************
234 ********************************************
235 ********************************************
236 Number of Iterations Done:  7
237 ********************************************
238 ********************************************
239 ********************************************
240 Thread: 1 and Current Average: 319.59154074629214
241 ----------------------------------------
242 Thread: 2 and Current Average: 0.0
243 ----------------------------------------
244 Thread: 3 and Current Average: 245.79414051733957
245 ----------------------------------------
246 Thread: 4 and Current Average: 0.0
247 ----------------------------------------
248 Thread: 5 and Current Average: 278.78894143795617
249 ----------------------------------------
250 Thread: 6 and Current Average: 0.0
251 ----------------------------------------
252 Thread: 7 and Current Average: 368.11772711606545
253 ----------------------------------------
254 Thread: 8 and Current Average: 0.0
255 ----------------------------------------
256 Thread: 9 and Current Average: 0.0
257 ----------------------------------------
258 Thread: 10 and Current Average: 215.12728400896705
259 ----------------------------------------
260 Thread: 11 and Current Average: 159.1138884233215
261 ----------------------------------------
262 Thread: 12 and Current Average: 0.0
263 ----------------------------------------
```

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264 100%|█████████    | 12/12 [00:00<?, ?it/s]
265 ********************************************
266 ********************************************
267 ********************************************
268 Number of Iterations Done:   8
269 ********************************************
270 ********************************************
271 ********************************************
272 Thread: 1 and Current Average: 300.58142880456114
273 ----------------------------------------
274 Thread: 2 and Current Average: 308.9994238797337
275 ----------------------------------------
276 Thread: 3 and Current Average: 280.683864563606
277 ----------------------------------------
278 Thread: 4 and Current Average: 278.9977691415881
279 ----------------------------------------
280 Thread: 5 and Current Average: 251.3711357111257
281 ----------------------------------------
282 Thread: 6 and Current Average: 0.0
283 ----------------------------------------
284 Thread: 7 and Current Average: 308.3726091891336
285 ----------------------------------------
286 Thread: 8 and Current Average: 274.024742773541
287 ----------------------------------------
288 Thread: 9 and Current Average: 296.69061212363295
289 ----------------------------------------
290 Thread: 10 and Current Average: 241.16757241438162
291 ----------------------------------------
292 Thread: 11 and Current Average: 0.0
293 ----------------------------------------
294 Thread: 12 and Current Average: 0.0
295 ----------------------------------------
296 ********************************************
297 ********************************************
298 ********************************************
299 Number of Iterations Done:   9
300 ********************************************
301 ********************************************
302 ********************************************
303 100%|█████████    | 12/12 [00:00<00:00, 12035.31it/s]
304 Thread: 1 and Current Average: 283.1564079636297
305 ----------------------------------------
306 Thread: 2 and Current Average: 256.03251023636653
307 ----------------------------------------
308 Thread: 3 and Current Average: 296.6693643292303
309 ----------------------------------------
310 Thread: 4 and Current Average: 254.6960618804018
311 ----------------------------------------
312 Thread: 5 and Current Average: 205.40591909044463
313 ----------------------------------------
314 Thread: 6 and Current Average: 0.0
315 ----------------------------------------
316 Thread: 7 and Current Average: 292.6153985328255
```

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317 ----------------------------------------
318 Thread: 8 and Current Average: 277.73355904690084
319 ----------------------------------------
320 Thread: 9 and Current Average: 0.0
321 ----------------------------------------
322 Thread: 10 and Current Average: 277.765536651624
323 ----------------------------------------
324 Thread: 11 and Current Average: 0.0
325 ----------------------------------------
326 Thread: 12 and Current Average: 334.3415153965326
327 ----------------------------------------
328 ******************************************
329 ******************************************
330 ******************************************
331 Number of Iterations Done:   10
332 ******************************************
333 ******************************************
334 ******************************************
335 BEST RESULT BELOW:
336 [155.25544233216155, [0, 15, 14, 13, 12, 0, 7, 6, 5, 4, 10, 0, 11, 8
    , 9, 1, 3, 0, 2, 0]]
337 Time: 0:00:34.695498
338 1
339
340 Process finished with exit code 0
341
```