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1 C:\Users\Subramanian\AppData\Local\Programs\Python\
  Python39\python.exe "C:/Users/Subramanian/
  IdeaProjects/Data_for_michael_ani and hyperparameter
  tuning/scenario1_genetic_algorithm.py"
2 LHS sampling is: [[88, 14, 14, 7, 20, 2], [102, 14,
  15, 5, 31, 4], [118, 15, 15, 24, 30, 3], [10, 14, 15
  , 47, 25, 4], [91, 15, 15, 37, 7, 3], [7, 14, 14, 12
  , 41, 4], [19, 14, 14, 27, 17, 2], [74, 15, 15, 31,
  12, 5], [59, 14, 14, 10, 3, 4], [69, 14, 14, 17, 26,
  5], [138, 15, 15, 2, 33, 5], [39, 15, 15, 11, 28, 4
  ], [14, 15, 15, 9, 48, 4], [121, 15, 15, 15, 13, 3
  ], [27, 14, 15, 4, 35, 5], [85, 14, 15, 19, 23, 5], [
  71, 14, 15, 5, 3, 2], [83, 14, 15, 48, 5, 5], [95, 15
  , 15, 44, 45, 4], [105, 14, 14, 49, 50, 3], [56, 15,
  14, 21, 48, 2], [111, 14, 14, 21, 38, 2], [47, 14, 15
  , 43, 34, 4], [127, 14, 14, 23, 27, 3], [46, 14, 15,
  13, 6, 2], [133, 15, 15, 18, 9, 4], [8, 15, 14, 40,
  10, 5], [66, 15, 15, 45, 19, 3], [29, 14, 14, 35, 40
  , 4], [17, 14, 14, 11, 36, 4], [116, 15, 15, 25, 46,
  3], [131, 15, 14, 31, 15, 3], [32, 15, 15, 16, 23, 3
  ], [64, 14, 15, 27, 42, 3], [139, 14, 14, 22, 17, 3
  ], [135, 14, 14, 46, 5, 3], [115, 14, 14, 3, 30, 3
  ], [73, 15, 15, 36, 11, 3], [77, 15, 14, 24, 4, 4], [
  54, 15, 14, 30, 37, 2], [4, 15, 14, 18, 41, 3], [42,
  15, 14, 20, 40, 2], [31, 15, 14, 49, 24, 2], [60, 15
  , 14, 32, 29, 5], [22, 14, 14, 6, 44, 3], [110, 14,
  14, 28, 49, 3], [51, 15, 15, 34, 8, 3], [80, 15, 14,
  36, 21, 4], [50, 14, 15, 47, 43, 5], [37, 15, 14, 15
  , 16, 4], [24, 14, 14, 34, 32, 3], [99, 14, 15, 8, 45
  , 4], [126, 15, 15, 41, 22, 2], [94, 15, 14, 42, 13,
  3], [86, 14, 15, 28, 14, 4], [13, 15, 14, 32, 11, 4
  ], [107, 15, 15, 13, 19, 4], [123, 14, 14, 38, 26, 4
  ], [101, 15, 15, 42, 37, 4], [38, 14, 15, 39, 34, 5]]
3 2
4 Start point is: 2
5 16
6 16
7 (5.52, 6.66) (7.37, 3.27)
8 14 14
9 The travel time for UGV from depot B to NW UGV stop
  is: 3907

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10 The UGV travel time between two UGV stops is: 4980
11 24969222.0
12 End node is [24]
13 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
   , 16, 17, 18, 19, 20, 21, 22, 23]
14 [25, 26, 27, 28, 29]
15 Objective: 5000000
16 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
   17 18 19 20 21 22 23 25 26 27 28 29
17 30
18 Route for vehicle 0:
19 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
   Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
20 Distance of the route: 0 ft
21 Remaining Fuel of the route: 287700
22 Total Time of the route: 0 seconds
23
24 Total Distance of all routes: 0 ft
25 Total Fuel remaining of all routes: 287700
26 Total Time of all routes: 0 seconds
27 4
28 Start point is: 4
29 31
30 16
31 (4.8, 3.81) (7.98, 3.78)
32 14 15
33 The travel time for UGV from depot B to NW UGV stop
   is: 1663
34 The UGV travel time between two UGV stops is: 3956
35 10829341.5
36 End node is [24]
37 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
   , 16, 17, 18, 19, 20, 21, 22, 23]
38 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37,
   38, 39, 40, 41, 42]
39 Objective: 18000000
40 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
   17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33 34
   35 36 37 38 39 40 41 42
41 43
42 Route for vehicle 0:
```

```
43 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
44 Distance of the route: 0 ft
45 Remaining Fuel of the route: 287700
46 Total Time of the route: 0 seconds
47
48 Total Distance of all routes: 0 ft
49 Total Fuel remaining of all routes: 287700
50 Total Time of all routes: 0 seconds
51 3
52 Start point is: 3
53 16
54 16
55 (5.52, 6.66) (8.29, 4.03)
56 15 15
57 The travel time for UGV from depot B to NW UGV stop
    is: 3775
58 The UGV travel time between two UGV stops is: 5132
59 ****
*
60 UGV route goes infeasible although UAV has a solution
61 ****
*
62 52718896.5
63 End node is [18]
64 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
    , 16, 17]
65 []
66 ****No solution found*****
67 4
68 Start point is: 4
69 31
70 16
71 (7.06, 3.02) (5.76, 7.62)
72 14 15
73 The travel time for UGV from depot B to NW UGV stop
    is: 4461
74 The UGV travel time between two UGV stops is: 4917
75 19589406.0
76 End node is [24]
77 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
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77 , 16, 17, 18, 19, 20, 21, 22, 23]
78 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45]
79 Objective: 21000000
80 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44 45
81 46
82 Route for vehicle 0:
83 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
84 Distance of the route: 0 ft
85 Remaining Fuel of the route: 287700
86 Total Time of the route: 0 seconds
87
88 Total Distance of all routes: 0 ft
89 Total Fuel remaining of all routes: 287700
90 Total Time of all routes: 0 seconds
91 3
92 Start point is: 3
93 16
94 16
95 (5.88, 8.09) (7.37, 3.27)
96 15 15
97 The travel time for UGV from depot B to NW UGV stop
    is: 4296
98 The UGV travel time between two UGV stops is: 5230
99 ****
**  

100 UGV route goes infeasible although UAV has a
    solution
101 ****
**  

102 53077444.5
103 End node is [18]
104 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
105 []
106 ****No solution found*****
107 4
108 Start point is: 4
```

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109 31
110 16
111 (7.06, 3.02) (5.4, 6.19)
112 14 14
113 The travel time for UGV from depot B to NW UGV stop
    is: 4461
114 The UGV travel time between two UGV stops is: 4648
115 18765436.5
116 End node is [24]
117 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
118 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45]
119 Objective: 21000000
120 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44 45
121 46
122 Route for vehicle 0:
123 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
124 Distance of the route: 0 ft
125 Remaining Fuel of the route: 287700
126 Total Time of the route: 0 seconds
127
128 Total Distance of all routes: 0 ft
129 Total Fuel remaining of all routes: 287700
130 Total Time of all routes: 0 seconds
131 2
132 Start point is: 2
133 16
134 16
135 (7.37, 3.27) (5.64, 7.14)
136 14 14
137 The travel time for UGV from depot B to NW UGV stop
    is: 3164
138 The UGV travel time between two UGV stops is: 5168
139 ****
    **
140 UGV route goes infeasible although UAV has a
    solution
```

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141 ****
142 **
143 End node is [24]
144 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
   15, 16, 17, 18, 19, 20, 21, 22, 23]
145 [25, 26, 27, 28, 29, 30, 31]
146 Objective: 7000000
147 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
   16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
148 32
149 Route for vehicle 0:
150 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
   Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
151 Distance of the route: 0 ft
152 Remaining Fuel of the route: 287700
153 Total Time of the route: 0 seconds
154
155 Total Distance of all routes: 0 ft
156 Total Fuel remaining of all routes: 287700
157 Total Time of all routes: 0 seconds
158 5
159 Start point is: 5
160 16
161 31
162 (5.04, 4.76) (7.06, 3.02)
163 15 15
164 The travel time for UGV from depot B to NW UGV stop
   is: 3798
165 The UGV travel time between two UGV stops is: 3879
166 17336076.0
167 End node is [24]
168 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
   15, 16, 17, 18, 19, 20, 21, 22, 23]
169 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
   , 38, 39, 40, 41, 42, 43, 44, 45, 46]
170 Objective: 5447
171 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17
   18 19 20 21 23
172 47
173 47
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174 47
175 47
176 47
177 47
178 47
179 47
180 47
181 47
182 47
183 47
184 47
185 47
186 47
187 47
188 47
189 47
190 47
191 47
192 47
193 47
194 47
195 47
196 47
197 47
198 Route for vehicle 0:
199 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(0)
    FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914)
    Distance(40274) -> 25 Fuel(139842) Time(2742,3071)
    Slack(0) FuelSlack(0,0) Distance(64917) -> 26 Fuel(
    124476) Time(2819,3268) Slack(0) FuelSlack(0,0)
    Distance(67478) -> 27 Fuel(108804) Time(2927,3407)
    Slack(0) FuelSlack(0,0) Distance(70090) -> 28 Fuel(
    93438) Time(3124,3484) Slack(0) FuelSlack(0,0)
    Distance(72651) -> 29 Fuel(77766) Time(3323,3563)
    Slack(0) FuelSlack(0,0) Distance(75263) -> 31 Fuel(
    46722) Time(3599,3719) Slack(0) FuelSlack(0,0)
    Distance(80437) -> 12 Fuel(31050) Time(3798,3798)
    Slack(825) FuelSlack(170508,170508) Distance(83049
    ) -> 46 Fuel(148242) Time(5327,5327) Slack(0)
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199 FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
    Time(5368,5368) Slack(0) FuelSlack(0,0) Distance(
    107674) -> 44 Fuel(131304) Time(5411,5411) Slack(0)
    FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012)
    Time(5452,5452) Slack(0) FuelSlack(0,0) Distance(
    110497) -> 42 Fuel(114408) Time(5495,5495) Slack(0)
    FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116)
    Time(5536,5536) Slack(0) FuelSlack(0,0) Distance(
    113313) -> 40 Fuel(97470) Time(5579,5579) Slack(0)
    FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
    Time(5620,5620) Slack(0) FuelSlack(0,0) Distance(
    116136) -> 38 Fuel(80574) Time(5663,5663) Slack(0)
    FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
    Time(5704,5704) Slack(0) FuelSlack(0,0) Distance(
    118952) -> 36 Fuel(63636) Time(5747,5747) Slack(0)
    FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
    Time(5788,5788) Slack(0) FuelSlack(0,0) Distance(
    121775) -> 34 Fuel(46740) Time(5831,5831) Slack(0)
    FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
    Time(5872,5872) Slack(0) FuelSlack(0,0) Distance(
    124591) -> 32 Fuel(30114) Time(5914,5914) Slack(0)
    FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
    Time(5957,5957) Slack(855) FuelSlack(21510,287700)
    Distance(127414) -> 24 Fuel(287700) Time(8412,8412)
    Distance(180214)

200 Distance of the route: 180214 ft
201 Remaining Fuel of the route: 287700
202 Total Time of the route: 8412 seconds
203
204 Total Distance of all routes: 180214 ft
205 Total Fuel remaining of all routes: 287700
206 Total Time of all routes: 8412 seconds
207 4
208 Start point is: 4
209 31
210 16
211 (8.6, 4.29) (5.64, 7.14)
212 14 14
213 The travel time for UGV from depot B to NW UGV stop
    is: 5215
214 The UGV travel time between two UGV stops is: 5772

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215 22446145.5
216 End node is [24]
217 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
218 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40]
219 Objective: 16000000
220 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40
221 41
222 Route for vehicle 0:
223 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
224 Distance of the route: 0 ft
225 Remaining Fuel of the route: 287700
226 Total Time of the route: 0 seconds
227
228 Total Distance of all routes: 0 ft
229 Total Fuel remaining of all routes: 287700
230 Total Time of all routes: 0 seconds
231 5
232 Start point is: 5
233 16
234 31
235 (8.91, 4.54) (5.64, 7.14)
236 14 14
237 The travel time for UGV from depot B to NW UGV stop
    is: 0
238 The UGV travel time between two UGV stops is: 5923
239 22657707.0
240 End node is [24]
241 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
242 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41]
243 Objective: 16001408
244 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 12 13 14 15 16
    17 18 19 20 21 22 23 25 27 28 29 30 31 32 33 34 35
    36 37 38 39 40 41
245 42
```

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246 42
247 42
248 Route for vehicle 0:
249 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 26 Fuel(148134) Time(704,704) Slack(0)
    ) FuelSlack(0,0) Distance(23261) -> 6 Fuel(8568)
    Time(1408,1408) Slack(897) FuelSlack(8423,287700)
    Distance(46522) -> 24 Fuel(287700) Time(2305,2305)
    Distance(46522)
250 Distance of the route: 46522 ft
251 Remaining Fuel of the route: 287700
252 Total Time of the route: 2305 seconds
253
254 Total Distance of all routes: 46522 ft
255 Total Fuel remaining of all routes: 287700
256 Total Time of all routes: 2305 seconds
257 5
258 Start point is: 5
259 16
260 31
261 (5.52, 6.66) (8.91, 4.54)
262 15 15
263 The travel time for UGV from depot B to NW UGV stop
    is: 4488
264 The UGV travel time between two UGV stops is: 5414
265 20306328.0
266 End node is [24]
267 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
268 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39]
269 Objective: 15000000
270 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39
271 40
272 Route for vehicle 0:
273 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
274 Distance of the route: 0 ft
275 Remaining Fuel of the route: 287700
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276 Total Time of the route: 0 seconds
277
278 Total Distance of all routes: 0 ft
279 Total Fuel remaining of all routes: 287700
280 Total Time of all routes: 0 seconds
281 4
282 Start point is: 4
283 31
284 16
285 (7.98, 3.78) (5.64, 7.14)
286 15 15
287 The travel time for UGV from depot B to NW UGV stop
is: 4586
288 The UGV travel time between two UGV stops is: 5167
289 20024218.5
290 End node is [24]
291 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17, 18, 19, 20, 21, 22, 23]
292 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
, 38, 39, 40, 41, 42]
293 Objective: 18000000
294 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41 42
295 43
296 Route for vehicle 0:
297 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
298 Distance of the route: 0 ft
299 Remaining Fuel of the route: 287700
300 Total Time of the route: 0 seconds
301
302 Total Distance of all routes: 0 ft
303 Total Fuel remaining of all routes: 287700
304 Total Time of all routes: 0 seconds
305 4
306 Start point is: 4
307 31
308 16
309 (7.37, 3.27) (5.04, 4.76)
310 15 15
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311 The travel time for UGV from depot B to NW UGV stop  
is: 4304  
312 The UGV travel time between two UGV stops is: 4020  
313 17074269.0  
314 End node is [24]  
315 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
    15, 16, 17, 18, 19, 20, 21, 22, 23]  
316 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37  
    , 38, 39, 40, 41, 42, 43, 44]  
317 Objective: 20000000  
318 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33  
    34 35 36 37 38 39 40 41 42 43 44  
319 45  
320 Route for vehicle 0:  
321 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)  
322 Distance of the route: 0 ft  
323 Remaining Fuel of the route: 287700  
324 Total Time of the route: 0 seconds  
325  
326 Total Distance of all routes: 0 ft  
327 Total Fuel remaining of all routes: 287700  
328 Total Time of all routes: 0 seconds  
329 3  
330 Start point is: 3  
331 16  
332 16  
333 (5.88, 8.09) (8.29, 4.03)  
334 15 15  
335 The travel time for UGV from depot B to NW UGV stop  
is: 4296  
336 The UGV travel time between two UGV stops is: 5653  
337 *****  
    **  
338 UGV route goes infeasible although UAV has a  
solution  
339 *****  
    **  
340 53567818.5  
341 End node is [18]
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```

342 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17]
343 []
344 *****No solution found*****
345 5
346 Start point is: 5
347 16
348 31
349 (7.68, 3.53) (5.4, 6.19)
350 14 15
351 The travel time for UGV from depot B to NW UGV stop
is: 599
352 The UGV travel time between two UGV stops is: 4685
353 19778298.0
354 End node is [24]
355 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17, 18, 19, 20, 21, 22, 23]
356 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
, 38, 39, 40, 41, 42, 43]
357 Objective: 15004294
358 Dropped nodes: 1 2 3 4 7 8 9 10 11 12 13 14 15 16 17
19 20 21 22 23 29 30 31 32 33 34 35 36 37 38 39 40
41 42 43
359 44
360 44
361 44
362 44
363 44
364 44
365 44
366 44
367 Route for vehicle 0:
368 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
Distance(0) -> 28 Fuel(160866) Time(640,700) Slack(0
) FuelSlack(0,0) Distance(21139) -> 6 Fuel(34032)
Time(1280,1460) Slack(815) FuelSlack(132348,166380)
Distance(42278) -> 27 Fuel(155352) Time(2763,2947)
Slack(0) FuelSlack(0,0) Distance(64336) -> 5 Fuel(
23004) Time(3431,3615) Slack(851) FuelSlack(170862,
170862) Distance(86394) -> 25 Fuel(139842) Time(5028
,5212) Slack(0) FuelSlack(0,0) Distance(111037) ->

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368 26 Fuel(124476) Time(5169,5289) Slack(0) FuelSlack(0  
,0) Distance(113598) -> 18 Fuel(77760) Time(5524,  
5524) Slack(675) FuelSlack(77760,287700) Distance(  
121384) -> 24 Fuel(287700) Time(6819,6819) Distance(  
141862)  
369 Distance of the route: 141862 ft  
370 Remaining Fuel of the route: 287700  
371 Total Time of the route: 6819 seconds  
372  
373 Total Distance of all routes: 141862 ft  
374 Total Fuel remaining of all routes: 287700  
375 Total Time of all routes: 6819 seconds  
376 5  
377 Start point is: 5  
378 16  
379 31  
380 (5.16, 5.24) (7.37, 3.27)  
381 14 15  
382 The travel time for UGV from depot B to NW UGV stop  
is: 4257  
383 The UGV travel time between two UGV stops is: 4196  
384 18850555.5  
385 End node is [24]  
386 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
15, 16, 17, 18, 19, 20, 21, 22, 23]  
387 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37  
, 38, 39, 40, 41, 42, 43, 44, 45]  
388 Objective: 5507  
389 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17  
18 19 21 22 23  
390 46  
391 46  
392 46  
393 46  
394 46  
395 46  
396 46  
397 46  
398 46  
399 46  
400 46
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401 46
402 46
403 46
404 46
405 46
406 46
407 46
408 46
409 46
410 46
411 46
412 46
413 46
414 46
415 Route for vehicle 0:
416 0 Fuel(253693) Time(58,58) Slack(60) FuelSlack(0,0)
    Distance(0) -> 28 Fuel(126859) Time(758,758) Slack(
        120) FuelSlack(0,0) Distance(21139) -> 2 Fuel(25)
        Time(1518,1518) Slack(925) FuelSlack(147858,147883)
        Distance(42278) -> 25 Fuel(139842) Time(3189,3189)
        Slack(120) FuelSlack(0,0) Distance(66921) -> 26 Fuel
        (124476) Time(3386,3386) Slack(120) FuelSlack(0,0)
        Distance(69482) -> 27 Fuel(108804) Time(3585,3585)
        Slack(120) FuelSlack(0,0) Distance(72094) -> 29 Fuel
        (77760) Time(3861,3861) Slack(120) FuelSlack(0,0)
        Distance(77268) -> 30 Fuel(62088) Time(4060,4060)
        Slack(120) FuelSlack(0,0) Distance(79880) -> 12 Fuel
        (46722) Time(4257,4257) Slack(774) FuelSlack(201852,
        201852) Distance(82441) -> 45 Fuel(132570) Time(5814
        ,5814) Slack(0) FuelSlack(0,0) Distance(108296) ->
        44 Fuel(124278) Time(5855,5855) Slack(0) FuelSlack(0
        ,0) Distance(109678) -> 43 Fuel(115632) Time(5898,
        5898) Slack(0) FuelSlack(0,0) Distance(111119) -> 42
        Fuel(107340) Time(5939,5939) Slack(0) FuelSlack(0,0
        ) Distance(112501) -> 41 Fuel(98736) Time(5982,5982
        ) Slack(0) FuelSlack(0,0) Distance(113935) -> 40
        Fuel(90444) Time(6023,6023) Slack(0) FuelSlack(0,0
        ) Distance(115317) -> 39 Fuel(81798) Time(6066,6066)
        Slack(0) FuelSlack(0,0) Distance(116758) -> 38 Fuel(
        73506) Time(6107,6107) Slack(0) FuelSlack(0,0)
        Distance(118140) -> 37 Fuel(64902) Time(6150,6150)
```

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416 Slack(0) FuelSlack(0,0) Distance(119574) -> 36 Fuel(
  56610) Time(6191,6191) Slack(0) FuelSlack(0,0)
  Distance(120956) -> 35 Fuel(47964) Time(6234,6234)
  Slack(0) FuelSlack(0,0) Distance(122397) -> 34 Fuel(
  39672) Time(6275,6275) Slack(0) FuelSlack(0,0)
  Distance(123779) -> 33 Fuel(31068) Time(6318,6318)
  Slack(0) FuelSlack(0,0) Distance(125213) -> 32 Fuel(
  22776) Time(6359,6359) Slack(0) FuelSlack(0,0)
  Distance(126595) -> 31 Fuel(14442) Time(6401,6401)
  Slack(0) FuelSlack(0,0) Distance(127984) -> 20 Fuel(
  5838) Time(6444,6444) Slack(906) FuelSlack(5838,
  287700) Distance(129418) -> 24 Fuel(287700) Time(
  8950,8950) Distance(182218)
417 Distance of the route: 182218 ft
418 Remaining Fuel of the route: 287700
419 Total Time of the route: 8950 seconds
420
421 Total Distance of all routes: 182218 ft
422 Total Fuel remaining of all routes: 287700
423 Total Time of all routes: 8950 seconds
424 2
425 Start point is: 2
426 16
427 16
428 (8.91, 4.54) (5.88, 8.09)
429 14 15
430 The travel time for UGV from depot B to NW UGV stop
  is: 3918
431 The UGV travel time between two UGV stops is: 5934
432 ****
  **
433 UGV route goes infeasible although UAV has a
  solution
434 ****
  **
435 29325091.5
436 End node is [24]
437 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
  15, 16, 17, 18, 19, 20, 21, 22, 23]
438 []
439 Objective: 0

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440 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
        16 17 18 19 20 21 22 23  
441 25  
442 Route for vehicle 0:  
443 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
        Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)  
444 Distance of the route: 0 ft  
445 Remaining Fuel of the route: 287700  
446 Total Time of the route: 0 seconds  
447  
448 Total Distance of all routes: 0 ft  
449 Total Fuel remaining of all routes: 287700  
450 Total Time of all routes: 0 seconds  
451 5  
452 Start point is: 5  
453 16  
454 31  
455 (4.92, 4.29) (7.37, 3.27)  
456 14 15  
457 The travel time for UGV from depot B to NW UGV stop  
    is: 3888  
458 The UGV travel time between two UGV stops is: 3851  
459 17400688.5  
460 End node is [24]  
461 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
    15, 16, 17, 18, 19, 20, 21, 22, 23]  
462 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37  
    , 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]  
463 Objective: 5446  
464 Dropped nodes: 1 2 4 5 6 7 8 9 10 11 13 14 15 16 17  
        18 19 20 21 22  
465 48  
466 48  
467 48  
468 48  
469 48  
470 48  
471 48  
472 48  
473 48  
474 48
```

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475 48
476 48
477 48
478 48
479 48
480 48
481 48
482 48
483 48
484 48
485 48
486 48
487 48
488 48
489 48
490 48
491 48
492 Route for vehicle 0:
493 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(0)
    FuelSlack(0,0) Distance(20137) -> 3 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914)
    Distance(40274) -> 25 Fuel(139842) Time(2742,3071)
    Slack(0) FuelSlack(0,0) Distance(64917) -> 26 Fuel(
    124476) Time(2819,3268) Slack(0) FuelSlack(0,0)
    Distance(67478) -> 27 Fuel(108804) Time(2898,3420)
    Slack(0) FuelSlack(0,0) Distance(70090) -> 28 Fuel(
    93438) Time(3017,3497) Slack(0) FuelSlack(0,0)
    Distance(72651) -> 29 Fuel(77766) Time(3216,3576)
    Slack(0) FuelSlack(0,0) Distance(75263) -> 31 Fuel(
    46722) Time(3492,3732) Slack(0) FuelSlack(0,0)
    Distance(80437) -> 32 Fuel(31050) Time(3691,3811)
    Slack(0) FuelSlack(0,0) Distance(83049) -> 12 Fuel(
    15684) Time(3888,3888) Slack(874) FuelSlack(139770,
    139770) Distance(85610) -> 47 Fuel(163614) Time(5388
    ,5388) Slack(0) FuelSlack(0,0) Distance(106291) ->
    46 Fuel(155322) Time(5429,5429) Slack(0) FuelSlack(0
    ,0) Distance(107673) -> 45 Fuel(146676) Time(5472,
    5472) Slack(0) FuelSlack(0,0) Distance(109114) -> 44
    Fuel(138384) Time(5513,5513) Slack(0) FuelSlack(0,0
    ) Distance(110496) -> 43 Fuel(129780) Time(5556,5556)
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493 ) Slack(0) FuelSlack(0,0) Distance(111930) -> 42
    Fuel(121488) Time(5597,5597) Slack(0) FuelSlack(0,0)
    ) Distance(113312) -> 41 Fuel(112842) Time(5640,5640
    ) Slack(0) FuelSlack(0,0) Distance(114753) -> 40
    Fuel(104550) Time(5681,5681) Slack(0) FuelSlack(0,0)
    ) Distance(116135) -> 39 Fuel(95946) Time(5724,5724
    ) Slack(0) FuelSlack(0,0) Distance(117569) -> 38
    Fuel(87654) Time(5765,5765) Slack(0) FuelSlack(0,0)
    Distance(118951) -> 37 Fuel(79008) Time(5808,5808)
    Slack(0) FuelSlack(0,0) Distance(120392) -> 36 Fuel(
    70716) Time(5849,5849) Slack(0) FuelSlack(0,0)
    Distance(121774) -> 35 Fuel(62112) Time(5892,5892)
    Slack(0) FuelSlack(0,0) Distance(123208) -> 34 Fuel(
    53820) Time(5933,5933) Slack(0) FuelSlack(0,0)
    Distance(124590) -> 33 Fuel(45486) Time(5975,5975)
    Slack(0) FuelSlack(0,0) Distance(125979) -> 23 Fuel(
    36882) Time(6018,6018) Slack(806) FuelSlack(36882,
    287700) Distance(127413) -> 24 Fuel(287700) Time(
    8424,8424) Distance(180213)
494 Distance of the route: 180213 ft
495 Remaining Fuel of the route: 287700
496 Total Time of the route: 8424 seconds
497
498 Total Distance of all routes: 180213 ft
499 Total Fuel remaining of all routes: 287700
500 Total Time of all routes: 8424 seconds
501 4
502 Start point is: 4
503 31
504 16
505 (5.16, 5.24) (7.68, 3.53)
506 15 15
507 The travel time for UGV from depot B to NW UGV stop
    is: 1034
508 The UGV travel time between two UGV stops is: 4340
509 10922544.0
510 End node is [24]
511 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
512 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43]

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513 Objective: 19000000
514 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43
515 44
516 Route for vehicle 0:
517 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
518 Distance of the route: 0 ft
519 Remaining Fuel of the route: 287700
520 Total Time of the route: 0 seconds
521
522 Total Distance of all routes: 0 ft
523 Total Fuel remaining of all routes: 287700
524 Total Time of all routes: 0 seconds
525 3
526 Start point is: 3
527 16
528 16
529 (5.16, 5.24) (7.98, 3.78)
530 14 14
531 The travel time for UGV from depot B to NW UGV stop
    is: 3385
532 The UGV travel time between two UGV stops is: 4731
533 ****
      **
534 UGV route goes infeasible although UAV has a
    solution
535 ****
      **
536 55935220.5
537 End node is [18]
538 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
539 [25, 26, 27]
540 *****No solution found*****
541 2
542 Start point is: 2
543 16
544 16
545 (8.6, 4.29) (5.28, 5.71)
```

```
546 15 14
547 The travel time for UGV from depot B to NW UGV stop
is: 3516
548 The UGV travel time between two UGV stops is: 5214
549 ****
**  

550 UGV route goes infeasible although UAV has a
solution
551 ****
**  

552 25732435.5
553 End node is [24]
554 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17, 18, 19, 20, 21, 22, 23]
555 [25, 26, 27, 28, 29, 30]
556 Objective: 6000000
557 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 25 26 27 28 29 30
558 31
559 Route for vehicle 0:
560 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
561 Distance of the route: 0 ft
562 Remaining Fuel of the route: 287700
563 Total Time of the route: 0 seconds
564
565 Total Distance of all routes: 0 ft
566 Total Fuel remaining of all routes: 287700
567 Total Time of all routes: 0 seconds
568 2
569 Start point is: 2
570 16
571 16
572 (5.88, 8.09) (7.98, 3.78)
573 14 14
574 The travel time for UGV from depot B to NW UGV stop
is: 4465
575 The UGV travel time between two UGV stops is: 5840
576 ****
**  

577 UGV route goes infeasible although UAV has a
```

```
577 solution
578 ****
579 29163882.0
580 End node is [24]
581 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
   15, 16, 17, 18, 19, 20, 21, 22, 23]
582 [25, 26, 27]
583 Objective: 3000000
584 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
   16 17 18 19 20 21 22 23 25 26 27
585 28
586 Route for vehicle 0:
587 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
   Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
588 Distance of the route: 0 ft
589 Remaining Fuel of the route: 287700
590 Total Time of the route: 0 seconds
591
592 Total Distance of all routes: 0 ft
593 Total Fuel remaining of all routes: 287700
594 Total Time of all routes: 0 seconds
595 4
596 Start point is: 4
597 31
598 16
599 (8.29, 4.03) (5.4, 6.19)
600 14 15
601 The travel time for UGV from depot B to NW UGV stop
   is: 5065
602 The UGV travel time between two UGV stops is: 4963
603 21089481.0
604 End node is [24]
605 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
   15, 16, 17, 18, 19, 20, 21, 22, 23]
606 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
   , 38, 39, 40, 41]
607 Objective: 17000000
608 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
   16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
   34 35 36 37 38 39 40 41
```

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609 42
610 Route for vehicle 0:
611 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
612 Distance of the route: 0 ft
613 Remaining Fuel of the route: 287700
614 Total Time of the route: 0 seconds
615
616 Total Distance of all routes: 0 ft
617 Total Fuel remaining of all routes: 287700
618 Total Time of all routes: 0 seconds
619 3
620 Start point is: 3
621 16
622 16
623 (5.4, 6.19) (8.6, 4.29)
624 14 14
625 The travel time for UGV from depot B to NW UGV stop
    is: 3754
626 The UGV travel time between two UGV stops is: 5402
627 ****
**  

628 UGV route goes infeasible although UAV has a
    solution
629 ****
**  

630 54110971.5
631 End node is [18]
632 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
633 []
634 *****No solution found*****
635 2
636 Start point is: 2
637 16
638 16
639 (8.29, 4.03) (5.28, 5.71)
640 14 15
641 The travel time for UGV from depot B to NW UGV stop
    is: 3616
642 The UGV travel time between two UGV stops is: 4787
```

```
643 24328209.0
644 End node is [24]
645 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
646 [25, 26, 27, 28, 29, 30, 31]
647 Objective: 7000000
648 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
649 32
650 Route for vehicle 0:
651 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
652 Distance of the route: 0 ft
653 Remaining Fuel of the route: 287700
654 Total Time of the route: 0 seconds
655
656 Total Distance of all routes: 0 ft
657 Total Fuel remaining of all routes: 287700
658 Total Time of all routes: 0 seconds
659 4
660 Start point is: 4
661 31
662 16
663 (4.92, 4.29) (8.91, 4.54)
664 15 15
665 The travel time for UGV from depot B to NW UGV stop
    is: 1379
666 The UGV travel time between two UGV stops is: 4555
667 11419224.0
668 End node is [24]
669 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
670 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39]
671 Objective: 15000000
672 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39
673 40
674 Route for vehicle 0:
675 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
```

```
675 Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
676 Distance of the route: 0 ft
677 Remaining Fuel of the route: 287700
678 Total Time of the route: 0 seconds
679
680 Total Distance of all routes: 0 ft
681 Total Fuel remaining of all routes: 287700
682 Total Time of all routes: 0 seconds
683 5
684 Start point is: 5
685 16
686 31
687 (7.06, 3.02) (5.52, 6.66)
688 15 14
689 The travel time for UGV from depot B to NW UGV stop
is: 841
690 The UGV travel time between two UGV stops is: 4829
691 11110332.0
692 End node is [24]
693 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17, 18, 19, 20, 21, 22, 23]
694 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
, 38, 39]
695 Objective: 15000000
696 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39
697 40
698 Route for vehicle 0:
699 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
700 Distance of the route: 0 ft
701 Remaining Fuel of the route: 287700
702 Total Time of the route: 0 seconds
703
704 Total Distance of all routes: 0 ft
705 Total Fuel remaining of all routes: 287700
706 Total Time of all routes: 0 seconds
707 3
708 Start point is: 3
709 16
```

```
710 16
711 (8.91, 4.54) (5.28, 5.71)
712 15 15
713 The travel time for UGV from depot B to NW UGV stop
    is: 3786
714 The UGV travel time between two UGV stops is: 5069
715 ****
    **
716 UGV route goes infeasible although UAV has a
    solution
717 ****
    **
718 53773837.5
719 End node is [18]
720 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
721 []
722 *****No solution found*****
723 4
724 Start point is: 4
725 31
726 16
727 (7.68, 3.53) (5.64, 7.14)
728 14 14
729 The travel time for UGV from depot B to NW UGV stop
    is: 4767
730 The UGV travel time between two UGV stops is: 5323
731 21202842.0
732 End node is [24]
733 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
734 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43]
735 Objective: 19000000
736 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43
737 44
738 Route for vehicle 0:
739 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
```

```
740 Distance of the route: 0 ft
741 Remaining Fuel of the route: 287700
742 Total Time of the route: 0 seconds
743
744 Total Distance of all routes: 0 ft
745 Total Fuel remaining of all routes: 287700
746 Total Time of all routes: 0 seconds
747 4
748 Start point is: 4
749 31
750 16
751 (7.37, 3.27) (5.4, 6.19)
752 14 14
753 The travel time for UGV from depot B to NW UGV stop
    is: 4612
754 The UGV travel time between two UGV stops is: 4799
755 19362517.5
756 End node is [24]
757 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
758 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44]
759 Objective: 20000000
760 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44
761 45
762 Route for vehicle 0:
763 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
764 Distance of the route: 0 ft
765 Remaining Fuel of the route: 287700
766 Total Time of the route: 0 seconds
767
768 Total Distance of all routes: 0 ft
769 Total Fuel remaining of all routes: 287700
770 Total Time of all routes: 0 seconds
771 3
772 Start point is: 3
773 16
774 16
```

```
775 (5.28, 5.71) (8.29, 4.03)
776 15 15
777 The travel time for UGV from depot B to NW UGV stop
    is: 3430
778 The UGV travel time between two UGV stops is: 4787
779 ****
    **
780 UGV route goes infeasible although UAV has a
    solution
781 ****
    **
782 52125316.5
783 End node is [18]
784 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
785 [25]
786 *****No solution found*****
787 3
788 Start point is: 3
789 16
790 16
791 (5.88, 8.09) (8.6, 4.29)
792 15 14
793 The travel time for UGV from depot B to NW UGV stop
    is: 4296
794 The UGV travel time between two UGV stops is: 6141
795 ****
    **
796 UGV route goes infeasible although UAV has a
    solution
797 ****
    **
798 58985812.5
799 End node is [18]
800 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
801 []
802 *****No solution found*****
803 3
804 Start point is: 3
805 16
```

```
806 16
807 (7.98, 3.78) (4.8, 3.81)
808 15 15
809 The travel time for UGV from depot B to NW UGV stop
is: 3363
810 The UGV travel time between two UGV stops is: 3956
811 ****
812 UGV route goes infeasible although UAV has a
solution
813 ****
814 41815876.5
815 End node is [18]
816 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17]
817 []
818 *****No solution found*****
819 3
820 Start point is: 3
821 16
822 16
823 (8.91, 4.54) (5.04, 4.76)
824 14 15
825 The travel time for UGV from depot B to NW UGV stop
is: 3946
826 The UGV travel time between two UGV stops is: 4724
827 ****
828 UGV route goes infeasible although UAV has a
solution
829 ****
830 53135955.0
831 End node is [18]
832 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17]
833 [25]
834 *****No solution found*****
835 3
836 Start point is: 3
```

```
837 16
838 16
839 (5.64, 7.14) (8.91, 4.54)
840 14 14
841 The travel time for UGV from depot B to NW UGV stop
is: 4124
842 The UGV travel time between two UGV stops is: 5923
843 ****
844 **
845 UGV route goes infeasible although UAV has a
solution
846 ****
847 **
848 End node is [18]
849 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17]
850 []
851 ****No solution found****
852 3
853 Start point is: 3
854 16
855 16
856 (5.16, 5.24) (8.91, 4.54)
857 14 14
858 The travel time for UGV from depot B to NW UGV stop
is: 3385
859 ****
860 **
861 UGV route goes infeasible although UAV has a
solution
862 ****
863 **
864 End node is [18]
865 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17]
866 []
867 ****No solution found****
868 3
```

```
868 Start point is: 3
869 16
870 16
871 (5.16, 5.24) (8.29, 4.03)
872 14 14
873 The travel time for UGV from depot B to NW UGV stop
is: 3385
874 The UGV travel time between two UGV stops is: 4882
875 ****
876 UGV route goes infeasible although UAV has a
solution
877 ****
878 47373462.0
879 End node is [18]
880 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17]
881 [25, 26]
882 Objective: 7096
883 Dropped nodes: 2 3 4 5 6 7 8 9 10 11 13 14 15 16
884 27
885 27
886 27
887 27
888 27
889 27
890 27
891 27
892 27
893 27
894 27
895 27
896 Route for vehicle 0:
897 0 Fuel(287700) Time(1557,1557) Slack(60) FuelSlack(0
,0) Distance(0) -> 22 Fuel(85854) Time(2636,2636)
Slack(120) FuelSlack(0,0) Distance(33641) -> 21 Fuel
(70488) Time(2833,2833) Slack(120) FuelSlack(0,0)
Distance(36202) -> 23 Fuel(39444) Time(3109,3109)
Slack(120) FuelSlack(0,0) Distance(41376) -> 1 Fuel(
8400) Time(3385,3385) Slack(898) FuelSlack(12375,
```

```
897 49723) Distance(46550) -> 24 Fuel(275325) Time(4360,  
        4387) Slack(27) FuelSlack(0,0) Distance(49111) -> 17  
        Fuel(28948) Time(5658,5751) Slack(832) FuelSlack(  
        93752,151648) Distance(90174) -> 20 Fuel(193948)  
        Time(8111,8204) Slack(27) FuelSlack(0,0) Distance(  
        140609) -> 26 Fuel(54382) Time(8935,9028) Slack(27)  
        FuelSlack(0,0) Distance(163870) -> 25 Fuel(41764)  
        Time(9118,9211) Slack(27) FuelSlack(0,0) Distance(  
        165973) -> 12 Fuel(28948) Time(9302,9395) Slack(832)  
        ) FuelSlack(0,68392) Distance(168109) -> 19 Fuel(  
        287700) Time(10982,11075) Slack(27) FuelSlack(0,0)  
        Distance(193038) -> 18 Fuel(39444) Time(12355,12355)  
        ) Distance(234414)  
898 Distance of the route: 234414 ft  
899 Remaining Fuel of the route: 39444  
900 Total Time of the route: 12355 seconds  
901  
902 Total Distance of all routes: 234414 ft  
903 Total Fuel remaining of all routes: 39444  
904 Total Time of all routes: 12355 seconds  
905 3  
906 Start point is: 3  
907 16  
908 16  
909 (4.92, 4.29) (7.06, 3.02)  
910 15 15  
911 The travel time for UGV from depot B to NW UGV stop  
    is: 2916  
912 The UGV travel time between two UGV stops is: 3710  
913 ****  
    **  
914 UGV route goes infeasible although UAV has a  
    solution  
915 ****  
    **  
916 40349949.0  
917 End node is [18]  
918 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
    15, 16, 17]  
919 [25, 26, 27, 28, 29, 30, 31, 32]  
920 Objective: 5669
```

```
921 Dropped nodes: 2 3 4 5 6 7 8 9 11 12 13 14 16 17
922 33
923 33
924 33
925 33
926 33
927 33
928 33
929 33
930 33
931 33
932 33
933 33
934 33
935 33
936 33
937 33
938 33
939 33
940 Route for vehicle 0:
941 0 Fuel(287700) Time(1537,1537) Slack(45) FuelSlack(0,0) Distance(0) -> 25 Fuel(132570) Time(2365,2380) Slack(105) FuelSlack(0,0) Distance(25855) -> 24 Fuel(117204) Time(2562,2577) Slack(105) FuelSlack(0,0) Distance(28416) -> 1 Fuel(70794) Time(2916,2931) Slack(697) FuelSlack(15366,86160) Distance(36151) -> 26 Fuel(272334) Time(3690,3933) Slack(0) FuelSlack(0,0) Distance(38712) -> 15 Fuel(52716) Time(4799,5162) Slack(755) FuelSlack(52716,54624) Distance(75315) -> 23 Fuel(287700) Time(6868,7231) Slack(0) FuelSlack(0,0) Distance(118687) -> 22 Fuel(272028) Time(6947,7430) Slack(0) FuelSlack(0,0) Distance(121299) -> 21 Fuel(256662) Time(7024,7627) Slack(0) FuelSlack(0,0) Distance(123860) -> 20 Fuel(240990) Time(7125,7826) Slack(0) FuelSlack(0,0) Distance(126472) -> 19 Fuel(225624) Time(7322,8023) Slack(0) FuelSlack(0,0) Distance(129033) -> 32 Fuel(77766) Time(8188,8889) Slack(0) FuelSlack(0,0) Distance(153676) -> 31 Fuel(65148) Time(8371,8978) Slack(0) FuelSlack(0,0) Distance(155779) -> 30 Fuel(52332) Time(8555,9042) Slack(0) FuelSlack(0,0)
```

```

941 Distance(157915) -> 29 Fuel(39714) Time(8738,9105)
    Slack(0) FuelSlack(0,0) Distance(160018) -> 28 Fuel(
    27342) Time(8920,9167) Slack(0) FuelSlack(0,0)
    Distance(162080) -> 27 Fuel(14526) Time(9104,9231)
    Slack(0) FuelSlack(0,0) Distance(164216) -> 10 Fuel(
    1908) Time(9287,9294) Slack(918) FuelSlack(0,287700
    ) Distance(166319) -> 18 Fuel(287700) Time(10850,
    10850) Distance(187405)
942 Distance of the route: 187405 ft
943 Remaining Fuel of the route: 287700
944 Total Time of the route: 10850 seconds
945
946 Total Distance of all routes: 187405 ft
947 Total Fuel remaining of all routes: 287700
948 Total Time of all routes: 10850 seconds
949 4
950 Start point is: 4
951 31
952 16
953 (5.4, 6.19) (7.06, 3.02)
954 15 14
955 The travel time for UGV from depot B to NW UGV stop
    is: 689
956 The UGV travel time between two UGV stops is: 4648
957 10108570.5
958 End node is [24]
959 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
960 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45]
961 Objective: 21000000
962 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44 45
963 46
964 Route for vehicle 0:
965 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
966 Distance of the route: 0 ft
967 Remaining Fuel of the route: 287700
968 Total Time of the route: 0 seconds

```

```
969
970 Total Distance of all routes: 0 ft
971 Total Fuel remaining of all routes: 287700
972 Total Time of all routes: 0 seconds
973 2
974 Start point is: 2
975 16
976 16
977 (8.6, 4.29) (5.04, 4.76)
978 15 14
979 The travel time for UGV from depot B to NW UGV stop
    is: 3516
980 The UGV travel time between two UGV stops is: 4844
981 24068965.5
982 End node is [24]
983 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
984 [25, 26, 27, 28, 29, 30, 31, 32]
985 Objective: 8000000
986 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32
987 33
988 Route for vehicle 0:
989 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
990 Distance of the route: 0 ft
991 Remaining Fuel of the route: 287700
992 Total Time of the route: 0 seconds
993
994 Total Distance of all routes: 0 ft
995 Total Fuel remaining of all routes: 287700
996 Total Time of all routes: 0 seconds
997 3
998 Start point is: 3
999 16
1000 16
1001 (7.06, 3.02) (5.04, 4.76)
1002 15 14
1003 The travel time for UGV from depot B to NW UGV stop
    is: 2941
```

```
1004 The UGV travel time between two UGV stops is: 4090
1005 ****
1006 ***  
1006 UGV route goes infeasible although UAV has a
1006 solution
1007 ****
1007 ***
1008 44448616.5
1009 End node is [18]
1010 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
1010 15, 16, 17]
1011 [25, 26, 27, 28, 29, 30, 31]
1012 Objective: 6295
1013 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 13 14 15 16
1014 32
1015 32
1016 32
1017 32
1018 32
1019 32
1020 32
1021 32
1022 32
1023 32
1024 32
1025 32
1026 32
1027 32
1028 32
1029 32
1030 32
1031 Route for vehicle 0:
1032 0 Fuel(278251) Time(1540,1540) Slack(60) FuelSlack(
1032 0,0) Distance(0) -> 26 Fuel(139117) Time(2302,2302
1032 ) Slack(120) FuelSlack(0,0) Distance(23189) -> 27
Fuel(126301) Time(2486,2486) Slack(120) FuelSlack(0
1032 ,0) Distance(25325) -> 31 Fuel(75883) Time(2860,
2860) Slack(120) FuelSlack(0,0) Distance(33728) ->
30 Fuel(63265) Time(3043,3043) Slack(120) FuelSlack
1032 (0,0) Distance(35831) -> 29 Fuel(50449) Time(3227,
3227) Slack(120) FuelSlack(0,0) Distance(37967) ->
```

```

1032 28 Fuel(37831) Time(3410,3410) Slack(120) FuelSlack
    (0,0) Distance(40070) -> 6 Fuel(25) Time(3720,3720
    ) Slack(925) FuelSlack(27443,27493) Distance(46371
    ) -> 23 Fuel(260257) Time(5217,5217) Slack(120)
    FuelSlack(0,0) Distance(65265) -> 17 Fuel(25) Time(
    6651,6651) Slack(925) FuelSlack(178877,178927)
    Distance(108637) -> 19 Fuel(108823) Time(9176,9176
    ) Slack(120) FuelSlack(0,0) Distance(161443) -> 20
    Fuel(93457) Time(9373,9373) Slack(120) FuelSlack(0,
    0) Distance(164004) -> 21 Fuel(77785) Time(9572,
    9572) Slack(120) FuelSlack(0,0) Distance(166616
    ) -> 22 Fuel(62419) Time(9769,9769) Slack(120)
    FuelSlack(0,0) Distance(169177) -> 24 Fuel(31069)
    Time(10047,10047) Slack(120) FuelSlack(0,0)
    Distance(174402) -> 12 Fuel(25) Time(10323,10323)
    Slack(925) FuelSlack(15672,15697) Distance(179576
    ) -> 25 Fuel(272028) Time(11327,11327) Slack(120)
    FuelSlack(0,0) Distance(182188) -> 18 Fuel(116898)
    Time(12230,12230) Distance(208043)

1033 Distance of the route: 208043 ft
1034 Remaining Fuel of the route: 116898
1035 Total Time of the route: 12230 seconds
1036
1037 Total Distance of all routes: 208043 ft
1038 Total Fuel remaining of all routes: 116898
1039 Total Time of all routes: 12230 seconds
1040 2
1041 Start point is: 2
1042 16
1043 16
1044 (8.29, 4.03) (4.8, 3.81)
1045 15 14
1046 The travel time for UGV from depot B to NW UGV stop
    is: 3375
1047 The UGV travel time between two UGV stops is: 4324
1048 21700785.0
1049 End node is [24]
1050 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1051 [25, 26]
1052 Objective: 2000000

```

```

1053 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26
1054 27
1055 Route for vehicle 0:
1056 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1057 Distance of the route: 0 ft
1058 Remaining Fuel of the route: 287700
1059 Total Time of the route: 0 seconds
1060
1061 Total Distance of all routes: 0 ft
1062 Total Fuel remaining of all routes: 287700
1063 Total Time of all routes: 0 seconds
1064 2
1065 Start point is: 2
1066 16
1067 16
1068 (7.68, 3.53) (5.88, 8.09)
1069 15 14
1070 The travel time for UGV from depot B to NW UGV stop
    is: 3097
1071 The UGV travel time between two UGV stops is: 5693
1072 ****
    ***
1073 UGV route goes infeasible although UAV has a
    solution
1074 ****
    ***
1075 27967134.0
1076 End node is [24]
1077 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1078 [25, 26, 27, 28]
1079 Objective: 4000000
1080 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28
1081 29
1082 Route for vehicle 0:
1083 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )

```

```
1083 )
1084 Distance of the route: 0 ft
1085 Remaining Fuel of the route: 287700
1086 Total Time of the route: 0 seconds
1087
1088 Total Distance of all routes: 0 ft
1089 Total Fuel remaining of all routes: 287700
1090 Total Time of all routes: 0 seconds
1091 5
1092 Start point is: 5
1093 16
1094 31
1095 (8.6, 4.29) (5.76, 7.62)
1096 15 14
1097 The travel time for UGV from depot B to NW UGV stop
    is: 140
1098 The UGV travel time between two UGV stops is: 5957
1099 23644701.0
1100 End node is [24]
1101 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1102 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40]
1103 Objective: 16000000
1104 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40
1105 41
1106 Route for vehicle 0:
1107 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1108 Distance of the route: 0 ft
1109 Remaining Fuel of the route: 287700
1110 Total Time of the route: 0 seconds
1111
1112 Total Distance of all routes: 0 ft
1113 Total Fuel remaining of all routes: 287700
1114 Total Time of all routes: 0 seconds
1115 3
1116 Start point is: 3
```

```
1117 16
1118 16
1119 (7.68, 3.53) (4.8, 3.81)
1120 14 14
1121 The travel time for UGV from depot B to NW UGV stop
    is: 3347
1122 The UGV travel time between two UGV stops is: 4026
1123 ****
***  

1124 UGV route goes infeasible although UAV has a
    solution
1125 ****
***  

1126 44061463.5
1127 End node is [18]
1128 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
1129 []
1130 *****No solution found*****
1131 3
1132 Start point is: 3
1133 16
1134 16
1135 (5.76, 7.62) (7.98, 3.78)
1136 14 14
1137 The travel time for UGV from depot B to NW UGV stop
    is: 4309
1138 The UGV travel time between two UGV stops is: 5655
1139 ****
***  

1140 UGV route goes infeasible although UAV has a
    solution
1141 ****
***  

1142 60935248.5
1143 End node is [18]
1144 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
1145 []
1146 *****No solution found*****
1147 3
```

```
1148 Start point is: 3
1149 16
1150 16
1151 (8.29, 4.03) (5.88, 8.09)
1152 15 15
1153 The travel time for UGV from depot B to NW UGV stop
    is: 3504
1154 The UGV travel time between two UGV stops is: 5653
1155 ****
1156 *** UGV route goes infeasible although UAV has a
    solution
1157 ****
1158 ***
1159 End node is [18]
1160 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
1161 []
1162 ****No solution found****
1163 4
1164 Start point is: 4
1165 31
1166 16
1167 (5.76, 7.62) (7.06, 3.02)
1168 15 14
1169 The travel time for UGV from depot B to NW UGV stop
    is: 172
1170 The UGV travel time between two UGV stops is: 5202
1171 10538544.0
1172 End node is [24]
1173 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1174 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45]
1175 Objective: 21000000
1176 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44 45
1177 46
1178 Route for vehicle 0:
```

```
1179 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1180 Distance of the route: 0 ft
1181 Remaining Fuel of the route: 287700
1182 Total Time of the route: 0 seconds
1183
1184 Total Distance of all routes: 0 ft
1185 Total Fuel remaining of all routes: 287700
1186 Total Time of all routes: 0 seconds
1187 5
1188 Start point is: 5
1189 16
1190 31
1191 (8.29, 4.03) (5.76, 7.62)
1192 14 15
1193 The travel time for UGV from depot B to NW UGV stop
    is: 301
1194 The UGV travel time between two UGV stops is: 5480
1195 22592505.0
1196 End node is [24]
1197 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1198 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40]
1199 Objective: 16000000
1200 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40
1201 41
1202 Route for vehicle 0:
1203 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1204 Distance of the route: 0 ft
1205 Remaining Fuel of the route: 287700
1206 Total Time of the route: 0 seconds
1207
1208 Total Distance of all routes: 0 ft
1209 Total Fuel remaining of all routes: 287700
1210 Total Time of all routes: 0 seconds
```

```
1211 4
1212 Start point is: 4
1213 31
1214 16
1215 (7.98, 3.78) (5.4, 6.19)
1216 15 14
1217 The travel time for UGV from depot B to NW UGV stop
    is: 4586
1218 The UGV travel time between two UGV stops is: 5100
1219 19779780.0
1220 End node is [24]
1221 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1222 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42]
1223 Objective: 18000000
1224 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42
1225 43
1226 Route for vehicle 0:
1227 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1228 Distance of the route: 0 ft
1229 Remaining Fuel of the route: 287700
1230 Total Time of the route: 0 seconds
1231
1232 Total Distance of all routes: 0 ft
1233 Total Fuel remaining of all routes: 287700
1234 Total Time of all routes: 0 seconds
1235 3
1236 Start point is: 3
1237 16
1238 16
1239 (7.68, 3.53) (5.04, 4.76)
1240 14 14
1241 The travel time for UGV from depot B to NW UGV stop
    is: 3347
1242 The UGV travel time between two UGV stops is: 4395
1243 *****
```

```
1243 ***
1244 UGV route goes infeasible although UAV has a
    solution
1245 ****
    ***
1246 48835117.5
1247 End node is [18]
1248 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
1249 [25, 26, 27, 28, 29]
1250 Objective: 7285
1251 Dropped nodes: 1 3 4 6 7 8 9 10 11 13 14 15 17
1252 30
1253 30
1254 30
1255 30
1256 30
1257 30
1258 30
1259 30
1260 30
1261 30
1262 30
1263 30
1264 30
1265 30
1266 30
1267 30
1268 Route for vehicle 0:
1269 0 Fuel(286453) Time(1597,1597) Slack(60) FuelSlack(
    0,0) Distance(0) -> 25 Fuel(131323) Time(2440,2440
    ) Slack(120) FuelSlack(0,0) Distance(25855) -> 27
    Fuel(25015) Time(3096,3096) Slack(120) FuelSlack(0,
    0) Distance(43573) -> 26 Fuel(12397) Time(3279,3279
    ) Slack(120) FuelSlack(0,0) Distance(45676) -> 2
    Fuel(25) Time(3461,3461) Slack(925) FuelSlack(50418
    ,50443) Distance(47738) -> 29 Fuel(237282) Time(
    4640,4640) Slack(120) FuelSlack(0,0) Distance(56141
    ) -> 28 Fuel(224664) Time(4823,4823) Slack(120)
    FuelSlack(0,0) Distance(58244) -> 5 Fuel(186858)
    Time(5133,5133) Slack(324) FuelSlack(196806,196831
```

```

1269 ) Distance(64545) -> 22 Fuel(277752) Time(6066,6066
      ) Slack(120) FuelSlack(0,0) Distance(84668) -> 24
      Fuel(246402) Time(6344,6344) Slack(120) FuelSlack(0
      ,0) Distance(89893) -> 16 Fuel(25) Time(7708,7708)
      Slack(925) FuelSlack(178877,178927) Distance(130956
      ) -> 19 Fuel(108823) Time(10233,10233) Slack(120)
      FuelSlack(0,0) Distance(183762) -> 20 Fuel(93457)
      Time(10430,10430) Slack(120) FuelSlack(0,0)
      Distance(186323) -> 21 Fuel(77785) Time(10629,10629
      ) Slack(120) FuelSlack(0,0) Distance(188935) -> 12
      Fuel(25) Time(11141,11141) Slack(925) FuelSlack(0,
      101551) Distance(201895) -> 23 Fuel(287700) Time(
      12301,12301) Slack(120) FuelSlack(0,0) Distance(
      209681) -> 18 Fuel(101526) Time(13361,13361)
      Distance(240710)

1270 Distance of the route: 240710 ft
1271 Remaining Fuel of the route: 101526
1272 Total Time of the route: 13361 seconds
1273
1274 Total Distance of all routes: 240710 ft
1275 Total Fuel remaining of all routes: 101526
1276 Total Time of all routes: 13361 seconds
1277 4
1278 Start point is: 4
1279 31
1280 16
1281 (5.64, 7.14) (7.68, 3.53)
1282 14 15
1283 The travel time for UGV from depot B to NW UGV stop
      is: 369
1284 The UGV travel time between two UGV stops is: 5030
1285 10545931.5
1286 End node is [24]
1287 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
1288 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43]
1289 Objective: 19000000
1290 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
      34 35 36 37 38 39 40 41 42 43

```

```
1291 44
1292 Route for vehicle 0:
1293 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1294 Distance of the route: 0 ft
1295 Remaining Fuel of the route: 287700
1296 Total Time of the route: 0 seconds
1297
1298 Total Distance of all routes: 0 ft
1299 Total Fuel remaining of all routes: 287700
1300 Total Time of all routes: 0 seconds
1301 2
1302 Start point is: 2
1303 16
1304 16
1305 (5.28, 5.71) (8.6, 4.29)
1306 15 15
1307 The travel time for UGV from depot B to NW UGV stop
    is: 3301
1308 The UGV travel time between two UGV stops is: 4928
1309 24725494.5
1310 End node is [24]
1311 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1312 [25, 26, 27, 28, 29, 30]
1313 Objective: 6000000
1314 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30
1315 31
1316 Route for vehicle 0:
1317 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1318 Distance of the route: 0 ft
1319 Remaining Fuel of the route: 287700
1320 Total Time of the route: 0 seconds
1321
1322 Total Distance of all routes: 0 ft
1323 Total Fuel remaining of all routes: 287700
1324 Total Time of all routes: 0 seconds
```

```
1325 3
1326 Start point is: 3
1327 16
1328 16
1329 (5.04, 4.76) (7.68, 3.53)
1330 15 14
1331 The travel time for UGV from depot B to NW UGV stop
    is: 3085
1332 The UGV travel time between two UGV stops is: 4395
1333 ****
***  
1334 UGV route goes infeasible although UAV has a
    solution
1335 ****
***  
1336 46192956.0
1337 End node is [18]
1338 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
1339 [25, 26, 27, 28, 29]
1340 *****No solution found*****  
1341 4
1342 Start point is: 4
1343 31
1344 16
1345 (5.28, 5.71) (7.37, 3.27)
1346 14 15
1347 The travel time for UGV from depot B to NW UGV stop
    is: 924
1348 The UGV travel time between two UGV stops is: 4365
1349 10170226.5
1350 End node is [24]
1351 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33]
1352 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44]
1353 Objective: 20000000
1354 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44
1355 45
```

```
1356 Route for vehicle 0:  
1357 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0  
    )  
1358 Distance of the route: 0 ft  
1359 Remaining Fuel of the route: 287700  
1360 Total Time of the route: 0 seconds  
1361  
1362 Total Distance of all routes: 0 ft  
1363 Total Fuel remaining of all routes: 287700  
1364 Total Time of all routes: 0 seconds  
1365 4  
1366 Start point is: 4  
1367 31  
1368 16  
1369 (7.37, 3.27) (4.92, 4.29)  
1370 15 14  
1371 The travel time for UGV from depot B to NW UGV stop  
    is: 4304  
1372 The UGV travel time between two UGV stops is: 4060  
1373 16994889.0  
1374 End node is [24]  
1375 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
    15, 16, 17, 18, 19, 20, 21, 22, 23]  
1376 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37  
    , 38, 39, 40, 41, 42, 43, 44]  
1377 Objective: 20000000  
1378 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33  
    34 35 36 37 38 39 40 41 42 43 44  
1379 45  
1380 Route for vehicle 0:  
1381 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0  
    )  
1382 Distance of the route: 0 ft  
1383 Remaining Fuel of the route: 287700  
1384 Total Time of the route: 0 seconds  
1385  
1386 Total Distance of all routes: 0 ft  
1387 Total Fuel remaining of all routes: 287700
```

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1388 Total Time of all routes: 0 seconds
1389 4
1390 Start point is: 4
1391 31
1392 16
1393 (5.4, 6.19) (7.98, 3.78)
1394 15 15
1395 The travel time for UGV from depot B to NW UGV stop
    is: 689
1396 The UGV travel time between two UGV stops is: 4822
1397 10542067.5
1398 End node is [24]
1399 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1400 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42]
1401 Objective: 18000000
1402 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42
1403 43
1404 Route for vehicle 0:
1405 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1406 Distance of the route: 0 ft
1407 Remaining Fuel of the route: 287700
1408 Total Time of the route: 0 seconds
1409
1410 Total Distance of all routes: 0 ft
1411 Total Fuel remaining of all routes: 287700
1412 Total Time of all routes: 0 seconds
1413 4
1414 Start point is: 4
1415 31
1416 16
1417 (4.92, 4.29) (8.6, 4.29)
1418 14 14
1419 The travel time for UGV from depot B to NW UGV stop
    is: 1478
1420 The UGV travel time between two UGV stops is: 4663
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1421 12321832.5
1422 End node is [24]
1423 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1424 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40]
1425 Objective: 16000000
1426 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40
1427 41
1428 Route for vehicle 0:
1429 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1430 Distance of the route: 0 ft
1431 Remaining Fuel of the route: 287700
1432 Total Time of the route: 0 seconds
1433
1434 Total Distance of all routes: 0 ft
1435 Total Fuel remaining of all routes: 287700
1436 Total Time of all routes: 0 seconds
1437 4
1438 Start point is: 4
1439 31
1440 16
1441 (5.88, 8.09) (7.68, 3.53)
1442 15 15
1443 The travel time for UGV from depot B to NW UGV stop
    is: 0
1444 The UGV travel time between two UGV stops is: 5375
1445 10804759.5
1446 End node is [24]
1447 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1448 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43]
1449 Objective: 19000000
1450 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43

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1451 44
1452 Route for vehicle 0:
1453 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1454 Distance of the route: 0 ft
1455 Remaining Fuel of the route: 287700
1456 Total Time of the route: 0 seconds
1457
1458 Total Distance of all routes: 0 ft
1459 Total Fuel remaining of all routes: 287700
1460 Total Time of all routes: 0 seconds
1461 5
1462 Start point is: 5
1463 16
1464 31
1465 (7.98, 3.78) (5.52, 6.66)
1466 14 15
1467 The travel time for UGV from depot B to NW UGV stop
    is: 452
1468 The UGV travel time between two UGV stops is: 4991
1469 10883413.5
1470 End node is [24]
1471 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1472 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39]
1473 Objective: 15000000
1474 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39
1475 40
1476 Route for vehicle 0:
1477 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
1478 Distance of the route: 0 ft
1479 Remaining Fuel of the route: 287700
1480 Total Time of the route: 0 seconds
1481
1482 Total Distance of all routes: 0 ft
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1483 Total Fuel remaining of all routes: 287700
1484 Total Time of all routes: 0 seconds
1485 Candidate 1: [88, 14, 14, 7, 20, 5000000, 2]
1486 Candidate 2: [14, 15, 15, 9, 48, 20000000, 4]
1487 Candidate 1: [102, 14, 15, 5, 31, 18000000, 4]
1488 Candidate 2: [59, 14, 14, 10, 3, 16000000, 4]
1489 Father before deletion: [88, 14, 14, 7, 20, 5000000
, 2]
1490 Mother before deletion: [59, 14, 14, 10, 3,
16000000, 4]
1491 Father after deletion: [88, 14, 14, 7, 20, 2]
1492 Mother after deletion: [59, 14, 14, 10, 3, 4]
1493 01011000000011100000111000001110001010000000010
1494 001110110000111000001110000010100000001100000100
1495 Offspring1 after mutation:
01011011000011100000111000001110001010000000010
1496 Offspring2 after mutation:
001110000000111000001110000010100000001100000100
1497 48 48
1498 [91, 14, 14, 7, 20, 2]
1499 [56, 14, 14, 10, 3, 4]
1500 Candidate 1: [8, 15, 14, 40, 10, 15000000, 5]
1501 Candidate 2: [66, 15, 15, 45, 19, 50000000, 3]
1502 Candidate 1: [71, 14, 15, 5, 3, 5000000, 2]
1503 Candidate 2: [60, 15, 14, 32, 29, 16000000, 5]
1504 Father before deletion: [8, 15, 14, 40, 10,
15000000, 5]
1505 Mother before deletion: [71, 14, 15, 5, 3, 5000000
, 2]
1506 Father after deletion: [8, 15, 14, 40, 10, 5]
1507 Mother after deletion: [71, 14, 15, 5, 3, 2]
1508 000010000000111100001110001010000000101000000101
1509 01000111000011100000111100001010000001100000010
1510 Offspring1 after mutation:
00001000000011110000111100001010000101000000101
1511 Offspring2 after mutation:
010001110000111000001110001010000000001100000010
1512 48 48
1513 [8, 15, 15, 5, 10, 5]
1514 [71, 14, 14, 40, 3, 2]
1515 Candidate 1: [10, 14, 15, 47, 25, 21000000, 4]

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1516 Candidate 2: [80, 15, 14, 36, 21, 21000000, 4]
1517 Candidate 1: [91, 15, 15, 37, 7, 50000000, 3]
1518 Candidate 2: [133, 15, 15, 18, 9, 15000000, 4]
1519 Father before deletion: [10, 14, 15, 47, 25,
    21000000, 4]
1520 Mother before deletion: [133, 15, 15, 18, 9,
    15000000, 4]
1521 Father after deletion: [10, 14, 15, 47, 25, 4]
1522 Mother after deletion: [133, 15, 15, 18, 9, 4]
1523 000010100000111000001111001011110001100100000100
1524 100001010000111100001111000100100000100100000100
1525 Offspring1 after mutation:
    000010100000111000001111001011110001100100000100
1526 Offspring2 after mutation:
    100001010000111100001111000100100000100100000100
1527 48 48
1528 [10, 14, 15, 47, 25, 4]
1529 [133, 15, 15, 18, 9, 4]
1530 Candidate 1: [29, 14, 14, 35, 40, 19000000, 4]
1531 Candidate 2: [102, 14, 15, 5, 31, 18000000, 4]
1532 Candidate 1: [54, 15, 14, 30, 37, 8000000, 2]
1533 Candidate 2: [77, 15, 14, 24, 4, 21000000, 4]
1534 Father before deletion: [102, 14, 15, 5, 31,
    18000000, 4]
1535 Mother before deletion: [54, 15, 14, 30, 37,
    8000000, 2]
1536 Father after deletion: [102, 14, 15, 5, 31, 4]
1537 Mother after deletion: [54, 15, 14, 30, 37, 2]
1538 011001100000111000001111000001010001111100000100
1539 001101100000111100001110000111100010010100000010
1540 Offspring1 after mutation:
    01100110000011110000111000001010001111100000100
1541 Offspring2 after mutation:
    001101100000111000001111000111100010010100000010
1542 48 48
1543 [102, 15, 14, 5, 31, 4]
1544 [54, 14, 15, 30, 37, 2]
1545 Candidate 1: [126, 15, 15, 41, 22, 6000000, 2]
1546 Candidate 2: [39, 15, 15, 11, 28, 18000000, 4]
1547 Candidate 1: [135, 14, 14, 46, 5, 50000000, 3]
1548 Candidate 2: [116, 15, 15, 25, 46, 50000000, 3]

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1549 Father before deletion: [126, 15, 15, 41, 22,
    6000000, 2]
1550 Mother before deletion: [135, 14, 14, 46, 5,
    50000000, 3]
1551 Father after deletion: [126, 15, 15, 41, 22, 2]
1552 Mother after deletion: [135, 14, 14, 46, 5, 3]
1553 011111100000111100001111001010010001011000000010
1554 100001110000111000001110001011100000010100000011
1555 Offspring1 after mutation:
    011111100000111100001110001011100000011000000010
1556 Offspring2 after mutation:
    100001110000111000001111001010010001010100000011
1557 48 48
1558 [126, 15, 14, 46, 6, 2]
1559 [135, 14, 15, 41, 21, 3]
1560 Candidate 1: [83, 14, 15, 48, 5, 5446, 5]
1561 Candidate 2: [116, 15, 15, 25, 46, 50000000, 3]
1562 Candidate 1: [37, 15, 14, 15, 16, 18000000, 4]
1563 Candidate 2: [83, 14, 15, 48, 5, 5446, 5]
1564 Candidate 1: [54, 15, 14, 30, 37, 8000000, 2]
1565 Candidate 2: [46, 14, 15, 13, 6, 7000000, 2]
1566 Father before deletion: [83, 14, 15, 48, 5, 5446, 5
    ]
1567 Mother before deletion: [46, 14, 15, 13, 6, 7000000
    , 2]
1568 Father after deletion: [83, 14, 15, 48, 5, 5]
1569 Mother after deletion: [46, 14, 15, 13, 6, 2]
1570 010100110000111000001111001100000000010100000101
1571 00101110000011100000111100001101000011000000010
1572 Offspring1 after mutation:
    01010011000011100000111100110000000010100000101
1573 Offspring2 after mutation:
    00101110000011100000111100001101000011000000010
1574 48 48
1575 [83, 14, 15, 48, 5, 5]
1576 [46, 14, 15, 13, 6, 2]
1577 Candidate 1: [74, 15, 15, 31, 12, 5447, 5]
1578 Candidate 2: [91, 15, 15, 37, 7, 50000000, 3]
1579 Candidate 1: [17, 14, 14, 11, 36, 20000000, 4]
1580 Candidate 2: [59, 14, 14, 10, 3, 16000000, 4]
1581 Father before deletion: [74, 15, 15, 31, 12, 5447,
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1581 5]
1582 Mother before deletion: [59, 14, 14, 10, 3,
    16000000, 4]
1583 Father after deletion: [74, 15, 15, 31, 12, 5]
1584 Mother after deletion: [59, 14, 14, 10, 3, 4]
1585 010010100000111100001111000111110000110000000101
1586 00111011000011100000111000001010000001100000100
1587 Offspring1 after mutation:
    010010100000111000001110000010100000010000000101
1588 Offspring2 after mutation:
    001110110000111100001111000111110000101100000100
1589 48 48
1590 [74, 14, 14, 10, 4, 5]
1591 [59, 15, 15, 31, 11, 4]
1592 Candidate 1: [138, 15, 15, 2, 33, 15000000, 5]
1593 Candidate 2: [66, 15, 15, 45, 19, 50000000, 3]
1594 Candidate 1: [64, 14, 15, 27, 42, 50000000, 3]
1595 Candidate 2: [59, 14, 14, 10, 3, 16000000, 4]
1596 Father before deletion: [138, 15, 15, 2, 33,
    15000000, 5]
1597 Mother before deletion: [59, 14, 14, 10, 3,
    16000000, 4]
1598 Father after deletion: [138, 15, 15, 2, 33, 5]
1599 Mother after deletion: [59, 14, 14, 10, 3, 4]
1600 100010100000111100001111000000100010000100000101
1601 00111011000011100000111000001010000001100000100
1602 Offspring1 after mutation:
    100010100000111100001111000000100010000100000101
1603 Offspring2 after mutation:
    00111011000011100000111000001010000001100000100
1604 48 48
1605 [138, 15, 15, 2, 33, 5]
1606 [59, 14, 14, 10, 3, 4]
1607 Candidate 1: [56, 15, 14, 21, 48, 11000000, 2]
1608 Candidate 2: [50, 14, 15, 47, 43, 16000000, 5]
1609 Candidate 1: [7, 14, 14, 12, 41, 21000000, 4]
1610 Candidate 2: [59, 14, 14, 10, 3, 16000000, 4]
1611 Father before deletion: [56, 15, 14, 21, 48,
    11000000, 2]
1612 Mother before deletion: [59, 14, 14, 10, 3,
    16000000, 4]
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1613 Father after deletion: [56, 15, 14, 21, 48, 2]
1614 Mother after deletion: [59, 14, 14, 10, 3, 4]
1615 0011100000011110000111000010101001100000000010
1616 001110110000111000011100001010000001100000100
1617 Offspring1 after mutation:
    0011100100001110000111000010101001100000000010
1618 Offspring2 after mutation:
    0011101000001111000011100001010000001100000100
1619 48 48
1620 [57, 14, 14, 21, 48, 2]
1621 [58, 15, 14, 10, 3, 4]
1622 Candidate 1: [105, 14, 14, 49, 50, 50000000, 3]
1623 Candidate 2: [37, 15, 14, 15, 16, 18000000, 4]
1624 Candidate 1: [14, 15, 15, 9, 48, 20000000, 4]
1625 Candidate 2: [118, 15, 15, 24, 30, 50000000, 3]
1626 Father before deletion: [37, 15, 14, 15, 16,
    18000000, 4]
1627 Mother before deletion: [14, 15, 15, 9, 48,
    20000000, 4]
1628 Father after deletion: [37, 15, 14, 15, 16, 4]
1629 Mother after deletion: [14, 15, 15, 9, 48, 4]
1630 001001010000111100001110000011110001000000000100
1631 000011100000111100001111000010010011000000000100
1632 Offspring1 after mutation:
    001001010000111100001111000011110001000000000100
1633 Offspring2 after mutation:
    000011100000111100001111000010010011000000000100
1634 48 48
1635 [37, 15, 15, 15, 16, 4]
1636 [14, 15, 14, 9, 48, 4]
1637 Candidate 1: [22, 14, 14, 6, 44, 50000000, 3]
1638 Candidate 2: [94, 15, 14, 42, 13, 50000000, 3]
1639 Candidate 1: [60, 15, 14, 32, 29, 16000000, 5]
1640 Candidate 2: [85, 14, 15, 19, 23, 5507, 5]
1641 Father before deletion: [22, 14, 14, 6, 44,
    50000000, 3]
1642 Mother before deletion: [85, 14, 15, 19, 23, 5507,
    5]
1643 Father after deletion: [22, 14, 14, 6, 44, 3]
1644 Mother after deletion: [85, 14, 15, 19, 23, 5]
1645 00010110000011100000111000001100010110000000011

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1646 010101010000111000001111000100110001011100000101
1647 Offspring1 after mutation:
    00010110000011100000111100010110001011000000011
1648 Offspring2 after mutation:
    010101010000111000001110000000110001011100000101
1649 48 48
1650 [22, 14, 15, 22, 44, 3]
1651 [85, 14, 14, 3, 23, 5]
1652 Candidate 1: [138, 15, 15, 2, 33, 15000000, 5]
1653 Candidate 2: [115, 14, 14, 3, 30, 5007096, 3]
1654 Candidate 1: [99, 14, 15, 8, 45, 19000000, 4]
1655 Candidate 2: [46, 14, 15, 13, 6, 7000000, 2]
1656 Father before deletion: [115, 14, 14, 3, 30,
    5007096, 3]
1657 Mother before deletion: [46, 14, 15, 13, 6, 7000000
    , 2]
1658 Father after deletion: [115, 14, 14, 3, 30, 3]
1659 Mother after deletion: [46, 14, 15, 13, 6, 2]
1660 011100110000111000001110000000110001111000000011
1661 00101110000011100000111100001101000011000000010
1662 Offspring1 after mutation:
    01110011000011100000111100001101000011000000011
1663 Offspring2 after mutation:
    001011100000111000001110000000110001111000000010
1664 48 48
1665 [115, 14, 15, 13, 6, 3]
1666 [46, 14, 14, 3, 30, 2]
1667 Candidate 1: [86, 14, 15, 28, 14, 20000000, 4]
1668 Candidate 2: [135, 14, 14, 46, 5, 50000000, 3]
1669 Candidate 1: [29, 14, 14, 35, 40, 19000000, 4]
1670 Candidate 2: [19, 14, 14, 27, 17, 12000000, 2]
1671 Father before deletion: [86, 14, 15, 28, 14,
    20000000, 4]
1672 Mother before deletion: [19, 14, 14, 27, 17,
    12000000, 2]
1673 Father after deletion: [86, 14, 15, 28, 14, 4]
1674 Mother after deletion: [19, 14, 14, 27, 17, 2]
1675 010101100000111000001111000111000000111000000100
1676 000100110000111000001110000110110001000100000010
1677 Offspring1 after mutation:
    010101100000111000001110000111000000111000000100
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1678 Offspring2 after mutation:  
    000100110000111000001111000110110001000100000010  
1679 48 48  
1680 [86, 14, 14, 28, 14, 4]  
1681 [19, 14, 15, 27, 17, 2]  
1682 Candidate 1: [66, 15, 15, 45, 19, 50000000, 3]  
1683 Candidate 2: [24, 14, 14, 34, 32, 5007285, 3]  
1684 Candidate 1: [121, 15, 15, 15, 13, 50000000, 3]  
1685 Candidate 2: [111, 14, 14, 21, 38, 8000000, 2]  
1686 Father before deletion: [24, 14, 14, 34, 32,  
    5007285, 3]  
1687 Mother before deletion: [111, 14, 14, 21, 38,  
    8000000, 2]  
1688 Father after deletion: [24, 14, 14, 34, 32, 3]  
1689 Mother after deletion: [111, 14, 14, 21, 38, 2]  
1690 00011000000011100000111000100010001000000000011  
1691 01101111000011100000111000010101001001100000010  
1692 Offspring1 after mutation:  
    00011000000011100000111000010101001000000000011  
1693 Offspring2 after mutation:  
    01101111000011100000111000100010001001100000010  
1694 48 48  
1695 [24, 14, 14, 21, 32, 3]  
1696 [111, 14, 14, 34, 38, 2]  
1697 Candidate 1: [71, 14, 15, 5, 3, 5000000, 2]  
1698 Candidate 2: [47, 14, 15, 43, 34, 17000000, 4]  
1699 Candidate 1: [135, 14, 14, 46, 5, 50000000, 3]  
1700 Candidate 2: [85, 14, 15, 19, 23, 5507, 5]  
1701 Father before deletion: [71, 14, 15, 5, 3, 5000000  
    , 2]  
1702 Mother before deletion: [85, 14, 15, 19, 23, 5507,  
    5]  
1703 Father after deletion: [71, 14, 15, 5, 3, 2]  
1704 Mother after deletion: [85, 14, 15, 19, 23, 5]  
1705 010001110000111000001111000001010000001100000010  
1706 010101010000111000001111000100110001011100000101  
1707 Offspring1 after mutation:  
    010001110000111000001111000100110000001100000010  
1708 Offspring2 after mutation:  
    010101010000111000001111000001010001011100000101  
1709 48 48
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1710 [71, 14, 15, 19, 3, 2]
1711 [85, 14, 15, 5, 23, 5]
1712 Candidate 1: [135, 14, 14, 46, 5, 50000000, 3]
1713 Candidate 2: [69, 14, 14, 17, 26, 16001408, 5]
1714 Candidate 1: [105, 14, 14, 49, 50, 50000000, 3]
1715 Candidate 2: [24, 14, 14, 34, 32, 5007285, 3]
1716 Father before deletion: [69, 14, 14, 17, 26,
    16001408, 5]
1717 Mother before deletion: [24, 14, 14, 34, 32,
    5007285, 3]
1718 Father after deletion: [69, 14, 14, 17, 26, 5]
1719 Mother after deletion: [24, 14, 14, 34, 32, 3]
1720 010001010000111000001110000100010001101000000101
1721 00011000000011100000111000100010001000000000011
1722 Offspring1 after mutation:
    010001010000111000001110001000100010000000000101
1723 Offspring2 after mutation:
    000110000000111000001110000100010001101000000011
1724 48 48
1725 [69, 14, 14, 34, 32, 5]
1726 [24, 14, 14, 17, 26, 3]
1727 Candidate 1: [7, 14, 14, 12, 41, 21000000, 4]
1728 Candidate 2: [38, 14, 15, 39, 34, 15000000, 5]
1729 Candidate 1: [127, 14, 14, 23, 27, 50000000, 3]
1730 Candidate 2: [69, 14, 14, 17, 26, 16001408, 5]
1731 Father before deletion: [38, 14, 15, 39, 34,
    15000000, 5]
1732 Mother before deletion: [69, 14, 14, 17, 26,
    16001408, 5]
1733 Father after deletion: [38, 14, 15, 39, 34, 5]
1734 Mother after deletion: [69, 14, 14, 17, 26, 5]
1735 001001100000111000001111001001110010001000000101
1736 010001010000111000001110000100010001101000000101
1737 Offspring1 after mutation:
    001001100000111000001110000100010001101000000101
1738 Offspring2 after mutation:
    010001010000111000001111001001110010001000000101
1739 48 48
1740 [38, 14, 14, 17, 26, 5]
1741 [69, 14, 15, 39, 34, 5]
1742 Candidate 1: [19, 14, 14, 27, 17, 12000000, 2]

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1743 Candidate 2: [8, 15, 14, 40, 10, 15000000, 5]
1744 Candidate 1: [64, 14, 15, 27, 42, 50000000, 3]
1745 Candidate 2: [121, 15, 15, 15, 13, 50000000, 3]
1746 Father before deletion: [19, 14, 14, 27, 17,
    12000000, 2]
1747 Mother before deletion: [64, 14, 15, 27, 42,
    50000000, 3]
1748 Father after deletion: [19, 14, 14, 27, 17, 2]
1749 Mother after deletion: [64, 14, 15, 27, 42, 3]
1750 000100110000111000001110000110110001000100000010
1751 010000000000111000001111000110110010101000000011
1752 Offspring1 after mutation:
    000000100000111000001111000110110001000100000010
1753 Offspring2 after mutation:
    010100110000111000001110000110110010101000000011
1754 48 48
1755 [2, 14, 15, 27, 17, 2]
1756 [83, 14, 14, 27, 42, 3]
1757 Candidate 1: [66, 15, 15, 45, 19, 50000000, 3]
1758 Candidate 2: [121, 15, 15, 15, 13, 50000000, 3]
1759 Candidate 1: [126, 15, 15, 41, 22, 6000000, 2]
1760 Candidate 2: [46, 14, 15, 13, 6, 7000000, 2]
1761 Father before deletion: [66, 15, 15, 45, 19,
    50000000, 3]
1762 Mother before deletion: [126, 15, 15, 41, 22,
    6000000, 2]
1763 Father after deletion: [66, 15, 15, 45, 19, 3]
1764 Mother after deletion: [126, 15, 15, 41, 22, 2]
1765 010000100000111100001111001011010001001100000011
1766 011111100000111100001111001010010001011000000010
1767 Offspring1 after mutation:
    010000100000111100001111001011010001001100000011
1768 Offspring2 after mutation:
    011111100000111100001111001010010001011000000010
1769 48 48
1770 [66, 15, 15, 45, 19, 3]
1771 [126, 15, 15, 41, 22, 2]
1772 Candidate 1: [127, 14, 14, 23, 27, 50000000, 3]
1773 Candidate 2: [111, 14, 14, 21, 38, 8000000, 2]
1774 Candidate 1: [54, 15, 14, 30, 37, 8000000, 2]
1775 Candidate 2: [13, 15, 14, 32, 11, 20000000, 4]

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1776 Father before deletion: [111, 14, 14, 21, 38,
    8000000, 2]
1777 Mother before deletion: [54, 15, 14, 30, 37,
    8000000, 2]
1778 Father after deletion: [111, 14, 14, 21, 38, 2]
1779 Mother after deletion: [54, 15, 14, 30, 37, 2]
1780 01101111000011100001110000101010010011000000010
1781 0011011000011110000111000111100010010100000010
1782 Offspring1 after mutation:
    0110111000011110000111000111100010010100000010
1783 Offspring2 after mutation:
    0011011100001110000111000101010010011000000010
1784 48 48
1785 [110, 15, 14, 30, 37, 2]
1786 [55, 14, 14, 21, 38, 2]
1787 Candidate 1: [118, 15, 15, 24, 30, 50000000, 3]
1788 Candidate 2: [138, 15, 15, 2, 33, 15000000, 5]
1789 Candidate 1: [126, 15, 15, 41, 22, 6000000, 2]
1790 Candidate 2: [91, 15, 15, 37, 7, 50000000, 3]
1791 Father before deletion: [138, 15, 15, 2, 33,
    15000000, 5]
1792 Mother before deletion: [126, 15, 15, 41, 22,
    6000000, 2]
1793 Father after deletion: [138, 15, 15, 2, 33, 5]
1794 Mother after deletion: [126, 15, 15, 41, 22, 2]
1795 100010100000111100001111000000100010000100000101
1796 011111100000111100001111001010010001011000000010
1797 Offspring1 after mutation:
    100010100000111100001111000000100010000100000101
1798 Offspring2 after mutation:
    011111100000111100001111001010010001011000000010
1799 48 48
1800 [138, 15, 15, 2, 33, 5]
1801 [126, 15, 15, 41, 22, 2]
1802 Candidate 1: [64, 14, 15, 27, 42, 50000000, 3]
1803 Candidate 2: [127, 14, 14, 23, 27, 50000000, 3]
1804 Candidate 1: [85, 14, 15, 19, 23, 5507, 5]
1805 Candidate 2: [71, 14, 15, 5, 3, 5000000, 2]
1806 Father before deletion: [64, 14, 15, 27, 42,
    50000000, 3]
1807 Mother before deletion: [85, 14, 15, 19, 23, 5507,

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1807 5]
1808 Father after deletion: [64, 14, 15, 27, 42, 3]
1809 Mother after deletion: [85, 14, 15, 19, 23, 5]
1810 010000000000111000001111000110110010101000000011
1811 010101010000111000001111000100110001011100000101
1812 Offspring1 after mutation:
    010000000000111000001111000110110010101000000011
1813 Offspring2 after mutation:
    010101010000111000001111000100110001011100000101
1814 48 48
1815 [64, 14, 15, 27, 42, 3]
1816 [85, 14, 15, 19, 23, 5]
1817 Candidate 1: [80, 15, 14, 36, 21, 21000000, 4]
1818 Candidate 2: [27, 14, 15, 4, 35, 15004294, 5]
1819 Candidate 1: [29, 14, 14, 35, 40, 19000000, 4]
1820 Candidate 2: [91, 15, 15, 37, 7, 50000000, 3]
1821 Father before deletion: [27, 14, 15, 4, 35,
    15004294, 5]
1822 Mother before deletion: [29, 14, 14, 35, 40,
    19000000, 4]
1823 Father after deletion: [27, 14, 15, 4, 35, 5]
1824 Mother after deletion: [29, 14, 14, 35, 40, 4]
1825 000110110000111000001111000001000010001100000101
1826 000111010000111000001110001000110010100000000100
1827 Offspring1 after mutation:
    000111010000111000001110001000110010101100000101
1828 Offspring2 after mutation:
    000110110000111000001111000001000010000000000100
1829 48 48
1830 [29, 14, 14, 35, 43, 5]
1831 [27, 14, 15, 4, 32, 4]
1832 Candidate 1: [8, 15, 14, 40, 10, 15000000, 5]
1833 Candidate 2: [38, 14, 15, 39, 34, 15000000, 5]
1834 Candidate 1: [69, 14, 14, 17, 26, 16001408, 5]
1835 Candidate 2: [85, 14, 15, 19, 23, 5507, 5]
1836 Father before deletion: [8, 15, 14, 40, 10,
    15000000, 5]
1837 Mother before deletion: [85, 14, 15, 19, 23, 5507,
    5]
1838 Father after deletion: [8, 15, 14, 40, 10, 5]
1839 Mother after deletion: [85, 14, 15, 19, 23, 5]

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1840 0000100000001110000111000101000000101000000101
1841 01010101000011100001111000100110001011100000101
1842 Offspring1 after mutation:
    00011000000011110000111000101000000101000000101
1843 Offspring2 after mutation:
    01000101000011100001111000100110001011100000101
1844 48 48
1845 [24, 15, 14, 40, 10, 5]
1846 [69, 14, 15, 19, 23, 5]
1847 Candidate 1: [110, 14, 14, 28, 49, 50000000, 3]
1848 Candidate 2: [42, 15, 14, 20, 40, 2000000, 2]
1849 Candidate 1: [14, 15, 15, 9, 48, 20000000, 4]
1850 Candidate 2: [88, 14, 14, 7, 20, 5000000, 2]
1851 Father before deletion: [42, 15, 14, 20, 40,
    2000000, 2]
1852 Mother before deletion: [88, 14, 14, 7, 20, 5000000
    , 2]
1853 Father after deletion: [42, 15, 14, 20, 40, 2]
1854 Mother after deletion: [88, 14, 14, 7, 20, 2]
1855 001010100000111100001110000101000010100000000010
1856 01011000000011100000111000001110001010000000010
1857 Offspring1 after mutation:
    00101010000011110000111000010100001010000000010
1858 Offspring2 after mutation:
    01011000000011100000111000001110001010000000010
1859 48 48
1860 [42, 15, 14, 20, 40, 2]
1861 [88, 14, 14, 7, 20, 2]
1862 Candidate 1: [39, 15, 15, 11, 28, 18000000, 4]
1863 Candidate 2: [94, 15, 14, 42, 13, 50000000, 3]
1864 Candidate 1: [69, 14, 14, 17, 26, 16001408, 5]
1865 Candidate 2: [121, 15, 15, 15, 13, 50000000, 3]
1866 Father before deletion: [39, 15, 15, 11, 28,
    18000000, 4]
1867 Mother before deletion: [69, 14, 14, 17, 26,
    16001408, 5]
1868 Father after deletion: [39, 15, 15, 11, 28, 4]
1869 Mother after deletion: [69, 14, 14, 17, 26, 5]
1870 001001110000111100001111000010110001110000000100
1871 010001010000111000001110000100010001101000000101
1872 Offspring1 after mutation:

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1872 001001110000111100001110000100010001110000000100
1873 Offspring2 after mutation:
    010001010000111000001111000010110001101000000101
1874 48 48
1875 [39, 15, 14, 17, 28, 4]
1876 [69, 14, 15, 11, 26, 5]
1877 Candidate 1: [14, 15, 15, 9, 48, 20000000, 4]
1878 Candidate 2: [46, 14, 15, 13, 6, 7000000, 2]
1879 Candidate 1: [73, 15, 15, 36, 11, 5005669, 3]
1880 Candidate 2: [135, 14, 14, 46, 5, 50000000, 3]
1881 Father before deletion: [46, 14, 15, 13, 6, 7000000
    , 2]
1882 Mother before deletion: [73, 15, 15, 36, 11,
    5005669, 3]
1883 Father after deletion: [46, 14, 15, 13, 6, 2]
1884 Mother after deletion: [73, 15, 15, 36, 11, 3]
1885 001011100000111000001111000011010000011000000010
1886 010010010000111100001111001001000000101100000011
1887 Offspring1 after mutation:
    001011110000111000001111000011010000011000000010
1888 Offspring2 after mutation:
    010010000000111100001111001001000000101100000011
1889 48 48
1890 [47, 14, 15, 13, 6, 2]
1891 [72, 15, 15, 36, 11, 3]
1892 Candidate 1: [37, 15, 14, 15, 16, 18000000, 4]
1893 Candidate 2: [102, 14, 15, 5, 31, 18000000, 4]
1894 Candidate 1: [27, 14, 15, 4, 35, 15004294, 5]
1895 Candidate 2: [37, 15, 14, 15, 16, 18000000, 4]
1896 Father before deletion: [37, 15, 14, 15, 16,
    18000000, 4]
1897 Mother before deletion: [27, 14, 15, 4, 35,
    15004294, 5]
1898 Father after deletion: [37, 15, 14, 15, 16, 4]
1899 Mother after deletion: [27, 14, 15, 4, 35, 5]
1900 001001010000111100001110000011110001000000000100
1901 0001101100001110000011110000010000100011000000101
1902 Offspring1 after mutation:
    001001010000111100001111000010000010000000000100
1903 Offspring2 after mutation:
    0001101100001110000011100000111100100011000000101

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1904 48 48
1905 [37, 15, 15, 4, 16, 4]
1906 [27, 14, 14, 15, 35, 5]
1907 5
1908 Start point is: 5
1909 16
1910 31
1911 (4.92, 4.29) (7.37, 3.27)
1912 14 15
1913 The travel time for UGV from depot B to NW UGV stop
    is: 3888
1914 The UGV travel time between two UGV stops is: 3851
1915 17400688.5
1916 End node is [24]
1917 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1918 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]
1919 Objective: 5446
1920 Dropped nodes: 1 2 4 5 6 7 8 9 10 11 13 14 15 16 17
    18 19 20 21 22
1921 48
1922 48
1923 48
1924 48
1925 48
1926 48
1927 48
1928 48
1929 48
1930 48
1931 48
1932 48
1933 48
1934 48
1935 48
1936 48
1937 48
1938 48
1939 48
1940 48
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1941 48
1942 48
1943 48
1944 48
1945 48
1946 48
1947 48
1948 Route for vehicle 0:
1949 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20137) -> 3 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
    Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2898,3420
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3017,3497) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3216,3576
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3492,3732) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 32 Fuel(31050) Time(3691,3811
    ) Slack(0) FuelSlack(0,0) Distance(83049) -> 12
    Fuel(15684) Time(3888,3888) Slack(874) FuelSlack(
    139770,139770) Distance(85610) -> 47 Fuel(163614)
    Time(5388,5388) Slack(0) FuelSlack(0,0) Distance(
    106291) -> 46 Fuel(155322) Time(5429,5429) Slack(0
    ) FuelSlack(0,0) Distance(107673) -> 45 Fuel(146676
    ) Time(5472,5472) Slack(0) FuelSlack(0,0) Distance(
    109114) -> 44 Fuel(138384) Time(5513,5513) Slack(0
    ) FuelSlack(0,0) Distance(110496) -> 43 Fuel(129780
    ) Time(5556,5556) Slack(0) FuelSlack(0,0) Distance(
    111930) -> 42 Fuel(121488) Time(5597,5597) Slack(0
    ) FuelSlack(0,0) Distance(113312) -> 41 Fuel(112842
    ) Time(5640,5640) Slack(0) FuelSlack(0,0) Distance(
    114753) -> 40 Fuel(104550) Time(5681,5681) Slack(0
    ) FuelSlack(0,0) Distance(116135) -> 39 Fuel(95946
    ) Time(5724,5724) Slack(0) FuelSlack(0,0) Distance(
    117569) -> 38 Fuel(87654) Time(5765,5765) Slack(0
    ) FuelSlack(0,0) Distance(118951) -> 37 Fuel(79008)
    Time(5808,5808) Slack(0) FuelSlack(0,0) Distance(

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1949 120392) -> 36 Fuel(70716) Time(5849,5849) Slack(0)
    FuelSlack(0,0) Distance(121774) -> 35 Fuel(62112)
    Time(5892,5892) Slack(0) FuelSlack(0,0) Distance(
    123208) -> 34 Fuel(53820) Time(5933,5933) Slack(0)
    FuelSlack(0,0) Distance(124590) -> 33 Fuel(45486)
    Time(5975,5975) Slack(0) FuelSlack(0,0) Distance(
    125979) -> 23 Fuel(36882) Time(6018,6018) Slack(806
) FuelSlack(36882,287700) Distance(127413) -> 24
    Fuel(287700) Time(8424,8424) Distance(180213)
1950 Distance of the route: 180213 ft
1951 Remaining Fuel of the route: 287700
1952 Total Time of the route: 8424 seconds
1953
1954 Total Distance of all routes: 180213 ft
1955 Total Fuel remaining of all routes: 287700
1956 Total Time of all routes: 8424 seconds
1957 5
1958 Start point is: 5
1959 16
1960 31
1961 (5.04, 4.76) (7.06, 3.02)
1962 15 15
1963 The travel time for UGV from depot B to NW UGV stop
    is: 3798
1964 The UGV travel time between two UGV stops is: 3879
1965 17336076.0
1966 End node is [24]
1967 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
1968 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45, 46]
1969 Objective: 5447
1970 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17
    18 19 20 21 23
1971 47
1972 47
1973 47
1974 47
1975 47
1976 47
1977 47
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1978 47
1979 47
1980 47
1981 47
1982 47
1983 47
1984 47
1985 47
1986 47
1987 47
1988 47
1989 47
1990 47
1991 47
1992 47
1993 47
1994 47
1995 47
1996 47
1997 Route for vehicle 0:
1998 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
        0) FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
        Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
        Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2927,3407
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
        Fuel(93438) Time(3124,3484) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3323,3563
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
        Fuel(46722) Time(3599,3719) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 12 Fuel(31050) Time(3798,3798
    ) Slack(825) FuelSlack(170508,170508) Distance(
        83049) -> 46 Fuel(148242) Time(5327,5327) Slack(0)
        FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
        Time(5368,5368) Slack(0) FuelSlack(0,0) Distance(
            107674) -> 44 Fuel(131304) Time(5411,5411) Slack(0
        ) FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012
        ) Time(5452,5452) Slack(0) FuelSlack(0,0) Distance(
```

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1998 110497) -> 42 Fuel(114408) Time(5495,5495) Slack(0)
    ) FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116
    ) Time(5536,5536) Slack(0) FuelSlack(0,0) Distance(
    113313) -> 40 Fuel(97470) Time(5579,5579) Slack(0)
    FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
    Time(5620,5620) Slack(0) FuelSlack(0,0) Distance(
    116136) -> 38 Fuel(80574) Time(5663,5663) Slack(0)
    FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
    Time(5704,5704) Slack(0) FuelSlack(0,0) Distance(
    118952) -> 36 Fuel(63636) Time(5747,5747) Slack(0)
    FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
    Time(5788,5788) Slack(0) FuelSlack(0,0) Distance(
    121775) -> 34 Fuel(46740) Time(5831,5831) Slack(0)
    FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
    Time(5872,5872) Slack(0) FuelSlack(0,0) Distance(
    124591) -> 32 Fuel(30114) Time(5914,5914) Slack(0)
    FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
    Time(5957,5957) Slack(855) FuelSlack(21510,287700)
    Distance(127414) -> 24 Fuel(287700) Time(8412,8412
    ) Distance(180214)

1999 Distance of the route: 180214 ft
2000 Remaining Fuel of the route: 287700
2001 Total Time of the route: 8412 seconds
2002
2003 Total Distance of all routes: 180214 ft
2004 Total Fuel remaining of all routes: 287700
2005 Total Time of all routes: 8412 seconds
2006 5
2007 Start point is: 5
2008 16
2009 31
2010 (5.16, 5.24) (7.37, 3.27)
2011 14 15
2012 The travel time for UGV from depot B to NW UGV stop
    is: 4257
2013 The UGV travel time between two UGV stops is: 4196
2014 18850555.5
2015 End node is [24]
2016 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2017 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37]

```

```
2017 , 38, 39, 40, 41, 42, 43, 44, 45]
2018 Objective: 5507
2019 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17
                     18 19 21 22 23
2020 46
2021 46
2022 46
2023 46
2024 46
2025 46
2026 46
2027 46
2028 46
2029 46
2030 46
2031 46
2032 46
2033 46
2034 46
2035 46
2036 46
2037 46
2038 46
2039 46
2040 46
2041 46
2042 46
2043 46
2044 46
2045 Route for vehicle 0:
2046 0 Fuel(253693) Time(58,58) Slack(60) FuelSlack(0,0)
      ) Distance(0) -> 28 Fuel(126859) Time(758,758)
      Slack(120) FuelSlack(0,0) Distance(21139) -> 2 Fuel
      (25) Time(1518,1518) Slack(925) FuelSlack(147858,
      147883) Distance(42278) -> 25 Fuel(139842) Time(
      3189,3189) Slack(120) FuelSlack(0,0) Distance(66921
      ) -> 26 Fuel(124476) Time(3386,3386) Slack(120)
      FuelSlack(0,0) Distance(69482) -> 27 Fuel(108804)
      Time(3585,3585) Slack(120) FuelSlack(0,0) Distance(
      72094) -> 29 Fuel(77760) Time(3861,3861) Slack(120
      ) FuelSlack(0,0) Distance(77268) -> 30 Fuel(62088)
```

```
2046 Time(4060,4060) Slack(120) FuelSlack(0,0) Distance(79880) -> 12 Fuel(46722) Time(4257,4257) Slack(774) FuelSlack(201852,201852) Distance(82441) -> 45 Fuel(132570) Time(5814,5814) Slack(0) FuelSlack(0,0) Distance(108296) -> 44 Fuel(124278) Time(5855,5855) Slack(0) FuelSlack(0,0) Distance(109678) -> 43 Fuel(115632) Time(5898,5898) Slack(0) FuelSlack(0,0) Distance(111119) -> 42 Fuel(107340) Time(5939,5939) Slack(0) FuelSlack(0,0) Distance(112501) -> 41 Fuel(98736) Time(5982,5982) Slack(0) FuelSlack(0,0) Distance(113935) -> 40 Fuel(90444) Time(6023,6023) Slack(0) FuelSlack(0,0) Distance(115317) -> 39 Fuel(81798) Time(6066,6066) Slack(0) FuelSlack(0,0) Distance(116758) -> 38 Fuel(73506) Time(6107,6107) Slack(0) FuelSlack(0,0) Distance(118140) -> 37 Fuel(64902) Time(6150,6150) Slack(0) FuelSlack(0,0) Distance(119574) -> 36 Fuel(56610) Time(6191,6191) Slack(0) FuelSlack(0,0) Distance(120956) -> 35 Fuel(47964) Time(6234,6234) Slack(0) FuelSlack(0,0) Distance(122397) -> 34 Fuel(39672) Time(6275,6275) Slack(0) FuelSlack(0,0) Distance(123779) -> 33 Fuel(31068) Time(6318,6318) Slack(0) FuelSlack(0,0) Distance(125213) -> 32 Fuel(22776) Time(6359,6359) Slack(0) FuelSlack(0,0) Distance(126595) -> 31 Fuel(14442) Time(6401,6401) Slack(0) FuelSlack(0,0) Distance(127984) -> 20 Fuel(5838) Time(6444,6444) Slack(906) FuelSlack(5838,287700) Distance(129418) -> 24 Fuel(287700) Time(8950,8950) Distance(182218)  
2047 Distance of the route: 182218 ft  
2048 Remaining Fuel of the route: 287700  
2049 Total Time of the route: 8950 seconds  
2050  
2051 Total Distance of all routes: 182218 ft  
2052 Total Fuel remaining of all routes: 287700  
2053 Total Time of all routes: 8950 seconds  
2054 2  
2055 Start point is: 2  
2056 16  
2057 16  
2058 (8.29, 4.03) (4.8, 3.81)
```

```
2059 15 14
2060 The travel time for UGV from depot B to NW UGV stop
      is: 3375
2061 The UGV travel time between two UGV stops is: 4324
2062 21700785.0
2063 End node is [24]
2064 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2065 [25, 26]
2066 Objective: 2000000
2067 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26
2068 27
2069 Route for vehicle 0:
2070 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
2071 Distance of the route: 0 ft
2072 Remaining Fuel of the route: 287700
2073 Total Time of the route: 0 seconds
2074
2075 Total Distance of all routes: 0 ft
2076 Total Fuel remaining of all routes: 287700
2077 Total Time of all routes: 0 seconds
2078 2
2079 Start point is: 2
2080 16
2081 16
2082 (5.88, 8.09) (7.37, 3.27)
2083 14 14
2084 The travel time for UGV from depot B to NW UGV stop
      is: 4465
2085 The UGV travel time between two UGV stops is: 5538
2086 ****
      ***
2087 UGV route goes infeasible although UAV has a
      solution
2088 ****
      ***
2089 27441720.0
2090 End node is [24]
```

```
2091 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2092 [25, 26, 27, 28, 29]
2093 Objective: 5000000
2094 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
                  16 17 18 19 20 21 22 23 25 26 27 28 29
2095 30
2096 Route for vehicle 0:
2097 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
2098 Distance of the route: 0 ft
2099 Remaining Fuel of the route: 287700
2100 Total Time of the route: 0 seconds
2101
2102 Total Distance of all routes: 0 ft
2103 Total Fuel remaining of all routes: 287700
2104 Total Time of all routes: 0 seconds
2105 4
2106 Start point is: 4
2107 31
2108 16
2109 (8.6, 4.29) (5.28, 5.71)
2110 14 14
2111 The travel time for UGV from depot B to NW UGV stop
      is: 5215
2112 The UGV travel time between two UGV stops is: 5214
2113 21209896.5
2114 End node is [24]
2115 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2116 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40]
2117 Objective: 16000000
2118 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
                  16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
                  34 35 36 37 38 39 40
2119 41
2120 Route for vehicle 0:
2121 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
```

```
2121 )
2122 Distance of the route: 0 ft
2123 Remaining Fuel of the route: 287700
2124 Total Time of the route: 0 seconds
2125
2126 Total Distance of all routes: 0 ft
2127 Total Fuel remaining of all routes: 287700
2128 Total Time of all routes: 0 seconds
2129 5
2130 Start point is: 5
2131 16
2132 31
2133 (7.06, 3.02) (5.52, 6.66)
2134 15 15
2135 The travel time for UGV from depot B to NW UGV stop
    is: 841
2136 The UGV travel time between two UGV stops is: 4569
2137 10114302.0
2138 End node is [24]
2139 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2140 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39]
2141 Objective: 15000000
2142 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39
2143 40
2144 Route for vehicle 0:
2145 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2146 Distance of the route: 0 ft
2147 Remaining Fuel of the route: 287700
2148 Total Time of the route: 0 seconds
2149
2150 Total Distance of all routes: 0 ft
2151 Total Fuel remaining of all routes: 287700
2152 Total Time of all routes: 0 seconds
2153 2
2154 Start point is: 2
```

```
2155 16
2156 16
2157 (8.91, 4.54) (5.88, 8.09)
2158 14 14
2159 The travel time for UGV from depot B to NW UGV stop
    is: 3918
2160 The UGV travel time between two UGV stops is: 6292
2161 ****
2162 *** UGV route goes infeasible although UAV has a
    solution
2163 ****
2164 ***
2165 30974694.0
2166 End node is [24]
2167 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2168 []
2169 Objective: 0
2170 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23
2171 25
2172 Route for vehicle 0:
2173 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2174 Distance of the route: 0 ft
2175 Remaining Fuel of the route: 287700
2176 Total Time of the route: 0 seconds
2177 25
2178 Total Distance of all routes: 0 ft
2179 Total Fuel remaining of all routes: 287700
2180 Total Time of all routes: 0 seconds
2181 4
2182 Start point is: 4
2183 31
2184 16
2185 (7.06, 3.02) (5.76, 7.62)
2186 15
2187 The travel time for UGV from depot B to NW UGV stop
    is: 4461
```

```

2187 The UGV travel time between two UGV stops is: 4917
2188 19589406.0
2189 End node is [24]
2190 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2191 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45]
2192 Objective: 21000000
2193 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
      34 35 36 37 38 39 40 41 42 43 44 45
2194 46
2195 Route for vehicle 0:
2196 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
2197 Distance of the route: 0 ft
2198 Remaining Fuel of the route: 287700
2199 Total Time of the route: 0 seconds
2200
2201 Total Distance of all routes: 0 ft
2202 Total Fuel remaining of all routes: 287700
2203 Total Time of all routes: 0 seconds
2204 4
2205 Start point is: 4
2206 31
2207 16
2208 (4.92, 4.29) (8.91, 4.54)
2209 15 15
2210 The travel time for UGV from depot B to NW UGV stop
      is: 1379
2211 The UGV travel time between two UGV stops is: 4555
2212 11419224.0
2213 End node is [24]
2214 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2215 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39]
2216 Objective: 15000000
2217 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33

```

```
2217 34 35 36 37 38 39
2218 40
2219 Route for vehicle 0:
2220 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
)
2221 Distance of the route: 0 ft
2222 Remaining Fuel of the route: 287700
2223 Total Time of the route: 0 seconds
2224
2225 Total Distance of all routes: 0 ft
2226 Total Fuel remaining of all routes: 287700
2227 Total Time of all routes: 0 seconds
2228 4
2229 Start point is: 4
2230 31
2231 16
2232 (4.8, 3.81) (7.98, 3.78)
2233 15 14
2234 The travel time for UGV from depot B to NW UGV stop
    is: 1552
2235 The UGV travel time between two UGV stops is: 4173
2236 11064184.5
2237 End node is [24]
2238 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2239 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42]
2240 Objective: 18000000
2241 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42
2242 43
2243 Route for vehicle 0:
2244 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
)
2245 Distance of the route: 0 ft
2246 Remaining Fuel of the route: 287700
2247 Total Time of the route: 0 seconds
2248
```

```
2249 Total Distance of all routes: 0 ft
2250 Total Fuel remaining of all routes: 287700
2251 Total Time of all routes: 0 seconds
2252 2
2253 Start point is: 2
2254 16
2255 16
2256 (8.6, 4.29) (5.04, 4.76)
2257 14 15
2258 The travel time for UGV from depot B to NW UGV stop
    is: 3767
2259 The UGV travel time between two UGV stops is: 4583
2260 24022440.0
2261 End node is [24]
2262 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2263 [25, 26, 27, 28, 29, 30, 31, 32]
2264 Objective: 8000000
2265 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32
2266 33
2267 Route for vehicle 0:
2268 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2269 Distance of the route: 0 ft
2270 Remaining Fuel of the route: 287700
2271 Total Time of the route: 0 seconds
2272
2273 Total Distance of all routes: 0 ft
2274 Total Fuel remaining of all routes: 287700
2275 Total Time of all routes: 0 seconds
2276 2
2277 Start point is: 2
2278 16
2279 16
2280 (5.28, 5.71) (8.6, 4.29)
2281 15 14
2282 The travel time for UGV from depot B to NW UGV stop
    is: 3301
2283 The UGV travel time between two UGV stops is: 5214
```

```
2284 ****
     ***
2285 UGV route goes infeasible although UAV has a
     solution
2286 ****
     ***
2287 25561668.0
2288 End node is [24]
2289 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
     15, 16, 17, 18, 19, 20, 21, 22, 23]
2290 [25, 26, 27, 28, 29, 30]
2291 Objective: 6000000
2292 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
     16 17 18 19 20 21 22 23 25 26 27 28 29 30
2293 31
2294 Route for vehicle 0:
2295 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
     Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
     )
2296 Distance of the route: 0 ft
2297 Remaining Fuel of the route: 287700
2298 Total Time of the route: 0 seconds
2299
2300 Total Distance of all routes: 0 ft
2301 Total Fuel remaining of all routes: 287700
2302 Total Time of all routes: 0 seconds
2303 3
2304 Start point is: 3
2305 16
2306 16
2307 (5.16, 5.24) (8.91, 4.54)
2308 14 15
2309 The travel time for UGV from depot B to NW UGV stop
     is: 3385
2310 The UGV travel time between two UGV stops is: 4900
2311 ****
     ***
2312 UGV route goes infeasible although UAV has a
     solution
2313 ****
     ***
```

```
2314 51968575.5
2315 End node is [18]
2316 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
2317 []
2318 *****No solution found*****
2319 5
2320 Start point is: 5
2321 16
2322 31
2323 (4.92, 4.29) (7.37, 3.27)
2324 14 15
2325 The travel time for UGV from depot B to NW UGV stop
      is: 3888
2326 The UGV travel time between two UGV stops is: 3851
2327 17400688.5
2328 End node is [24]
2329 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2330 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]
2331 Objective: 5446
2332 Dropped nodes: 1 2 4 5 6 7 8 9 10 11 13 14 15 16 17
      18 19 20 21 22
2333 48
2334 48
2335 48
2336 48
2337 48
2338 48
2339 48
2340 48
2341 48
2342 48
2343 48
2344 48
2345 48
2346 48
2347 48
2348 48
2349 48
```

```
2350 48
2351 48
2352 48
2353 48
2354 48
2355 48
2356 48
2357 48
2358 48
2359 48
2360 Route for vehicle 0:
2361 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20137) -> 3 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
    Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2898,3420
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3017,3497) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3216,3576
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3492,3732) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 32 Fuel(31050) Time(3691,3811
    ) Slack(0) FuelSlack(0,0) Distance(83049) -> 12
    Fuel(15684) Time(3888,3888) Slack(874) FuelSlack(
    139770,139770) Distance(85610) -> 47 Fuel(163614)
    Time(5388,5388) Slack(0) FuelSlack(0,0) Distance(
    106291) -> 46 Fuel(155322) Time(5429,5429) Slack(0
    ) FuelSlack(0,0) Distance(107673) -> 45 Fuel(146676
    ) Time(5472,5472) Slack(0) FuelSlack(0,0) Distance(
    109114) -> 44 Fuel(138384) Time(5513,5513) Slack(0
    ) FuelSlack(0,0) Distance(110496) -> 43 Fuel(129780
    ) Time(5556,5556) Slack(0) FuelSlack(0,0) Distance(
    111930) -> 42 Fuel(121488) Time(5597,5597) Slack(0
    ) FuelSlack(0,0) Distance(113312) -> 41 Fuel(112842
    ) Time(5640,5640) Slack(0) FuelSlack(0,0) Distance(
    114753) -> 40 Fuel(104550) Time(5681,5681) Slack(0
    ) FuelSlack(0,0) Distance(116135) -> 39 Fuel(95946
    ) Time(5724,5724) Slack(0) FuelSlack(0,0) Distance(
```

```

2361 117569) -> 38 Fuel(87654) Time(5765,5765) Slack(0)
  FuelSlack(0,0) Distance(118951) -> 37 Fuel(79008)
  Time(5808,5808) Slack(0) FuelSlack(0,0) Distance(
  120392) -> 36 Fuel(70716) Time(5849,5849) Slack(0)
  FuelSlack(0,0) Distance(121774) -> 35 Fuel(62112)
  Time(5892,5892) Slack(0) FuelSlack(0,0) Distance(
  123208) -> 34 Fuel(53820) Time(5933,5933) Slack(0)
  FuelSlack(0,0) Distance(124590) -> 33 Fuel(45486)
  Time(5975,5975) Slack(0) FuelSlack(0,0) Distance(
  125979) -> 23 Fuel(36882) Time(6018,6018) Slack(806
) FuelSlack(36882,287700) Distance(127413) -> 24
  Fuel(287700) Time(8424,8424) Distance(180213)

2362 Distance of the route: 180213 ft
2363 Remaining Fuel of the route: 287700
2364 Total Time of the route: 8424 seconds
2365
2366 Total Distance of all routes: 180213 ft
2367 Total Fuel remaining of all routes: 287700
2368 Total Time of all routes: 8424 seconds
2369 2
2370 Start point is: 2
2371 16
2372 16
2373 (8.29, 4.03) (5.28, 5.71)
2374 14 15
2375 The travel time for UGV from depot B to NW UGV stop
  is: 3616
2376 The UGV travel time between two UGV stops is: 4787
2377 24328209.0
2378 End node is [24]
2379 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
  15, 16, 17, 18, 19, 20, 21, 22, 23]
2380 [25, 26, 27, 28, 29, 30, 31]
2381 Objective: 7000000
2382 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
2383 32
2384 Route for vehicle 0:
2385 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
  Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
)

```

```
2386 Distance of the route: 0 ft
2387 Remaining Fuel of the route: 287700
2388 Total Time of the route: 0 seconds
2389
2390 Total Distance of all routes: 0 ft
2391 Total Fuel remaining of all routes: 287700
2392 Total Time of all routes: 0 seconds
2393 5
2394 Start point is: 5
2395 16
2396 31
2397 (5.04, 4.76) (7.06, 3.02)
2398 14 14
2399 The travel time for UGV from depot B to NW UGV stop
    is: 4069
2400 The UGV travel time between two UGV stops is: 4090
2401 18188877.0
2402 End node is [24]
2403 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2404 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45, 46]
2405 Objective: 5447
2406 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17
    18 19 20 21 23
2407 47
2408 47
2409 47
2410 47
2411 47
2412 47
2413 47
2414 47
2415 47
2416 47
2417 47
2418 47
2419 47
2420 47
2421 47
2422 47
```

```
2423 47
2424 47
2425 47
2426 47
2427 47
2428 47
2429 47
2430 47
2431 47
2432 47
2433 Route for vehicle 0:
2434 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2802,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
    Fuel(124476) Time(2999,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(3198,3467
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3395,3664) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3594,3834
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3870,3990) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 12 Fuel(31050) Time(4069,4069
    ) Slack(825) FuelSlack(170508,170508) Distance(
    83049) -> 46 Fuel(148242) Time(5598,5598) Slack(0)
    FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
    Time(5639,5639) Slack(0) FuelSlack(0,0) Distance(
    107674) -> 44 Fuel(131304) Time(5682,5682) Slack(0
    ) FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012
    ) Time(5723,5723) Slack(0) FuelSlack(0,0) Distance(
    110497) -> 42 Fuel(114408) Time(5766,5766) Slack(0
    ) FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116
    ) Time(5807,5807) Slack(0) FuelSlack(0,0) Distance(
    113313) -> 40 Fuel(97470) Time(5850,5850) Slack(0)
    FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
    Time(5891,5891) Slack(0) FuelSlack(0,0) Distance(
    116136) -> 38 Fuel(80574) Time(5934,5934) Slack(0)
    FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
    Time(5975,5975) Slack(0) FuelSlack(0,0) Distance(
```

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2434 118952) -> 36 Fuel(63636) Time(6018,6018) Slack(0)
  FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
  Time(6059,6059) Slack(0) FuelSlack(0,0) Distance(
  121775) -> 34 Fuel(46740) Time(6102,6102) Slack(0)
  FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
  Time(6143,6143) Slack(0) FuelSlack(0,0) Distance(
  124591) -> 32 Fuel(30114) Time(6185,6185) Slack(0)
  FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
  Time(6228,6228) Slack(855) FuelSlack(21510,287700)
  Distance(127414) -> 24 Fuel(287700) Time(8683,8683
) Distance(180214)

2435 Distance of the route: 180214 ft
2436 Remaining Fuel of the route: 287700
2437 Total Time of the route: 8683 seconds
2438
2439 Total Distance of all routes: 180214 ft
2440 Total Fuel remaining of all routes: 287700
2441 Total Time of all routes: 8683 seconds
2442 4
2443 Start point is: 4
2444 31
2445 16
2446 (8.6, 4.29) (5.64, 7.14)
2447 15 15
2448 The travel time for UGV from depot B to NW UGV stop
  is: 4868
2449 The UGV travel time between two UGV stops is: 5449
2450 21309760.5
2451 End node is [24]
2452 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
  15, 16, 17, 18, 19, 20, 21, 22, 23]
2453 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
, 38, 39, 40]
2454 Objective: 16000000
2455 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
  34 35 36 37 38 39 40
2456 41
2457 Route for vehicle 0:
2458 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
  Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
)

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```
2458 )
2459 Distance of the route: 0 ft
2460 Remaining Fuel of the route: 287700
2461 Total Time of the route: 0 seconds
2462
2463 Total Distance of all routes: 0 ft
2464 Total Fuel remaining of all routes: 287700
2465 Total Time of all routes: 0 seconds
2466 5
2467 Start point is: 5
2468 16
2469 31
2470 (5.52, 6.66) (8.91, 4.54)
2471 15 15
2472 The travel time for UGV from depot B to NW UGV stop
    is: 4488
2473 The UGV travel time between two UGV stops is: 5414
2474 20306328.0
2475 End node is [24]
2476 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2477 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39]
2478 Objective: 15000000
2479 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39
2480 40
2481 Route for vehicle 0:
2482 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2483 Distance of the route: 0 ft
2484 Remaining Fuel of the route: 287700
2485 Total Time of the route: 0 seconds
2486
2487 Total Distance of all routes: 0 ft
2488 Total Fuel remaining of all routes: 287700
2489 Total Time of all routes: 0 seconds
2490 4
2491 Start point is: 4
```

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2492 31
2493 16
2494 (8.6, 4.29) (5.64, 7.14)
2495 14 14
2496 The travel time for UGV from depot B to NW UGV stop
    is: 5215
2497 The UGV travel time between two UGV stops is: 5772
2498 22446145.5
2499 End node is [24]
2500 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2501 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40]
2502 Objective: 16000000
2503 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40
2504 41
2505 Route for vehicle 0:
2506 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2507 Distance of the route: 0 ft
2508 Remaining Fuel of the route: 287700
2509 Total Time of the route: 0 seconds
2510
2511 Total Distance of all routes: 0 ft
2512 Total Fuel remaining of all routes: 287700
2513 Total Time of all routes: 0 seconds
2514 2
2515 Start point is: 2
2516 16
2517 16
2518 (8.6, 4.29) (5.4, 6.19)
2519 14 14
2520 The travel time for UGV from depot B to NW UGV stop
    is: 3767
2521 The UGV travel time between two UGV stops is: 5402
2522 ****
***
```

2523 UGV route goes infeasible although UAV has a

```
2523 solution
2524 ****
2525 27343104.0
2526 End node is [24]
2527 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2528 [25, 26, 27, 28, 29]
2529 Objective: 5000000
2530 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29
2531 30
2532 Route for vehicle 0:
2533 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
2534 Distance of the route: 0 ft
2535 Remaining Fuel of the route: 287700
2536 Total Time of the route: 0 seconds
2537
2538 Total Distance of all routes: 0 ft
2539 Total Fuel remaining of all routes: 287700
2540 Total Time of all routes: 0 seconds
2541 4
2542 Start point is: 4
2543 31
2544 16
2545 (8.6, 4.29) (5.52, 6.66)
2546 15 14
2547 The travel time for UGV from depot B to NW UGV stop
      is: 4868
2548 The UGV travel time between two UGV stops is: 5583
2549 21258637.5
2550 End node is [24]
2551 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2552 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40]
2553 Objective: 16000000
2554 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
```

```
2554 34 35 36 37 38 39 40
2555 41
2556 Route for vehicle 0:
2557 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
)
2558 Distance of the route: 0 ft
2559 Remaining Fuel of the route: 287700
2560 Total Time of the route: 0 seconds
2561
2562 Total Distance of all routes: 0 ft
2563 Total Fuel remaining of all routes: 287700
2564 Total Time of all routes: 0 seconds
2565 4
2566 Start point is: 4
2567 31
2568 16
2569 (7.98, 3.78) (5.4, 6.19)
2570 15 15
2571 The travel time for UGV from depot B to NW UGV stop
    is: 4586
2572 The UGV travel time between two UGV stops is: 4822
2573 19163871.0
2574 End node is [24]
2575 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2576 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42]
2577 Objective: 18000000
2578 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42
2579 43
2580 Route for vehicle 0:
2581 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
)
2582 Distance of the route: 0 ft
2583 Remaining Fuel of the route: 287700
2584 Total Time of the route: 0 seconds
2585
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2586 Total Distance of all routes: 0 ft
2587 Total Fuel remaining of all routes: 287700
2588 Total Time of all routes: 0 seconds
2589 4
2590 Start point is: 4
2591 31
2592 16
2593 (7.37, 3.27) (5.04, 4.76)
2594 15 14
2595 The travel time for UGV from depot B to NW UGV stop
    is: 4304
2596 The UGV travel time between two UGV stops is: 4241
2597 17563894.5
2598 End node is [24]
2599 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2600 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44]
2601 Objective: 20000000
2602 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44
2603 45
2604 Route for vehicle 0:
2605 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2606 Distance of the route: 0 ft
2607 Remaining Fuel of the route: 287700
2608 Total Time of the route: 0 seconds
2609
2610 Total Distance of all routes: 0 ft
2611 Total Fuel remaining of all routes: 287700
2612 Total Time of all routes: 0 seconds
2613 3
2614 Start point is: 3
2615 16
2616 16
2617 (7.68, 3.53) (4.8, 3.81)
2618 14 15
2619 The travel time for UGV from depot B to NW UGV stop
```

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2619 is: 3347
2620 The UGV travel time between two UGV stops is: 3819
2621 ****
2622 *** UGV route goes infeasible although UAV has a
2623 solution
2624 ****
2625 End node is [18]
2626 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
2627 15, 16, 17]
2628 []
2629 ****No solution found*****
2630 5
2631 Start point is: 5
2632 16
2633 31
2634 (5.16, 5.24) (7.37, 3.27)
2635 14 14
2636 The travel time for UGV from depot B to NW UGV stop
2637 is: 4257
2638 The UGV travel time between two UGV stops is: 4429
2639 19174767.0
2640 End node is [24]
2641 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
2642 15, 16, 17, 18, 19, 20, 21, 22, 23]
2643 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
2644 , 38, 39, 40, 41, 42, 43, 44, 45]
2645 Objective: 5507
2646 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17
2647 18 19 21 22 23
2648
2649
2650
2651
```

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2652 46
2653 46
2654 46
2655 46
2656 46
2657 46
2658 46
2659 46
2660 46
2661 46
2662 46
2663 46
2664 46
2665 46
2666 46
2667 46
2668 Route for vehicle 0:
2669 0 Fuel(253693) Time(58,58) Slack(60) FuelSlack(0,0)
) Distance(0) -> 28 Fuel(126859) Time(758,758)
Slack(120) FuelSlack(0,0) Distance(21139) -> 2 Fuel
(25) Time(1518,1518) Slack(925) FuelSlack(147858,
147883) Distance(42278) -> 25 Fuel(139842) Time(
3189,3189) Slack(120) FuelSlack(0,0) Distance(66921
) -> 26 Fuel(124476) Time(3386,3386) Slack(120)
FuelSlack(0,0) Distance(69482) -> 27 Fuel(108804)
Time(3585,3585) Slack(120) FuelSlack(0,0) Distance(
72094) -> 29 Fuel(77760) Time(3861,3861) Slack(120
) FuelSlack(0,0) Distance(77268) -> 30 Fuel(62088)
Time(4060,4060) Slack(120) FuelSlack(0,0) Distance(
79880) -> 12 Fuel(46722) Time(4257,4257) Slack(774
) FuelSlack(201852,201852) Distance(82441) -> 45
Fuel(132570) Time(5814,5814) Slack(0) FuelSlack(0,0)
) Distance(108296) -> 44 Fuel(124278) Time(5855,
5855) Slack(0) FuelSlack(0,0) Distance(109678) ->
43 Fuel(115632) Time(5898,5898) Slack(0) FuelSlack(
0,0) Distance(111119) -> 42 Fuel(107340) Time(5939,
5939) Slack(0) FuelSlack(0,0) Distance(112501) ->
41 Fuel(98736) Time(5982,5982) Slack(0) FuelSlack(0
,0) Distance(113935) -> 40 Fuel(90444) Time(6023,
6023) Slack(0) FuelSlack(0,0) Distance(115317) ->
39 Fuel(81798) Time(6066,6066) Slack(0) FuelSlack(0
```

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2669 ,0) Distance(116758) -> 38 Fuel(73506) Time(6107,
6107) Slack(0) FuelSlack(0,0) Distance(118140) ->
37 Fuel(64902) Time(6150,6150) Slack(0) FuelSlack(0
,0) Distance(119574) -> 36 Fuel(56610) Time(6191,
6191) Slack(0) FuelSlack(0,0) Distance(120956) ->
35 Fuel(47964) Time(6234,6234) Slack(0) FuelSlack(0
,0) Distance(122397) -> 34 Fuel(39672) Time(6275,
6275) Slack(0) FuelSlack(0,0) Distance(123779) ->
33 Fuel(31068) Time(6318,6318) Slack(0) FuelSlack(0
,0) Distance(125213) -> 32 Fuel(22776) Time(6359,
6359) Slack(0) FuelSlack(0,0) Distance(126595) ->
31 Fuel(14442) Time(6401,6401) Slack(0) FuelSlack(0
,0) Distance(127984) -> 20 Fuel(5838) Time(6444,
6444) Slack(906) FuelSlack(5838,287700) Distance(
129418) -> 24 Fuel(287700) Time(8950,8950) Distance
(182218)

2670 Distance of the route: 182218 ft
2671 Remaining Fuel of the route: 287700
2672 Total Time of the route: 8950 seconds
2673
2674 Total Distance of all routes: 182218 ft
2675 Total Fuel remaining of all routes: 287700
2676 Total Time of all routes: 8950 seconds
2677 3
2678 Start point is: 3
2679 16
2680 16
2681 (5.16, 5.24) (8.29, 4.03)
2682 14 15
2683 The travel time for UGV from depot B to NW UGV stop
is: 3385
2684 The UGV travel time between two UGV stops is: 4618
2685 ****
2686 UGV route goes infeasible although UAV has a
solution
2687 ****
2688 43862272.5
2689 End node is [18]
2690 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,

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```
2690 15, 16, 17]
2691 [25, 26]
2692 Objective: 6230
2693 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 13 14 15 16
2694 27
2695 27
2696 27
2697 27
2698 27
2699 27
2700 27
2701 27
2702 27
2703 27
2704 27
2705 27
2706 Route for vehicle 0:
2707 0 Fuel(287700) Time(1557,1557) Slack(60) FuelSlack(
    0,0) Distance(0) -> 22 Fuel(85854) Time(2636,2636)
    Slack(120) FuelSlack(0,0) Distance(33641) -> 21
    Fuel(70488) Time(2833,2833) Slack(120) FuelSlack(0,
    0) Distance(36202) -> 23 Fuel(39444) Time(3109,3109
    ) Slack(120) FuelSlack(0,0) Distance(41376) -> 6
    Fuel(8400) Time(3385,3385) Slack(898) FuelSlack(0,
    49723) Distance(46550) -> 24 Fuel(287700) Time(4360
    ,4387) Slack(0) FuelSlack(0,0) Distance(49111) ->
    17 Fuel(41323) Time(5604,5751) Slack(792) FuelSlack
    (67917,140365) Distance(90174) -> 20 Fuel(219783)
    Time(7924,8192) Slack(0) FuelSlack(0,0) Distance(
    140609) -> 19 Fuel(204417) Time(8001,8269) Slack(0
    ) FuelSlack(0,0) Distance(143170) -> 26 Fuel(56559
    ) Time(8795,9015) Slack(0) FuelSlack(0,0) Distance(
    167813) -> 12 Fuel(31125) Time(9043,9143) Slack(825
    ) FuelSlack(12816,43941) Distance(172052) -> 25
    Fuel(274884) Time(10032,10132) Slack(20) FuelSlack(
    0,0) Distance(174188) -> 18 Fuel(85128) Time(11110,
    11110) Distance(205814)
2708 Distance of the route: 205814 ft
2709 Remaining Fuel of the route: 85128
2710 Total Time of the route: 11110 seconds
2711
```

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2712 Total Distance of all routes: 205814 ft
2713 Total Fuel remaining of all routes: 85128
2714 Total Time of all routes: 11110 seconds
2715 2
2716 Start point is: 2
2717 16
2718 16
2719 (8.29, 4.03) (5.28, 5.71)
2720 14 14
2721 The travel time for UGV from depot B to NW UGV stop
    is: 3616
2722 The UGV travel time between two UGV stops is: 5063
2723 ****
2724 ***  
UGV route goes infeasible although UAV has a
    solution
2725 ****
2726 ***
2727 25408995.0
2728 End node is [24]
2729 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2730 [25, 26, 27, 28, 29, 30, 31]
2731 Objective: 7000000
2732 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
2733 32
2734 Route for vehicle 0:
2735 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2736 Distance of the route: 0 ft
2737 Remaining Fuel of the route: 287700
2738 Total Time of the route: 0 seconds
2739 0
2740 Total Distance of all routes: 0 ft
2741 Total Fuel remaining of all routes: 287700
2742 Total Time of all routes: 0 seconds
2743 4
2744 Start point is: 4
2745 31
```

```
2745 16
2746 (5.28, 5.71) (7.37, 3.27)
2747 14 14
2748 The travel time for UGV from depot B to NW UGV stop
    is: 924
2749 The UGV travel time between two UGV stops is: 4610
2750 10713024.0
2751 End node is [24]
2752 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2753 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44]
2754 Objective: 20000000
2755 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44
2756 45
2757 Route for vehicle 0:
2758 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2759 Distance of the route: 0 ft
2760 Remaining Fuel of the route: 287700
2761 Total Time of the route: 0 seconds
2762
2763 Total Distance of all routes: 0 ft
2764 Total Fuel remaining of all routes: 287700
2765 Total Time of all routes: 0 seconds
2766 2
2767 Start point is: 2
2768 16
2769 16
2770 (7.37, 3.27) (5.64, 7.14)
2771 14 15
2772 The travel time for UGV from depot B to NW UGV stop
    is: 3164
2773 The UGV travel time between two UGV stops is: 4886
2774 25000413.0
2775 End node is [24]
2776 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
```

```
2777 [25, 26, 27, 28, 29, 30, 31]
2778 Objective: 7000000
2779 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
2780 32
2781 Route for vehicle 0:
2782 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2783 Distance of the route: 0 ft
2784 Remaining Fuel of the route: 287700
2785 Total Time of the route: 0 seconds
2786
2787 Total Distance of all routes: 0 ft
2788 Total Fuel remaining of all routes: 287700
2789 Total Time of all routes: 0 seconds
2790 3
2791 Start point is: 3
2792 16
2793 16
2794 (7.68, 3.53) (5.04, 4.76)
2795 14 14
2796 The travel time for UGV from depot B to NW UGV stop
    is: 3347
2797 The UGV travel time between two UGV stops is: 4395
2798 ****
2799 ***
2800 ****
2801 46951027.5
2802 End node is [18]
2803 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
2804 [25, 26, 27, 28, 29]
2805 Objective: 2007073
2806 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 14 15 16 17 28
    29
2807 30
2808 30
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2809 30
2810 30
2811 30
2812 30
2813 30
2814 30
2815 30
2816 30
2817 30
2818 30
2819 30
2820 Route for vehicle 0:
2821 0 Fuel(286453) Time(1593,1593) Slack(60) FuelSlack(
    0,0) Distance(0) -> 25 Fuel(131323) Time(2436,2436
    ) Slack(120) FuelSlack(0,0) Distance(25855) -> 27
    Fuel(25015) Time(3092,3092) Slack(120) FuelSlack(0,
    0) Distance(43573) -> 26 Fuel(12397) Time(3275,3275
    ) Slack(120) FuelSlack(0,0) Distance(45676) -> 6
    Fuel(25) Time(3457,3457) Slack(925) FuelSlack(13391
    ,13441) Distance(47738) -> 22 Fuel(274309) Time(
    4991,4991) Slack(120) FuelSlack(0,0) Distance(67861
    ) -> 13 Fuel(25) Time(6496,6496) Slack(925)
    FuelSlack(178877,178927) Distance(113575) -> 19
    Fuel(108823) Time(9021,9021) Slack(120) FuelSlack(0
    ,0) Distance(166381) -> 20 Fuel(93457) Time(9218,
    9218) Slack(120) FuelSlack(0,0) Distance(168942
    ) -> 12 Fuel(25) Time(9809,9809) Slack(925)
    FuelSlack(0,23791) Distance(184514) -> 24 Fuel(
    287700) Time(10890,10890) Slack(120) FuelSlack(0,0
    ) Distance(189688) -> 21 Fuel(240984) Time(11245,
    11245) Slack(120) FuelSlack(0,0) Distance(197474
    ) -> 23 Fuel(209940) Time(11521,11521) Slack(120)
    FuelSlack(0,0) Distance(202648) -> 18 Fuel(23766)
    Time(12581,12581) Distance(233677)
2822 Distance of the route: 233677 ft
2823 Remaining Fuel of the route: 23766
2824 Total Time of the route: 12581 seconds
2825
2826 Total Distance of all routes: 233677 ft
2827 Total Fuel remaining of all routes: 23766
2828 Total Time of all routes: 12581 seconds
```

```
2829 2
2830 Start point is: 2
2831 16
2832 16
2833 (5.88, 8.09) (7.98, 3.78)
2834 14 14
2835 The travel time for UGV from depot B to NW UGV stop
    is: 4465
2836 The UGV travel time between two UGV stops is: 5840
2837 ****
2838 ***  
UGV route goes infeasible although UAV has a
    solution
2839 ****
2840 ***
2841 29319882.0
2842 End node is [24]
2843 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
2844 [25, 26, 27]
2845 Objective: 3000000
2846 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27
2847 28
2848 Route for vehicle 0:
2849 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
2850 2849 Distance of the route: 0 ft
2851 2849 Remaining Fuel of the route: 287700
2852 2849 Total Time of the route: 0 seconds
2853 2849
2854 2849 Total Distance of all routes: 0 ft
2855 2849 Total Fuel remaining of all routes: 287700
2856 2849 Total Time of all routes: 0 seconds
2857 2856 2
2858 2857 Start point is: 2
2859 2858 16
2860 2859 16
2861 2860 (8.91, 4.54) (5.88, 8.09)
2862 2861 14 15
```

```
2862 The travel time for UGV from depot B to NW UGV stop  
is: 3918  
2863 The UGV travel time between two UGV stops is: 5934  
2864 ****  
***  
2865 UGV route goes infeasible although UAV has a  
solution  
2866 ****  
***  
2867 29493091.5  
2868 End node is [24]  
2869 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
15, 16, 17, 18, 19, 20, 21, 22, 23]  
2870 []  
2871 Objective: 0  
2872 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
16 17 18 19 20 21 22 23  
2873 25  
2874 Route for vehicle 0:  
2875 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0  
)  
2876 Distance of the route: 0 ft  
2877 Remaining Fuel of the route: 287700  
2878 Total Time of the route: 0 seconds  
2879  
2880 Total Distance of all routes: 0 ft  
2881 Total Fuel remaining of all routes: 287700  
2882 Total Time of all routes: 0 seconds  
2883 5  
2884 Start point is: 5  
2885 16  
2886 31  
2887 (5.16, 5.24) (7.37, 3.27)  
2888 14 15  
2889 The travel time for UGV from depot B to NW UGV stop  
is: 4257  
2890 The UGV travel time between two UGV stops is: 4196  
2891 18682555.5  
2892 End node is [24]  
2893 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
```

```
2893 15, 16, 17, 18, 19, 20, 21, 22, 23]
2894 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45]
2895 Objective: 5507
2896 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17
                  18 19 21 22 23
2897 46
2898 46
2899 46
2900 46
2901 46
2902 46
2903 46
2904 46
2905 46
2906 46
2907 46
2908 46
2909 46
2910 46
2911 46
2912 46
2913 46
2914 46
2915 46
2916 46
2917 46
2918 46
2919 46
2920 46
2921 46
2922 Route for vehicle 0:
2923 0 Fuel(253693) Time(58,58) Slack(60) FuelSlack(0,0)
      ) Distance(0) -> 28 Fuel(126859) Time(758,758)
      Slack(120) FuelSlack(0,0) Distance(21139) -> 2 Fuel
      (25) Time(1518,1518) Slack(925) FuelSlack(147858,
      147883) Distance(42278) -> 25 Fuel(139842) Time(
      3189,3189) Slack(120) FuelSlack(0,0) Distance(66921
      ) -> 26 Fuel(124476) Time(3386,3386) Slack(120)
      FuelSlack(0,0) Distance(69482) -> 27 Fuel(108804)
      Time(3585,3585) Slack(120) FuelSlack(0,0) Distance(
```

```
2923 72094) -> 29 Fuel(77760) Time(3861,3861) Slack(120
) FuelSlack(0,0) Distance(77268) -> 30 Fuel(62088)
Time(4060,4060) Slack(120) FuelSlack(0,0) Distance(
79880) -> 12 Fuel(46722) Time(4257,4257) Slack(774
) FuelSlack(201852,201852) Distance(82441) -> 45
Fuel(132570) Time(5814,5814) Slack(0) FuelSlack(0,0
) Distance(108296) -> 44 Fuel(124278) Time(5855,
5855) Slack(0) FuelSlack(0,0) Distance(109678) ->
43 Fuel(115632) Time(5898,5898) Slack(0) FuelSlack(
0,0) Distance(111119) -> 42 Fuel(107340) Time(5939,
5939) Slack(0) FuelSlack(0,0) Distance(112501) ->
41 Fuel(98736) Time(5982,5982) Slack(0) FuelSlack(0
,0) Distance(113935) -> 40 Fuel(90444) Time(6023,
6023) Slack(0) FuelSlack(0,0) Distance(115317) ->
39 Fuel(81798) Time(6066,6066) Slack(0) FuelSlack(0
,0) Distance(116758) -> 38 Fuel(73506) Time(6107,
6107) Slack(0) FuelSlack(0,0) Distance(118140) ->
37 Fuel(64902) Time(6150,6150) Slack(0) FuelSlack(0
,0) Distance(119574) -> 36 Fuel(56610) Time(6191,
6191) Slack(0) FuelSlack(0,0) Distance(120956) ->
35 Fuel(47964) Time(6234,6234) Slack(0) FuelSlack(0
,0) Distance(122397) -> 34 Fuel(39672) Time(6275,
6275) Slack(0) FuelSlack(0,0) Distance(123779) ->
33 Fuel(31068) Time(6318,6318) Slack(0) FuelSlack(0
,0) Distance(125213) -> 32 Fuel(22776) Time(6359,
6359) Slack(0) FuelSlack(0,0) Distance(126595) ->
31 Fuel(14442) Time(6401,6401) Slack(0) FuelSlack(0
,0) Distance(127984) -> 20 Fuel(5838) Time(6444,
6444) Slack(906) FuelSlack(5838,287700) Distance(
129418) -> 24 Fuel(287700) Time(8950,8950) Distance
(182218)

2924 Distance of the route: 182218 ft
2925 Remaining Fuel of the route: 287700
2926 Total Time of the route: 8950 seconds
2927
2928 Total Distance of all routes: 182218 ft
2929 Total Fuel remaining of all routes: 287700
2930 Total Time of all routes: 8950 seconds
2931 5
2932 Start point is: 5
2933 16
```

```
2934 31
2935 (8.91, 4.54) (5.64, 7.14)
2936 14 14
2937 The travel time for UGV from depot B to NW UGV stop
      is: 0
2938 The UGV travel time between two UGV stops is: 5923
2939 22933707.0
2940 End node is [24]
2941 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
2942 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41]
2943 Objective: 16001408
2944 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 13 14 15 16
      17 18 19 20 21 22 23 25 27 28 29 30 31 32 33 34 35
      36 37 38 39 40 41
2945 42
2946 42
2947 42
2948 Route for vehicle 0:
2949 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 26 Fuel(148134) Time(704,704) Slack(
      0) FuelSlack(0,0) Distance(23261) -> 12 Fuel(8568)
      Time(1408,1408) Slack(897) FuelSlack(8423,287700)
      Distance(46522) -> 24 Fuel(287700) Time(2305,2305)
      Distance(46522)
2950 Distance of the route: 46522 ft
2951 Remaining Fuel of the route: 287700
2952 Total Time of the route: 2305 seconds
2953
2954 Total Distance of all routes: 46522 ft
2955 Total Fuel remaining of all routes: 287700
2956 Total Time of all routes: 2305 seconds
2957 3
2958 Start point is: 3
2959 16
2960 16
2961 (7.68, 3.53) (5.04, 4.76)
2962 14 14
2963 The travel time for UGV from depot B to NW UGV stop
      is: 3347
```

```
2964 The UGV travel time between two UGV stops is: 4395
2965 ****
2966 *** UGV route goes infeasible although UAV has a
2967 solution ****
2968 45501727.5
2969 End node is [18]
2970 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
2971 15, 16, 17]
2972 [25, 26, 27, 28, 29]
2973 Objective: 2006483
2973 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 13 14 15 17 28
2974 29
2975 30
2976 30
2977 30
2978 30
2979 30
2980 30
2981 30
2982 30
2983 30
2984 30
2985 30
2986 30
2987 Route for vehicle 0:
2988 0 Fuel(286453) Time(1583,1583) Slack(60) FuelSlack(
2989 0,0) Distance(0) -> 25 Fuel(131323) Time(2426,2426
2990 ) Slack(120) FuelSlack(0,0) Distance(25855) -> 27
2991 Fuel(25015) Time(3082,3082) Slack(120) FuelSlack(0,
2992 0) Distance(43573) -> 26 Fuel(12397) Time(3265,3265
2993 ) Slack(120) FuelSlack(0,0) Distance(45676) -> 6
2994 Fuel(25) Time(3447,3447) Slack(925) FuelSlack(27443
2995 ,27493) Distance(47738) -> 23 Fuel(260257) Time(
2996 4932,4932) Slack(120) FuelSlack(0,0) Distance(66236
2997 ) -> 16 Fuel(25) Time(6366,6366) Slack(925)
2998 FuelSlack(178884,178934) Distance(109608) -> 19
2999 Fuel(108816) Time(8891,8891) Slack(120) FuelSlack(0
```

```

2988 ,0) Distance(162414) -> 20 Fuel(93450) Time(9088,
9088) Slack(120) FuelSlack(0,0) Distance(164975
) -> 21 Fuel(77778) Time(9287,9287) Slack(120)
FuelSlack(0,0) Distance(167587) -> 22 Fuel(62412)
Time(9484,9484) Slack(120) FuelSlack(0,0) Distance(
170148) -> 12 Fuel(25) Time(9919,9919) Slack(925)
FuelSlack(0,117229) Distance(180546) -> 24 Fuel(
287700) Time(11000,11000) Slack(120) FuelSlack(0,0
) Distance(185720) -> 18 Fuel(117204) Time(11981,
11981) Distance(214136)
2989 Distance of the route: 214136 ft
2990 Remaining Fuel of the route: 117204
2991 Total Time of the route: 11981 seconds
2992
2993 Total Distance of all routes: 214136 ft
2994 Total Fuel remaining of all routes: 117204
2995 Total Time of all routes: 11981 seconds
2996 5
2997 Start point is: 5
2998 16
2999 31
3000 (7.98, 3.78) (5.52, 6.66)
3001 14 14
3002 The travel time for UGV from depot B to NW UGV stop
is: 452
3003 The UGV travel time between two UGV stops is: 5282
3004 11168124.0
3005 End node is [24]
3006 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17, 18, 19, 20, 21, 22, 23]
3007 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
, 38, 39]
3008 Objective: 15000000
3009 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39
3010 40
3011 Route for vehicle 0:
3012 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
)

```

```
3013 Distance of the route: 0 ft
3014 Remaining Fuel of the route: 287700
3015 Total Time of the route: 0 seconds
3016
3017 Total Distance of all routes: 0 ft
3018 Total Fuel remaining of all routes: 287700
3019 Total Time of all routes: 0 seconds
3020 5
3021 Start point is: 5
3022 16
3023 31
3024 (8.91, 4.54) (5.64, 7.14)
3025 14 15
3026 The travel time for UGV from depot B to NW UGV stop
    is: 0
3027 The UGV travel time between two UGV stops is: 5590
3028 21542184.0
3029 End node is [24]
3030 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
3031 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41]
3032 Objective: 16001408
3033 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 13 14 15 16
    17 18 19 20 21 22 23 25 27 28 29 30 31 32 33 34 35
    36 37 38 39 40 41
3034 42
3035 42
3036 42
3037 Route for vehicle 0:
3038 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 26 Fuel(148134) Time(704,704) Slack(
        0) FuelSlack(0,0) Distance(23261) -> 12 Fuel(8568)
        Time(1408,1408) Slack(897) FuelSlack(8423,287700)
        Distance(46522) -> 24 Fuel(287700) Time(2305,2305)
        Distance(46522)
3039 Distance of the route: 46522 ft
3040 Remaining Fuel of the route: 287700
3041 Total Time of the route: 2305 seconds
3042
3043 Total Distance of all routes: 46522 ft
```

```
3044 Total Fuel remaining of all routes: 287700
3045 Total Time of all routes: 2305 seconds
3046 2
3047 Start point is: 2
3048 16
3049 16
3050 (7.06, 3.02) (4.8, 3.81)
3051 14 15
3052 The travel time for UGV from depot B to NW UGV stop
      is: 3013
3053 The UGV travel time between two UGV stops is: 3534
3054 18987546.0
3055 End node is [24]
3056 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3057 [25, 26, 27, 28, 29, 30]
3058 Objective: 6000000
3059 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30
3060 31
3061 Route for vehicle 0:
3062 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
3063 Distance of the route: 0 ft
3064 Remaining Fuel of the route: 287700
3065 Total Time of the route: 0 seconds
3066
3067 Total Distance of all routes: 0 ft
3068 Total Fuel remaining of all routes: 287700
3069 Total Time of all routes: 0 seconds
3070 3
3071 Start point is: 3
3072 16
3073 16
3074 (4.92, 4.29) (7.37, 3.27)
3075 14 14
3076 The travel time for UGV from depot B to NW UGV stop
      is: 3015
3077 The UGV travel time between two UGV stops is: 4060
3078 *****
```

```
3078 ***
3079 UGV route goes infeasible although UAV has a
      solution
3080 ****
      ***
3081 46305568.5
3082 End node is [18]
3083 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
3084 [25, 26, 27, 28, 29, 30, 31]
3085 Objective: 6418
3086 Dropped nodes: 2 4 5 6 7 8 9 10 12 14 15 16 17
3087 32
3088 32
3089 32
3090 32
3091 32
3092 32
3093 32
3094 32
3095 32
3096 32
3097 32
3098 32
3099 32
3100 32
3101 32
3102 32
3103 32
3104 32
3105 Route for vehicle 0:
3106 0 Fuel(287700) Time(1537,1537) Slack(0) FuelSlack(0
      ,0) Distance(0) -> 25 Fuel(132570) Time(2320,2380)
      Slack(46) FuelSlack(0,0) Distance(25855) -> 23 Fuel
      (101526) Time(2582,2656) Slack(46) FuelSlack(0,0)
      Distance(31029) -> 3 Fuel(39444) Time(3015,3089)
      Slack(798) FuelSlack(168180,280734) Distance(41376
      ) -> 24 Fuel(119520) Time(4047,4248) Slack(0)
      FuelSlack(0,0) Distance(49111) -> 1 Fuel(73110)
      Time(4367,4602) Slack(690) FuelSlack(15366,88476)
      Distance(56846) -> 26 Fuel(272334) Time(5369,5604)
```

```

3106 Slack(0) FuelSlack(0,0) Distance(59407) -> 13 Fuel(52716) Time(6598,6833) Slack(755) FuelSlack(52716,82914) Distance(96010) -> 22 Fuel(287700) Time(8738,8973) Slack(0) FuelSlack(0,0) Distance(141724) -> 21 Fuel(272334) Time(8935,9170) Slack(0) FuelSlack(0,0) Distance(144285) -> 20 Fuel(256662) Time(9134,9369) Slack(0) FuelSlack(0,0) Distance(146897) -> 19 Fuel(241296) Time(9331,9566) Slack(0) FuelSlack(0,0) Distance(149458) -> 31 Fuel(93438) Time(10197,10432) Slack(0) FuelSlack(0,0) Distance(174101) -> 30 Fuel(80820) Time(10380,10615) Slack(0) FuelSlack(0,0) Distance(176204) -> 29 Fuel(68004) Time(10564,10799) Slack(0) FuelSlack(0,0) Distance(178340) -> 28 Fuel(55386) Time(10747,10982) Slack(0) FuelSlack(0,0) Distance(180443) -> 11 Fuel(30198) Time(10994,11212) Slack(827) FuelSlack(12816,43014) Distance(184641) -> 27 Fuel(274884) Time(11983,12103) Slack(0) FuelSlack(0,0) Distance(186777) -> 18 Fuel(122934) Time(12870,12870) Distance(212102)
3107 Distance of the route: 212102 ft
3108 Remaining Fuel of the route: 122934
3109 Total Time of the route: 12870 seconds
3110
3111 Total Distance of all routes: 212102 ft
3112 Total Fuel remaining of all routes: 122934
3113 Total Time of all routes: 12870 seconds
3114 3
3115 Start point is: 3
3116 16
3117 16
3118 (8.91, 4.54) (5.28, 5.71)
3119 15 15
3120 The travel time for UGV from depot B to NW UGV stop is: 3786
3121 The UGV travel time between two UGV stops is: 5069
3122 ****
3123 UGV route goes infeasible although UAV has a solution
3124 ****
3125 ***

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```
3125 53773837.5
3126 End node is [18]
3127 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
3128 []
3129 *****No solution found*****
3130 2
3131 Start point is: 2
3132 16
3133 16
3134 (5.28, 5.71) (8.6, 4.29)
3135 15 15
3136 The travel time for UGV from depot B to NW UGV stop
      is: 3301
3137 The UGV travel time between two UGV stops is: 4928
3138 24725494.5
3139 End node is [24]
3140 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3141 [25, 26, 27, 28, 29, 30]
3142 Objective: 6000000
3143 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30
3144 31
3145 Route for vehicle 0:
3146 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
3147 Distance of the route: 0 ft
3148 Remaining Fuel of the route: 287700
3149 Total Time of the route: 0 seconds
3150
3151 Total Distance of all routes: 0 ft
3152 Total Fuel remaining of all routes: 287700
3153 Total Time of all routes: 0 seconds
3154 2
3155 Start point is: 2
3156 16
3157 16
3158 (5.76, 7.62) (7.98, 3.78)
3159 15 14
```

```
3160 The travel time for UGV from depot B to NW UGV stop  
      is: 3995  
3161 The UGV travel time between two UGV stops is: 5655  
3162 ****  
      ***  
3163 UGV route goes infeasible although UAV has a  
      solution  
3164 ****  
      ***  
3165 27587179.5  
3166 End node is [24]  
3167 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
      15, 16, 17, 18, 19, 20, 21, 22, 23]  
3168 [25, 26, 27, 28]  
3169 Objective: 4000000  
3170 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
      16 17 18 19 20 21 22 23 25 26 27 28  
3171 29  
3172 Route for vehicle 0:  
3173 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0  
      )  
3174 Distance of the route: 0 ft  
3175 Remaining Fuel of the route: 287700  
3176 Total Time of the route: 0 seconds  
3177  
3178 Total Distance of all routes: 0 ft  
3179 Total Fuel remaining of all routes: 287700  
3180 Total Time of all routes: 0 seconds  
3181 2  
3182 Start point is: 2  
3183 16  
3184 16  
3185 (8.6, 4.29) (5.16, 5.24)  
3186 14 14  
3187 The travel time for UGV from depot B to NW UGV stop  
      is: 3767  
3188 The UGV travel time between two UGV stops is: 5033  
3189 ****  
      ***  
3190 UGV route goes infeasible although UAV has a
```

```
3190 solution
3191 ****
3192 25588065.0
3193 End node is [24]
3194 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3195 [25, 26, 27, 28, 29, 30, 31]
3196 Objective: 7000000
3197 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
3198 32
3199 Route for vehicle 0:
3200 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
3201 Distance of the route: 0 ft
3202 Remaining Fuel of the route: 287700
3203 Total Time of the route: 0 seconds
3204
3205 Total Distance of all routes: 0 ft
3206 Total Fuel remaining of all routes: 287700
3207 Total Time of all routes: 0 seconds
3208 5
3209 Start point is: 5
3210 16
3211 31
3212 (5.52, 6.66) (8.91, 4.54)
3213 15 15
3214 The travel time for UGV from depot B to NW UGV stop
      is: 4488
3215 The UGV travel time between two UGV stops is: 5414
3216 20306328.0
3217 End node is [24]
3218 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3219 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39]
3220 Objective: 15000000
3221 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
```

```
3221 34 35 36 37 38 39
3222 40
3223 Route for vehicle 0:
3224 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
)
3225 Distance of the route: 0 ft
3226 Remaining Fuel of the route: 287700
3227 Total Time of the route: 0 seconds
3228
3229 Total Distance of all routes: 0 ft
3230 Total Fuel remaining of all routes: 287700
3231 Total Time of all routes: 0 seconds
3232 2
3233 Start point is: 2
3234 16
3235 16
3236 (5.28, 5.71) (8.6, 4.29)
3237 15 15
3238 The travel time for UGV from depot B to NW UGV stop
    is: 3301
3239 The UGV travel time between two UGV stops is: 4928
3240 24725494.5
3241 End node is [24]
3242 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
3243 [25, 26, 27, 28, 29, 30]
3244 Objective: 6000000
3245 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30
3246 31
3247 Route for vehicle 0:
3248 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
)
3249 Distance of the route: 0 ft
3250 Remaining Fuel of the route: 287700
3251 Total Time of the route: 0 seconds
3252
3253 Total Distance of all routes: 0 ft
3254 Total Fuel remaining of all routes: 287700
```

```
3255 Total Time of all routes: 0 seconds
3256 3
3257 Start point is: 3
3258 16
3259 16
3260 (8.91, 4.54) (5.04, 4.76)
3261 14 15
3262 The travel time for UGV from depot B to NW UGV stop
    is: 3946
3263 The UGV travel time between two UGV stops is: 4724
3264 ****
3265 *** UGV route goes infeasible although UAV has a
    solution
3266 ****
3267 53135955.0
3268 End node is [18]
3269 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
3270 [25]
3271 *****No solution found*****
3272 5
3273 Start point is: 5
3274 16
3275 31
3276 (5.16, 5.24) (7.37, 3.27)
3277 14 15
3278 The travel time for UGV from depot B to NW UGV stop
    is: 4257
3279 The UGV travel time between two UGV stops is: 4196
3280 18850555.5
3281 End node is [24]
3282 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
3283 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45]
3284 Objective: 5507
3285 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17
    18 19 21 22 23
3286 46
```

```
3287 46
3288 46
3289 46
3290 46
3291 46
3292 46
3293 46
3294 46
3295 46
3296 46
3297 46
3298 46
3299 46
3300 46
3301 46
3302 46
3303 46
3304 46
3305 46
3306 46
3307 46
3308 46
3309 46
3310 46
3311 Route for vehicle 0:
3312 0 Fuel(253693) Time(58,58) Slack(60) FuelSlack(0,0)
) Distance(0) -> 28 Fuel(126859) Time(758,758)
Slack(120) FuelSlack(0,0) Distance(21139) -> 2 Fuel
(25) Time(1518,1518) Slack(925) FuelSlack(147858,
147883) Distance(42278) -> 25 Fuel(139842) Time(
3189,3189) Slack(120) FuelSlack(0,0) Distance(66921
) -> 26 Fuel(124476) Time(3386,3386) Slack(120)
FuelSlack(0,0) Distance(69482) -> 27 Fuel(108804)
Time(3585,3585) Slack(120) FuelSlack(0,0) Distance(
72094) -> 29 Fuel(77760) Time(3861,3861) Slack(120
) FuelSlack(0,0) Distance(77268) -> 30 Fuel(62088)
Time(4060,4060) Slack(120) FuelSlack(0,0) Distance(
79880) -> 12 Fuel(46722) Time(4257,4257) Slack(774
) FuelSlack(201852,201852) Distance(82441) -> 45
Fuel(132570) Time(5814,5814) Slack(0) FuelSlack(0,0
) Distance(108296) -> 44 Fuel(124278) Time(5855,
```

```

3312 5855) Slack(0) FuelSlack(0,0) Distance(109678) ->
    43 Fuel(115632) Time(5898,5898) Slack(0) FuelSlack(
    0,0) Distance(111119) -> 42 Fuel(107340) Time(5939,
    5939) Slack(0) FuelSlack(0,0) Distance(112501) ->
    41 Fuel(98736) Time(5982,5982) Slack(0) FuelSlack(0
    ,0) Distance(113935) -> 40 Fuel(90444) Time(6023,
    6023) Slack(0) FuelSlack(0,0) Distance(115317) ->
    39 Fuel(81798) Time(6066,6066) Slack(0) FuelSlack(0
    ,0) Distance(116758) -> 38 Fuel(73506) Time(6107,
    6107) Slack(0) FuelSlack(0,0) Distance(118140) ->
    37 Fuel(64902) Time(6150,6150) Slack(0) FuelSlack(0
    ,0) Distance(119574) -> 36 Fuel(56610) Time(6191,
    6191) Slack(0) FuelSlack(0,0) Distance(120956) ->
    35 Fuel(47964) Time(6234,6234) Slack(0) FuelSlack(0
    ,0) Distance(122397) -> 34 Fuel(39672) Time(6275,
    6275) Slack(0) FuelSlack(0,0) Distance(123779) ->
    33 Fuel(31068) Time(6318,6318) Slack(0) FuelSlack(0
    ,0) Distance(125213) -> 32 Fuel(22776) Time(6359,
    6359) Slack(0) FuelSlack(0,0) Distance(126595) ->
    31 Fuel(14442) Time(6401,6401) Slack(0) FuelSlack(0
    ,0) Distance(127984) -> 20 Fuel(5838) Time(6444,
    6444) Slack(906) FuelSlack(5838,287700) Distance(
    129418) -> 24 Fuel(287700) Time(8950,8950) Distance
    (182218)

3313 Distance of the route: 182218 ft
3314 Remaining Fuel of the route: 287700
3315 Total Time of the route: 8950 seconds
3316
3317 Total Distance of all routes: 182218 ft
3318 Total Fuel remaining of all routes: 287700
3319 Total Time of all routes: 8950 seconds
3320 5
3321 Start point is: 5
3322 16
3323 31
3324 (7.68, 3.53) (5.64, 7.14)
3325 14 14
3326 The travel time for UGV from depot B to NW UGV stop
    is: 599
3327 The UGV travel time between two UGV stops is: 5323
3328 23073276.0

```

```
3329 End node is [24]
3330 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3331 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41]
3332 Objective: 16001408
3333 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 12 13 14 15 16
      17 18 19 20 21 22 23 25 27 28 29 30 31 32 33 34 35
      36 37 38 39 40 41
3334 42
3335 42
3336 42
3337 Route for vehicle 0:
3338 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 26 Fuel(148134) Time(704,704) Slack(
      0) FuelSlack(0,0) Distance(23261) -> 6 Fuel(8568)
      Time(1408,1408) Slack(897) FuelSlack(8423,287700)
      Distance(46522) -> 24 Fuel(287700) Time(2305,2305)
      Distance(46522)
3339 Distance of the route: 46522 ft
3340 Remaining Fuel of the route: 287700
3341 Total Time of the route: 2305 seconds
3342
3343 Total Distance of all routes: 46522 ft
3344 Total Fuel remaining of all routes: 287700
3345 Total Time of all routes: 2305 seconds
3346 4
3347 Start point is: 4
3348 31
3349 16
3350 (7.68, 3.53) (5.4, 6.19)
3351 14 15
3352 The travel time for UGV from depot B to NW UGV stop
      is: 4767
3353 The UGV travel time between two UGV stops is: 4685
3354 19321353.0
3355 End node is [24]
3356 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3357 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43]
```

```
3358 Objective: 19000000
3359 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43
3360 44
3361 Route for vehicle 0:
3362 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
3363 Distance of the route: 0 ft
3364 Remaining Fuel of the route: 287700
3365 Total Time of the route: 0 seconds
3366
3367 Total Distance of all routes: 0 ft
3368 Total Fuel remaining of all routes: 287700
3369 Total Time of all routes: 0 seconds
3370 5
3371 Start point is: 5
3372 16
3373 31
3374 (7.68, 3.53) (5.04, 4.76)
3375 15 14
3376 The travel time for UGV from depot B to NW UGV stop
    is: 559
3377 The UGV travel time between two UGV stops is: 4395
3378 18448068.0
3379 End node is [24]
3380 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
3381 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45, 46]
3382 Objective: 15005196
3383 Dropped nodes: 1 2 3 5 6 9 10 11 12 13 14 15 16 17
    19 20 21 22 23 32 33 34 35 36 37 38 39 40 41 42 43
    44 45 46
3384 47
3385 47
3386 47
3387 47
3388 47
3389 47
```

```
3390 47
3391 47
3392 47
3393 47
3394 47
3395 47
3396 Route for vehicle 0:
3397 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20137) -> 7 Fuel(64164)
    Time(1128,1267) Slack(718) FuelSlack(117343,160644
    ) Distance(37256) -> 31 Fuel(191220) Time(2333,2472
    ) Slack(0) FuelSlack(0,0) Distance(53336) -> 8 Fuel
    (94740) Time(2909,2959) Slack(620) FuelSlack(205727
    ,205727) Distance(69416) -> 29 Fuel(176713) Time(
    4089,4139) Slack(70) FuelSlack(0,0) Distance(87914
    ) -> 4 Fuel(53846) Time(4829,4879) Slack(751)
    FuelSlack(201704,201704) Distance(108392) -> 25
    Fuel(139842) Time(6326,6376) Slack(70) FuelSlack(0,
    0) Distance(133035) -> 26 Fuel(124476) Time(6523,
    6573) Slack(70) FuelSlack(0,0) Distance(135596) ->
    27 Fuel(108804) Time(6722,6772) Slack(70) FuelSlack
    (0,0) Distance(138208) -> 28 Fuel(93438) Time(6919,
    6969) Slack(70) FuelSlack(0,0) Distance(140769) ->
    18 Fuel(31051) Time(7354,7354) Slack(825) FuelSlack
    (31051,287700) Distance(151167) -> 24 Fuel(287700)
    Time(8799,8799) Distance(171634)
3398 Distance of the route: 171634 ft
3399 Remaining Fuel of the route: 287700
3400 Total Time of the route: 8799 seconds
3401
3402 Total Distance of all routes: 171634 ft
3403 Total Fuel remaining of all routes: 287700
3404 Total Time of all routes: 8799 seconds
3405 5
3406 Start point is: 5
3407 16
3408 31
3409 (8.91, 4.54) (5.64, 7.14)
3410 14 15
3411 The travel time for UGV from depot B to NW UGV stop
```

```
3411 is: 0
3412 The UGV travel time between two UGV stops is: 5590
3413 21170184.0
3414 End node is [24]
3415 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3416 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41]
3417 Objective: 16001408
3418 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 12 13 14 15 16
                  17 18 19 20 21 22 23 25 27 28 29 30 31 32 33 34 35
                  36 37 38 39 40 41
3419 42
3420 42
3421 42
3422 Route for vehicle 0:
3423 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 26 Fuel(148134) Time(704,704) Slack(
      0) FuelSlack(0,0) Distance(23261) -> 6 Fuel(8568)
      Time(1408,1408) Slack(897) FuelSlack(8423,287700)
      Distance(46522) -> 24 Fuel(287700) Time(2305,2305)
      Distance(46522)
3424 Distance of the route: 46522 ft
3425 Remaining Fuel of the route: 287700
3426 Total Time of the route: 2305 seconds
3427
3428 Total Distance of all routes: 46522 ft
3429 Total Fuel remaining of all routes: 287700
3430 Total Time of all routes: 2305 seconds
3431 2
3432 Start point is: 2
3433 16
3434 16
3435 (8.29, 4.03) (4.8, 3.81)
3436 15 14
3437 The travel time for UGV from depot B to NW UGV stop
      is: 3375
3438 The UGV travel time between two UGV stops is: 4324
3439 21700785.0
3440 End node is [24]
3441 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
```

```
3441 15, 16, 17, 18, 19, 20, 21, 22, 23]
3442 [25, 26]
3443 Objective: 2000000
3444 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26
3445 27
3446 Route for vehicle 0:
3447 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
3448 Distance of the route: 0 ft
3449 Remaining Fuel of the route: 287700
3450 Total Time of the route: 0 seconds
3451
3452 Total Distance of all routes: 0 ft
3453 Total Fuel remaining of all routes: 287700
3454 Total Time of all routes: 0 seconds
3455 2
3456 Start point is: 2
3457 16
3458 16
3459 (5.52, 6.66) (7.37, 3.27)
3460 14 14
3461 The travel time for UGV from depot B to NW UGV stop
    is: 3907
3462 The UGV travel time between two UGV stops is: 4980
3463 24969222.0
3464 End node is [24]
3465 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
3466 [25, 26, 27, 28, 29]
3467 Objective: 5000000
3468 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29
3469 30
3470 Route for vehicle 0:
3471 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
3472 Distance of the route: 0 ft
3473 Remaining Fuel of the route: 287700
```

```
3474 Total Time of the route: 0 seconds
3475
3476 Total Distance of all routes: 0 ft
3477 Total Fuel remaining of all routes: 287700
3478 Total Time of all routes: 0 seconds
3479 4
3480 Start point is: 4
3481 31
3482 16
3483 (7.98, 3.78) (5.64, 7.14)
3484 15 14
3485 The travel time for UGV from depot B to NW UGV stop
      is: 4586
3486 The UGV travel time between two UGV stops is: 5470
3487 20767515.0
3488 End node is [24]
3489 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3490 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42]
3491 Objective: 18000000
3492 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
      34 35 36 37 38 39 40 41 42
3493 43
3494 Route for vehicle 0:
3495 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
3496 Distance of the route: 0 ft
3497 Remaining Fuel of the route: 287700
3498 Total Time of the route: 0 seconds
3499
3500 Total Distance of all routes: 0 ft
3501 Total Fuel remaining of all routes: 287700
3502 Total Time of all routes: 0 seconds
3503 5
3504 Start point is: 5
3505 16
3506 31
3507 (8.91, 4.54) (5.64, 7.14)
```

```
3508 14 15
3509 The travel time for UGV from depot B to NW UGV stop
      is: 0
3510 The UGV travel time between two UGV stops is: 5590
3511 21110184.0
3512 End node is [24]
3513 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3514 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41]
3515 Objective: 16001408
3516 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 12 13 14 15 16
      17 18 19 20 21 22 23 25 27 28 29 30 31 32 33 34 35
      36 37 38 39 40 41
3517 42
3518 42
3519 42
3520 Route for vehicle 0:
3521 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 26 Fuel(148134) Time(704,704) Slack(
      0) FuelSlack(0,0) Distance(23261) -> 6 Fuel(8568)
      Time(1408,1408) Slack(897) FuelSlack(8423,287700)
      Distance(46522) -> 24 Fuel(287700) Time(2305,2305)
      Distance(46522)
3522 Distance of the route: 46522 ft
3523 Remaining Fuel of the route: 287700
3524 Total Time of the route: 2305 seconds
3525
3526 Total Distance of all routes: 46522 ft
3527 Total Fuel remaining of all routes: 287700
3528 Total Time of all routes: 2305 seconds
3529 2
3530 Start point is: 2
3531 16
3532 16
3533 (8.29, 4.03) (5.4, 6.19)
3534 14 15
3535 The travel time for UGV from depot B to NW UGV stop
      is: 3616
3536 The UGV travel time between two UGV stops is: 4963
3537 *****
```

```
3537 ***
3538 UGV route goes infeasible although UAV has a
      solution
3539 ****
      ***
3540 25108065.0
3541 End node is [24]
3542 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3543 [25, 26, 27, 28, 29, 30]
3544 Objective: 6000000
3545 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30
3546 31
3547 Route for vehicle 0:
3548 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
3549 Distance of the route: 0 ft
3550 Remaining Fuel of the route: 287700
3551 Total Time of the route: 0 seconds
3552
3553 Total Distance of all routes: 0 ft
3554 Total Fuel remaining of all routes: 287700
3555 Total Time of all routes: 0 seconds
3556 3
3557 Start point is: 3
3558 16
3559 16
3560 (4.8, 3.81) (7.06, 3.02)
3561 15 15
3562 The travel time for UGV from depot B to NW UGV stop
      is: 2740
3563 The UGV travel time between two UGV stops is: 3534
3564 ****
      ***
3565 UGV route goes infeasible although UAV has a
      solution
3566 ****
      ***
3567 38790237.0
```

```
3568 End node is [18]
3569 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
3570 []
3571 Objective: 5554
3572 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 13 14 15 16
3573 25
3574 25
3575 25
3576 25
3577 25
3578 25
3579 25
3580 25
3581 25
3582 25
3583 Route for vehicle 0:
3584 0 Fuel(268383) Time(1537,1537) Slack(0) FuelSlack(0
      ,0) Distance(0) -> 19 Fuel(129249) Time(2239,2299)
      Slack(21) FuelSlack(0,0) Distance(23189) -> 6 Fuel(
      46053) Time(2740,2839) Slack(777) FuelSlack(0,65979
      ) Distance(37055) -> 20 Fuel(287700) Time(4078,4226
      ) Slack(0) FuelSlack(0,0) Distance(52333) -> 17
      Fuel(19926) Time(5550,5698) Slack(861) FuelSlack(
      165789,231768) Distance(96962) -> 24 Fuel(121911)
      Time(8075,8223) Slack(0) FuelSlack(0,0) Distance(
      149762) -> 23 Fuel(109293) Time(8258,8406) Slack(0
      ) FuelSlack(0,0) Distance(151865) -> 22 Fuel(96477
      ) Time(8442,8590) Slack(0) FuelSlack(0,0) Distance(
      154001) -> 21 Fuel(83859) Time(8625,8773) Slack(0)
      FuelSlack(0,0) Distance(156104) -> 12 Fuel(46053)
      Time(8935,9083) Slack(777) FuelSlack(0,287700)
      Distance(162405) -> 18 Fuel(287700) Time(10498,
      10498) Distance(183491)
3585 Distance of the route: 183491 ft
3586 Remaining Fuel of the route: 287700
3587 Total Time of the route: 10498 seconds
3588
3589 Total Distance of all routes: 183491 ft
3590 Total Fuel remaining of all routes: 287700
3591 Total Time of all routes: 10498 seconds
```

```
3592 4
3593 Start point is: 4
3594 31
3595 16
3596 (7.98, 3.78) (5.4, 6.19)
3597 15 15
3598 The travel time for UGV from depot B to NW UGV stop
    is: 4586
3599 The UGV travel time between two UGV stops is: 4822
3600 19031871.0
3601 End node is [24]
3602 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
3603 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42]
3604 Objective: 18000000
3605 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42
3606 43
3607 Route for vehicle 0:
3608 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
3609 Distance of the route: 0 ft
3610 Remaining Fuel of the route: 287700
3611 Total Time of the route: 0 seconds
3612
3613 Total Distance of all routes: 0 ft
3614 Total Fuel remaining of all routes: 287700
3615 Total Time of all routes: 0 seconds
3616 5
3617 Start point is: 5
3618 16
3619 31
3620 (7.68, 3.53) (5.4, 6.19)
3621 14 14
3622 The travel time for UGV from depot B to NW UGV stop
    is: 599
3623 The UGV travel time between two UGV stops is: 4953
3624 21097806.0
```

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3625 End node is [24]
3626 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
3627 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43]
3628 Objective: 16002695
3629 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 13 14 15 16 17
      18 19 20 21 22 23 25 29 30 31 32 33 34 35 36 37 38
      39 40 41 42 43
3630 44
3631 44
3632 44
3633 44
3634 44
3635 44
3636 Route for vehicle 0:
3637 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 28 Fuel(160866) Time(640,640) Slack(
      0) FuelSlack(0,0) Distance(21139) -> 12 Fuel(40128
      ) Time(1249,1249) Slack(796) FuelSlack(171198,
      171492) Distance(41262) -> 27 Fuel(156336) Time(
      2708,2708) Slack(0) FuelSlack(0,0) Distance(63156
      ) -> 26 Fuel(140664) Time(2787,2787) Slack(0)
      FuelSlack(0,0) Distance(65768) -> 6 Fuel(1098) Time
      (3491,3491) Slack(921) FuelSlack(1098,287700)
      Distance(89029) -> 24 Fuel(287700) Time(4412,4412)
      Distance(89029)
3638 Distance of the route: 89029 ft
3639 Remaining Fuel of the route: 287700
3640 Total Time of the route: 4412 seconds
3641
3642 Total Distance of all routes: 89029 ft
3643 Total Fuel remaining of all routes: 287700
3644 Total Time of all routes: 4412 seconds
3645 The best fitness obtained in the current generation
      is: 5446
3646 Candidate 1: [37, 15, 15, 15, 16, 18000000, 4]
3647 Candidate 2: [135, 14, 15, 41, 21, 50000000, 3]
3648 Candidate 1: [46, 14, 14, 3, 30, 12000000, 2]
3649 Candidate 2: [135, 14, 15, 41, 21, 50000000, 3]
3650 Father before deletion: [37, 15, 15, 15, 16,

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3650 18000000, 4]
3651 Mother before deletion: [46, 14, 14, 3, 30,
    12000000, 2]
3652 Father after deletion: [37, 15, 15, 15, 16, 4]
3653 Mother after deletion: [46, 14, 14, 3, 30, 2]
3654 00100101000011110000111100001111000100000000100
3655 001011100000111000001110000000110001111000000010
3656 Offspring1 after mutation:
    001001010000111100001110000000110001111000000100
3657 Offspring2 after mutation:
    00101110000011100000111100001111000100000000010
3658 48 48
3659 [37, 15, 14, 3, 30, 4]
3660 [46, 14, 15, 15, 16, 2]
3661 Candidate 1: [138, 15, 15, 2, 33, 15000000, 5]
3662 Candidate 2: [27, 14, 14, 15, 35, 16002695, 5]
3663 Candidate 1: [85, 14, 15, 5, 23, 5507, 5]
3664 Candidate 2: [37, 15, 15, 4, 16, 18000000, 4]
3665 Father before deletion: [138, 15, 15, 2, 33,
    15000000, 5]
3666 Mother before deletion: [85, 14, 15, 5, 23, 5507, 5
    ]
3667 Father after deletion: [138, 15, 15, 2, 33, 5]
3668 Mother after deletion: [85, 14, 15, 5, 23, 5]
3669 100010100000111100001111000000100010000100000101
3670 010101010000111000001111000001010001011100000101
3671 Offspring1 after mutation:
    100010100000111000001111000001010001000100000101
3672 Offspring2 after mutation:
    010101010000111100001111000000100010011100000101
3673 48 48
3674 [138, 14, 15, 5, 17, 5]
3675 [85, 15, 15, 2, 39, 5]
3676 Candidate 1: [83, 14, 15, 48, 5, 5446, 5]
3677 Candidate 2: [24, 15, 14, 40, 10, 15005196, 5]
3678 Candidate 1: [57, 14, 14, 21, 48, 10000000, 2]
3679 Candidate 2: [83, 14, 15, 48, 5, 5446, 5]
3680 Candidate 1: [24, 14, 14, 17, 26, 7006483, 3]
3681 Candidate 2: [42, 15, 14, 20, 40, 2000000, 2]
3682 Father before deletion: [83, 14, 15, 48, 5, 5446, 5
    ]

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3683 Mother before deletion: [42, 15, 14, 20, 40,
    2000000, 2]
3684 Father after deletion: [83, 14, 15, 48, 5, 5]
3685 Mother after deletion: [42, 15, 14, 20, 40, 2]
3686 010100110000111000001111001100000000010100000101
3687 00101010000011110000111000010100001010000000010
3688 Offspring1 after mutation:
    010100110000111100001110000101000010010100000101
3689 Offspring2 after mutation:
    001010100000111000001111001100000000100000000010
3690 48 48
3691 [83, 15, 14, 20, 37, 5]
3692 [42, 14, 15, 48, 8, 2]
3693 Candidate 1: [110, 15, 14, 30, 37, 9000000, 2]
3694 Candidate 2: [55, 14, 14, 21, 38, 12000000, 2]
3695 Candidate 1: [54, 14, 15, 30, 37, 8000000, 2]
3696 Candidate 2: [59, 15, 15, 31, 11, 16000000, 4]
3697 Father before deletion: [110, 15, 14, 30, 37,
    9000000, 2]
3698 Mother before deletion: [54, 14, 15, 30, 37,
    8000000, 2]
3699 Father after deletion: [110, 15, 14, 30, 37, 2]
3700 Mother after deletion: [54, 14, 15, 30, 37, 2]
3701 011011100000111100001110000111100010010100000010
3702 001101100000111000001111000111100010010100000010
3703 Offspring1 after mutation:
    011011100000111000001111000111100010010100000010
3704 Offspring2 after mutation:
    001101100000111100001110000111100010010100000010
3705 48 48
3706 [110, 14, 15, 30, 37, 2]
3707 [54, 15, 14, 30, 37, 2]
3708 Candidate 1: [2, 14, 15, 27, 17, 6000000, 2]
3709 Candidate 2: [85, 14, 14, 3, 23, 5507, 5]
3710 Candidate 1: [126, 15, 14, 46, 6, 11000000, 2]
3711 Candidate 2: [74, 15, 15, 31, 12, 5447, 5]
3712 Father before deletion: [85, 14, 14, 3, 23, 5507, 5
    ]
3713 Mother before deletion: [74, 15, 15, 31, 12, 5447,
    5]
3714 Father after deletion: [85, 14, 14, 3, 23, 5]

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3715 Mother after deletion: [74, 15, 15, 31, 12, 5]
3716 01010101000011100000111000000110001011100000101
3717 010010100000111100001111000111110000110000000101
3718 Offspring1 after mutation:
    010101010000111000001111000000110001011100000101
3719 Offspring2 after mutation:
    010010100000111100001110000111110000110000000101
3720 48 48
3721 [85, 14, 15, 3, 23, 5]
3722 [74, 15, 14, 31, 12, 5]
3723 Candidate 1: [19, 14, 15, 27, 17, 7000000, 2]
3724 Candidate 2: [24, 14, 14, 21, 32, 7007073, 3]
3725 Candidate 1: [37, 15, 15, 4, 16, 18000000, 4]
3726 Candidate 2: [66, 15, 15, 45, 19, 50000000, 3]
3727 Father before deletion: [19, 14, 15, 27, 17,
    7000000, 2]
3728 Mother before deletion: [37, 15, 15, 4, 16,
    18000000, 4]
3729 Father after deletion: [19, 14, 15, 27, 17, 2]
3730 Mother after deletion: [37, 15, 15, 4, 16, 4]
3731 000100110000111000001111000110110001000100000010
3732 001001010000111100001111000001000001000000000100
3733 Offspring1 after mutation:
    001001010000111100001111000110110001000100000010
3734 Offspring2 after mutation:
    000100110000111000001111000001000001000000000100
3735 48 48
3736 [37, 15, 15, 27, 17, 2]
3737 [19, 14, 15, 4, 16, 4]
3738 Candidate 1: [38, 14, 14, 17, 26, 15000000, 5]
3739 Candidate 2: [42, 15, 14, 20, 40, 2000000, 2]
3740 Candidate 1: [138, 15, 15, 2, 33, 15000000, 5]
3741 Candidate 2: [66, 15, 15, 45, 19, 50000000, 3]
3742 Father before deletion: [42, 15, 14, 20, 40,
    2000000, 2]
3743 Mother before deletion: [138, 15, 15, 2, 33,
    15000000, 5]
3744 Father after deletion: [42, 15, 14, 20, 40, 2]
3745 Mother after deletion: [138, 15, 15, 2, 33, 5]
3746 001010100000111100001110000101000010100000000010
3747 100010100000111100001111000000100010000100000101

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3748 Offspring1 after mutation:
    00101010000011110000111100010100001010000000010
3749 Offspring2 after mutation:
    1000101000001111000011110000000100010000100000101
3750 48 48
3751 [42, 15, 15, 20, 40, 2]
3752 [138, 15, 14, 2, 33, 5]
3753 Candidate 1: [86, 14, 14, 28, 14, 20000000, 4]
3754 Candidate 2: [39, 15, 14, 17, 28, 18000000, 4]
3755 Candidate 1: [54, 14, 15, 30, 37, 8000000, 2]
3756 Candidate 2: [138, 15, 15, 2, 33, 15000000, 5]
3757 Father before deletion: [39, 15, 14, 17, 28,
    18000000, 4]
3758 Mother before deletion: [54, 14, 15, 30, 37,
    8000000, 2]
3759 Father after deletion: [39, 15, 14, 17, 28, 4]
3760 Mother after deletion: [54, 14, 15, 30, 37, 2]
3761 001001110000111100001110000100010001110000000100
3762 001101100000111000001111000111100010010100000010
3763 Offspring1 after mutation:
    001001110000111000001111000111100010010000000100
3764 Offspring2 after mutation:
    001101100000111100001110000100010001110100000010
3765 48 48
3766 [39, 14, 15, 30, 36, 4]
3767 [54, 15, 14, 17, 29, 2]
3768 Candidate 1: [74, 14, 14, 10, 4, 5447, 5]
3769 Candidate 2: [115, 14, 15, 13, 6, 5006230, 3]
3770 Candidate 1: [59, 15, 15, 31, 11, 16000000, 4]
3771 Candidate 2: [71, 14, 14, 40, 3, 5000000, 2]
3772 Father before deletion: [74, 14, 14, 10, 4, 5447, 5
    ]
3773 Mother before deletion: [71, 14, 14, 40, 3, 5000000
    , 2]
3774 Father after deletion: [74, 14, 14, 10, 4, 5]
3775 Mother after deletion: [71, 14, 14, 40, 3, 2]
3776 010010100000111000001110000010100000010000000101
3777 01000111000011100000111000101000000001100000010
3778 Offspring1 after mutation:
    010011110000111000001110000010100000010000000101
3779 Offspring2 after mutation:

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3779 01000010000011100000111000101000000001100000010
3780 48 48
3781 [79, 14, 14, 10, 4, 5]
3782 [66, 14, 14, 40, 3, 2]
3783 Candidate 1: [126, 15, 15, 41, 22, 6000000, 2]
3784 Candidate 2: [14, 15, 14, 9, 48, 20000000, 4]
3785 Candidate 1: [74, 15, 15, 31, 12, 5447, 5]
3786 Candidate 2: [72, 15, 15, 36, 11, 5005554, 3]
3787 Father before deletion: [126, 15, 15, 41, 22,
6000000, 2]
3788 Mother before deletion: [74, 15, 15, 31, 12, 5447,
5]
3789 Father after deletion: [126, 15, 15, 41, 22, 2]
3790 Mother after deletion: [74, 15, 15, 31, 12, 5]
3791 01111100000111100001111001010010001011000000010
3792 010010100000111100001111000111110000110000000101
3793 Offspring1 after mutation:
01111100000111100001111000111110000111000000010
3794 Offspring2 after mutation:
010010100000111100001111001010010001010000000101
3795 48 48
3796 [126, 15, 15, 31, 14, 2]
3797 [74, 15, 15, 41, 20, 5]
3798 Candidate 1: [46, 14, 15, 13, 6, 7000000, 2]
3799 Candidate 2: [42, 15, 14, 20, 40, 2000000, 2]
3800 Candidate 1: [74, 15, 15, 31, 12, 5447, 5]
3801 Candidate 2: [64, 14, 15, 27, 42, 50000000, 3]
3802 Father before deletion: [42, 15, 14, 20, 40,
2000000, 2]
3803 Mother before deletion: [74, 15, 15, 31, 12, 5447,
5]
3804 Father after deletion: [42, 15, 14, 20, 40, 2]
3805 Mother after deletion: [74, 15, 15, 31, 12, 5]
3806 001010100000111100001110000101000010100000000010
3807 010010100000111100001111000111110000110000000101
3808 Offspring1 after mutation:
001010100000111100001110000101000010100000000010
3809 Offspring2 after mutation:
010010100000111100001111000111110000110000000101
3810 48 48
3811 [42, 15, 14, 20, 40, 2]
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3812 [74, 15, 15, 31, 12, 5]
3813 Candidate 1: [115, 14, 15, 13, 6, 5006230, 3]
3814 Candidate 2: [59, 14, 14, 10, 3, 16000000, 4]
3815 Candidate 1: [85, 14, 15, 19, 23, 5507, 5]
3816 Candidate 2: [46, 14, 15, 13, 6, 7000000, 2]
3817 Father before deletion: [115, 14, 15, 13, 6,
    5006230, 3]
3818 Mother before deletion: [85, 14, 15, 19, 23, 5507,
    5]
3819 Father after deletion: [115, 14, 15, 13, 6, 3]
3820 Mother after deletion: [85, 14, 15, 19, 23, 5]
3821 011100110000111000001111000011010000011000000011
3822 010101010000111000001111000100110001011100000101
3823 Offspring1 after mutation:
    011100010000111000001111000011010000011000000011
3824 Offspring2 after mutation:
    010101110000111000001111000100110001011100000101
3825 48 48
3826 [113, 14, 15, 13, 6, 3]
3827 [87, 14, 15, 19, 23, 5]
3828 Candidate 1: [27, 14, 15, 4, 32, 19000000, 4]
3829 Candidate 2: [71, 14, 14, 40, 3, 5000000, 2]
3830 Candidate 1: [57, 14, 14, 21, 48, 10000000, 2]
3831 Candidate 2: [83, 14, 14, 27, 42, 5006418, 3]
3832 Father before deletion: [71, 14, 14, 40, 3, 5000000
    , 2]
3833 Mother before deletion: [83, 14, 14, 27, 42,
    5006418, 3]
3834 Father after deletion: [71, 14, 14, 40, 3, 2]
3835 Mother after deletion: [83, 14, 14, 27, 42, 3]
3836 010001110000111000001110001010000000001100000010
3837 010100110000111000001110000110110010101000000011
3838 Offspring1 after mutation:
    010001110000111000001110001010000000001100000010
3839 Offspring2 after mutation:
    010100110000111000001110000110110010101000000011
3840 48 48
3841 [71, 14, 14, 40, 3, 2]
3842 [83, 14, 14, 27, 42, 3]
3843 Candidate 1: [29, 14, 14, 35, 43, 16001408, 5]
3844 Candidate 2: [42, 15, 14, 20, 40, 2000000, 2]

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3845 Candidate 1: [85, 14, 15, 5, 23, 5507, 5]
3846 Candidate 2: [85, 14, 15, 19, 23, 5507, 5]
3847 Father before deletion: [42, 15, 14, 20, 40,
    2000000, 2]
3848 Mother before deletion: [85, 14, 15, 5, 23, 5507, 5
    ]
3849 Father after deletion: [42, 15, 14, 20, 40, 2]
3850 Mother after deletion: [85, 14, 15, 5, 23, 5]
3851 001010100000111100001110000101000010100000000010
3852 010101010000111000001111000001010001011100000101
3853 Offspring1 after mutation:
    001010100000111100001111000001000010100000000010
3854 Offspring2 after mutation:
    010101010000111000001110000101010001011100000101
3855 48 48
3856 [42, 15, 15, 4, 40, 2]
3857 [85, 14, 14, 21, 23, 5]
3858 Candidate 1: [42, 15, 14, 20, 40, 2000000, 2]
3859 Candidate 2: [29, 14, 14, 35, 43, 16001408, 5]
3860 Candidate 1: [74, 14, 14, 10, 4, 5447, 5]
3861 Candidate 2: [126, 15, 14, 46, 6, 11000000, 2]
3862 Father before deletion: [42, 15, 14, 20, 40,
    2000000, 2]
3863 Mother before deletion: [74, 14, 14, 10, 4, 5447, 5
    ]
3864 Father after deletion: [42, 15, 14, 20, 40, 2]
3865 Mother after deletion: [74, 14, 14, 10, 4, 5]
3866 001010100000111100001110000101000010100000000010
3867 010010100000111000001110000010100000010000000101
3868 Offspring1 after mutation:
    001010100000111100001110000010100000100000000010
3869 Offspring2 after mutation:
    010010100000111000001110000101000010010000000101
3870 48 48
3871 [42, 15, 14, 10, 8, 2]
3872 [74, 14, 14, 20, 36, 5]
3873 Candidate 1: [71, 14, 14, 40, 3, 5000000, 2]
3874 Candidate 2: [27, 14, 15, 4, 32, 19000000, 4]
3875 Candidate 1: [72, 15, 15, 36, 11, 5005554, 3]
3876 Candidate 2: [37, 15, 15, 15, 16, 18000000, 4]
3877 Father before deletion: [71, 14, 14, 40, 3, 5000000
    ]

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3877 , 2]
3878 Mother before deletion: [72, 15, 15, 36, 11,
5005554, 3]
3879 Father after deletion: [71, 14, 14, 40, 3, 2]
3880 Mother after deletion: [72, 15, 15, 36, 11, 3]
3881 010001110000111000001110001010000000001100000010
3882 010010000000111100001111001001000000101100000011
3883 Offspring1 after mutation:
010001110000111000001110001010000000001100000010
3884 Offspring2 after mutation:
010010000000111100001111001001000000101100000011
3885 48 48
3886 [71, 14, 14, 40, 3, 2]
3887 [72, 15, 15, 36, 11, 3]
3888 Candidate 1: [71, 14, 14, 40, 3, 5000000, 2]
3889 Candidate 2: [8, 15, 15, 5, 10, 15000000, 5]
3890 Candidate 1: [19, 14, 15, 27, 17, 7000000, 2]
3891 Candidate 2: [39, 15, 14, 17, 28, 18000000, 4]
3892 Father before deletion: [71, 14, 14, 40, 3, 5000000
, 2]
3893 Mother before deletion: [19, 14, 15, 27, 17,
7000000, 2]
3894 Father after deletion: [71, 14, 14, 40, 3, 2]
3895 Mother after deletion: [19, 14, 15, 27, 17, 2]
3896 010001110000111000001110001010000000001100000010
3897 000100110000111000001111000110110001000100000010
3898 Offspring1 after mutation:
010001110000111000001111000110110001000100000010
3899 Offspring2 after mutation:
000100110000111000001110001010000000001100000010
3900 48 48
3901 [71, 14, 15, 27, 17, 2]
3902 [19, 14, 14, 40, 3, 2]
3903 Candidate 1: [29, 14, 14, 35, 43, 16001408, 5]
3904 Candidate 2: [83, 14, 14, 27, 42, 5006418, 3]
3905 Candidate 1: [85, 14, 15, 5, 23, 5507, 5]
3906 Candidate 2: [54, 14, 15, 30, 37, 8000000, 2]
3907 Father before deletion: [83, 14, 14, 27, 42,
5006418, 3]
3908 Mother before deletion: [85, 14, 15, 5, 23, 5507, 5
]
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3909 Father after deletion: [83, 14, 14, 27, 42, 3]
3910 Mother after deletion: [85, 14, 15, 5, 23, 5]
3911 01010011000011100000111000010110010101000000011
3912 010101010000111000001111000001010001011100000101
3913 Offspring1 after mutation:
    01010101000011100000111100000101000101000000011
3914 Offspring2 after mutation:
    010100110000111000001110000110110011001000000101
3915 48 48
3916 [85, 14, 15, 5, 10, 3]
3917 [83, 14, 14, 27, 50, 5]
3918 Candidate 1: [66, 15, 15, 45, 19, 50000000, 3]
3919 Candidate 2: [24, 14, 14, 21, 32, 7007073, 3]
3920 Candidate 1: [85, 14, 14, 3, 23, 5507, 5]
3921 Candidate 2: [86, 14, 14, 28, 14, 20000000, 4]
3922 Father before deletion: [24, 14, 14, 21, 32,
    7007073, 3]
3923 Mother before deletion: [85, 14, 14, 3, 23, 5507, 5
    ]
3924 Father after deletion: [24, 14, 14, 21, 32, 3]
3925 Mother after deletion: [85, 14, 14, 3, 23, 5]
3926 00011000000011100000111000010101001000000000011
3927 010101010000111000001110000000110001011100000101
3928 Offspring1 after mutation:
    000110000000111000001110000101010010000000000011
3929 Offspring2 after mutation:
    010101010000111000001110000000110001011100000101
3930 48 48
3931 [24, 14, 14, 21, 32, 3]
3932 [85, 14, 14, 3, 23, 5]
3933 Candidate 1: [59, 15, 15, 31, 11, 16000000, 4]
3934 Candidate 2: [27, 14, 14, 15, 35, 16002695, 5]
3935 Candidate 1: [71, 14, 15, 19, 3, 5000000, 2]
3936 Candidate 2: [69, 14, 15, 11, 26, 16001408, 5]
3937 Father before deletion: [59, 15, 15, 31, 11,
    16000000, 4]
3938 Mother before deletion: [71, 14, 15, 19, 3, 5000000
    , 2]
3939 Father after deletion: [59, 15, 15, 31, 11, 4]
3940 Mother after deletion: [71, 14, 15, 19, 3, 2]
3941 001110110000111100001111000111110000101100000100

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3942 010001110000111000001111000100110000001100000010
3943 Offspring1 after mutation:
    00000111000011100000111100011110000101100000100
3944 Offspring2 after mutation:
    011110110000111100001111000100110000001100000010
3945 48 48
3946 [7, 14, 15, 31, 11, 4]
3947 [123, 15, 15, 19, 3, 2]
3948 Candidate 1: [58, 15, 14, 10, 3, 16000000, 4]
3949 Candidate 2: [66, 15, 15, 45, 19, 50000000, 3]
3950 Candidate 1: [71, 14, 14, 40, 3, 50000000, 2]
3951 Candidate 2: [66, 15, 15, 45, 19, 50000000, 3]
3952 Father before deletion: [58, 15, 14, 10, 3,
    16000000, 4]
3953 Mother before deletion: [71, 14, 14, 40, 3, 5000000
    , 2]
3954 Father after deletion: [58, 15, 14, 10, 3, 4]
3955 Mother after deletion: [71, 14, 14, 40, 3, 2]
3956 001110100000111100001110000010100000001100000100
3957 01000111000011100000111000101000000001100000010
3958 Offspring1 after mutation:
    001110100000111100001110000010100000001100000100
3959 Offspring2 after mutation:
    01000111000011100000111000101000000001100000010
3960 48 48
3961 [58, 15, 14, 10, 3, 4]
3962 [71, 14, 14, 40, 3, 2]
3963 Candidate 1: [135, 14, 15, 41, 21, 50000000, 3]
3964 Candidate 2: [47, 14, 15, 13, 6, 11000000, 2]
3965 Candidate 1: [111, 14, 14, 34, 38, 8000000, 2]
3966 Candidate 2: [138, 15, 15, 2, 33, 15000000, 5]
3967 Father before deletion: [47, 14, 15, 13, 6,
    11000000, 2]
3968 Mother before deletion: [111, 14, 14, 34, 38,
    8000000, 2]
3969 Father after deletion: [47, 14, 15, 13, 6, 2]
3970 Mother after deletion: [111, 14, 14, 34, 38, 2]
3971 001011110000111000001111000011010000011000000010
3972 011011110000111000001110001000100010011000000010
3973 Offspring1 after mutation:
    001011110000111000001110001000110000011000000010
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3974 Offspring2 after mutation:
011011110000111000001111000011000010011000000010
3975 48 48
3976 [47, 14, 14, 35, 6, 2]
3977 [111, 14, 15, 12, 38, 2]
3978 Candidate 1: [83, 14, 14, 27, 42, 5006418, 3]
3979 Candidate 2: [135, 14, 15, 41, 21, 50000000, 3]
3980 Candidate 1: [42, 15, 14, 20, 40, 2000000, 2]
3981 Candidate 2: [111, 14, 14, 34, 38, 8000000, 2]
3982 Father before deletion: [83, 14, 14, 27, 42,
5006418, 3]
3983 Mother before deletion: [42, 15, 14, 20, 40,
2000000, 2]
3984 Father after deletion: [83, 14, 14, 27, 42, 3]
3985 Mother after deletion: [42, 15, 14, 20, 40, 2]
3986 010100110000111000001110000110110010101000000011
3987 00101010000011110000111000010100001010000000010
3988 Offspring1 after mutation:
010100110000111000001110000110110010101000000011
3989 Offspring2 after mutation:
00101010000011110000111000010100001010000000010
3990 48 48
3991 [83, 14, 14, 27, 42, 3]
3992 [42, 15, 14, 20, 40, 2]
3993 Candidate 1: [71, 14, 14, 40, 3, 5000000, 2]
3994 Candidate 2: [133, 15, 15, 18, 9, 15000000, 4]
3995 Candidate 1: [24, 14, 14, 17, 26, 7006483, 3]
3996 Candidate 2: [24, 15, 14, 40, 10, 15005196, 5]
3997 Father before deletion: [71, 14, 14, 40, 3, 5000000
, 2]
3998 Mother before deletion: [24, 14, 14, 17, 26,
7006483, 3]
3999 Father after deletion: [71, 14, 14, 40, 3, 2]
4000 Mother after deletion: [24, 14, 14, 17, 26, 3]
4001 01000111000011100000111000101000000001100000010
4002 000110000000111000001110000100010001101000000011
4003 Offspring1 after mutation:
01011000000011100000111000101000000001100000010
4004 Offspring2 after mutation:
000001110000111000001110000100010001101000000011
4005 48 48

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4006 [88, 14, 14, 40, 3, 2]
4007 [7, 14, 14, 17, 26, 3]
4008 Candidate 1: [110, 15, 14, 30, 37, 9000000, 2]
4009 Candidate 2: [138, 15, 15, 2, 33, 15000000, 5]
4010 Candidate 1: [133, 15, 15, 18, 9, 15000000, 4]
4011 Candidate 2: [111, 14, 14, 34, 38, 8000000, 2]
4012 Father before deletion: [110, 15, 14, 30, 37,
    9000000, 2]
4013 Mother before deletion: [111, 14, 14, 34, 38,
    8000000, 2]
4014 Father after deletion: [110, 15, 14, 30, 37, 2]
4015 Mother after deletion: [111, 14, 14, 34, 38, 2]
4016 011011100000111100001110000111100010010100000010
4017 011011110000111000001110001000100010011000000010
4018 Offspring1 after mutation:
    011011110000111000001110001100100010010100000010
4019 Offspring2 after mutation:
    011011100000111100001110000000100010011000000010
4020 48 48
4021 [111, 14, 14, 50, 37, 2]
4022 [110, 15, 14, 2, 38, 2]
4023 Candidate 1: [8, 15, 15, 5, 10, 15000000, 5]
4024 Candidate 2: [24, 14, 14, 17, 26, 7006483, 3]
4025 Candidate 1: [8, 15, 15, 5, 10, 15000000, 5]
4026 Candidate 2: [37, 15, 15, 15, 16, 18000000, 4]
4027 Father before deletion: [24, 14, 14, 17, 26,
    7006483, 3]
4028 Mother before deletion: [8, 15, 15, 5, 10, 15000000
    , 5]
4029 Father after deletion: [24, 14, 14, 17, 26, 3]
4030 Mother after deletion: [8, 15, 15, 5, 10, 5]
4031 000110000000111000001110000100010001101000000011
4032 00001000000011110000111100001010000101000000101
4033 Offspring1 after mutation:
    00011000000011100000111100001010001101000000011
4034 Offspring2 after mutation:
    000010000000111100001110000100010000101000000101
4035 48 48
4036 [24, 14, 15, 5, 26, 3]
4037 [8, 15, 14, 17, 10, 5]
4038 Candidate 1: [57, 14, 14, 21, 48, 10000000, 2]

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4039 Candidate 2: [102, 15, 14, 5, 31, 18000000, 4]
4040 Candidate 1: [59, 14, 14, 10, 3, 16000000, 4]
4041 Candidate 2: [57, 14, 14, 21, 48, 10000000, 2]
4042 Candidate 1: [138, 15, 15, 2, 33, 15000000, 5]
4043 Candidate 2: [83, 14, 15, 48, 5, 5446, 5]
4044 Father before deletion: [57, 14, 14, 21, 48,
    10000000, 2]
4045 Mother before deletion: [83, 14, 15, 48, 5, 5446, 5
    ]
4046 Father after deletion: [57, 14, 14, 21, 48, 2]
4047 Mother after deletion: [83, 14, 15, 48, 5, 5]
4048 001110010000111000001110000101010011000000000010
4049 010100110000111000001111001100000000010100000101
4050 Offspring1 after mutation:
    00111001000011100000111100110010001100000000010
4051 Offspring2 after mutation:
    010100110000111000001110000100000000010100000101
4052 48 48
4053 [57, 14, 15, 50, 48, 2]
4054 [83, 14, 14, 16, 5, 5]
4055 Candidate 1: [27, 14, 14, 15, 35, 16002695, 5]
4056 Candidate 2: [42, 15, 14, 20, 40, 2000000, 2]
4057 Candidate 1: [37, 15, 15, 15, 16, 18000000, 4]
4058 Candidate 2: [83, 14, 15, 48, 5, 5446, 5]
4059 Father before deletion: [42, 15, 14, 20, 40,
    2000000, 2]
4060 Mother before deletion: [83, 14, 15, 48, 5, 5446, 5
    ]
4061 Father after deletion: [42, 15, 14, 20, 40, 2]
4062 Mother after deletion: [83, 14, 15, 48, 5, 5]
4063 001010100000111100001110000101000010100000000010
4064 010100110000111000001111001100000000010100000101
4065 Offspring1 after mutation:
    001010100000111100001111001100100010100000000010
4066 Offspring2 after mutation:
    010100110000111000001110000100000000010100000101
4067 48 48
4068 [42, 15, 15, 50, 40, 2]
4069 [83, 14, 14, 16, 5, 5]
4070 5
4071 Start point is: 5

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4072 16
4073 31
4074 (4.92, 4.29) (7.37, 3.27)
4075 14 15
4076 The travel time for UGV from depot B to NW UGV stop
      is: 3888
4077 The UGV travel time between two UGV stops is: 3851
4078 17400688.5
4079 End node is [24]
4080 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4081 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]
4082 Objective: 5446
4083 Dropped nodes: 1 2 4 5 6 7 8 9 10 11 13 14 15 16 17
      18 19 20 21 22
4084 48
4085 48
4086 48
4087 48
4088 48
4089 48
4090 48
4091 48
4092 48
4093 48
4094 48
4095 48
4096 48
4097 48
4098 48
4099 48
4100 48
4101 48
4102 48
4103 48
4104 48
4105 48
4106 48
4107 48
4108 48
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4109 48
4110 48
4111 Route for vehicle 0:
4112 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(0)
    FuelSlack(0,0) Distance(20137) -> 3 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914)
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
    Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0)
    ) Distance(67478) -> 27 Fuel(108804) Time(2898,3420
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3017,3497) Slack(0) FuelSlack(0,0)
    ) Distance(72651) -> 29 Fuel(77766) Time(3216,3576
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3492,3732) Slack(0) FuelSlack(0,0)
    ) Distance(80437) -> 32 Fuel(31050) Time(3691,3811
    ) Slack(0) FuelSlack(0,0) Distance(83049) -> 12
    Fuel(15684) Time(3888,3888) Slack(874) FuelSlack(
    139770,139770) Distance(85610) -> 47 Fuel(163614)
    Time(5388,5388) Slack(0) FuelSlack(0,0) Distance(
    106291) -> 46 Fuel(155322) Time(5429,5429) Slack(0
    ) FuelSlack(0,0) Distance(107673) -> 45 Fuel(146676
    ) Time(5472,5472) Slack(0) FuelSlack(0,0) Distance(
    109114) -> 44 Fuel(138384) Time(5513,5513) Slack(0
    ) FuelSlack(0,0) Distance(110496) -> 43 Fuel(129780
    ) Time(5556,5556) Slack(0) FuelSlack(0,0) Distance(
    111930) -> 42 Fuel(121488) Time(5597,5597) Slack(0
    ) FuelSlack(0,0) Distance(113312) -> 41 Fuel(112842
    ) Time(5640,5640) Slack(0) FuelSlack(0,0) Distance(
    114753) -> 40 Fuel(104550) Time(5681,5681) Slack(0
    ) FuelSlack(0,0) Distance(116135) -> 39 Fuel(95946
    ) Time(5724,5724) Slack(0) FuelSlack(0,0) Distance(
    117569) -> 38 Fuel(87654) Time(5765,5765) Slack(0
    ) FuelSlack(0,0) Distance(118951) -> 37 Fuel(79008)
    Time(5808,5808) Slack(0) FuelSlack(0,0) Distance(
    120392) -> 36 Fuel(70716) Time(5849,5849) Slack(0
    ) FuelSlack(0,0) Distance(121774) -> 35 Fuel(62112)
    Time(5892,5892) Slack(0) FuelSlack(0,0) Distance(
    123208) -> 34 Fuel(53820) Time(5933,5933) Slack(0
    ) FuelSlack(0,0) Distance(124590) -> 33 Fuel(45486)

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4112 Time(5975,5975) Slack(0) FuelSlack(0,0) Distance(  
    125979) -> 23 Fuel(36882) Time(6018,6018) Slack(806  
    ) FuelSlack(36882,287700) Distance(127413) -> 24  
    Fuel(287700) Time(8424,8424) Distance(180213)  
4113 Distance of the route: 180213 ft  
4114 Remaining Fuel of the route: 287700  
4115 Total Time of the route: 8424 seconds  
4116  
4117 Total Distance of all routes: 180213 ft  
4118 Total Fuel remaining of all routes: 287700  
4119 Total Time of all routes: 8424 seconds  
4120 5  
4121 Start point is: 5  
4122 16  
4123 31  
4124 (4.92, 4.29) (7.37, 3.27)  
4125 14 15  
4126 The travel time for UGV from depot B to NW UGV stop  
    is: 3888  
4127 The UGV travel time between two UGV stops is: 3851  
4128 17400688.5  
4129 End node is [24]  
4130 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
    15, 16, 17, 18, 19, 20, 21, 22, 23]  
4131 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37  
    , 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]  
4132 Objective: 5446  
4133 Dropped nodes: 1 2 4 5 6 7 8 9 10 11 13 14 15 16 17  
    18 19 20 21 22  
4134 48  
4135 48  
4136 48  
4137 48  
4138 48  
4139 48  
4140 48  
4141 48  
4142 48  
4143 48  
4144 48  
4145 48
```

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4146 48
4147 48
4148 48
4149 48
4150 48
4151 48
4152 48
4153 48
4154 48
4155 48
4156 48
4157 48
4158 48
4159 48
4160 48
4161 Route for vehicle 0:
4162 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20137) -> 3 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
    Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2898,3420
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3017,3497) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3216,3576
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3492,3732) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 32 Fuel(31050) Time(3691,3811
    ) Slack(0) FuelSlack(0,0) Distance(83049) -> 12
    Fuel(15684) Time(3888,3888) Slack(874) FuelSlack(
    139770,139770) Distance(85610) -> 47 Fuel(163614)
    Time(5388,5388) Slack(0) FuelSlack(0,0) Distance(
    106291) -> 46 Fuel(155322) Time(5429,5429) Slack(0
    ) FuelSlack(0,0) Distance(107673) -> 45 Fuel(146676
    ) Time(5472,5472) Slack(0) FuelSlack(0,0) Distance(
    109114) -> 44 Fuel(138384) Time(5513,5513) Slack(0
    ) FuelSlack(0,0) Distance(110496) -> 43 Fuel(129780
    ) Time(5556,5556) Slack(0) FuelSlack(0,0) Distance(
    111930) -> 42 Fuel(121488) Time(5597,5597) Slack(0
```

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4162 ) FuelSlack(0,0) Distance(113312) -> 41 Fuel(112842
      ) Time(5640,5640) Slack(0) FuelSlack(0,0) Distance(
      114753) -> 40 Fuel(104550) Time(5681,5681) Slack(0
      ) FuelSlack(0,0) Distance(116135) -> 39 Fuel(95946
      ) Time(5724,5724) Slack(0) FuelSlack(0,0) Distance(
      117569) -> 38 Fuel(87654) Time(5765,5765) Slack(0
      FuelSlack(0,0) Distance(118951) -> 37 Fuel(79008)
      Time(5808,5808) Slack(0) FuelSlack(0,0) Distance(
      120392) -> 36 Fuel(70716) Time(5849,5849) Slack(0
      FuelSlack(0,0) Distance(121774) -> 35 Fuel(62112)
      Time(5892,5892) Slack(0) FuelSlack(0,0) Distance(
      123208) -> 34 Fuel(53820) Time(5933,5933) Slack(0
      FuelSlack(0,0) Distance(124590) -> 33 Fuel(45486)
      Time(5975,5975) Slack(0) FuelSlack(0,0) Distance(
      125979) -> 23 Fuel(36882) Time(6018,6018) Slack(806
      ) FuelSlack(36882,287700) Distance(127413) -> 24
      Fuel(287700) Time(8424,8424) Distance(180213)

4163 Distance of the route: 180213 ft
4164 Remaining Fuel of the route: 287700
4165 Total Time of the route: 8424 seconds
4166
4167 Total Distance of all routes: 180213 ft
4168 Total Fuel remaining of all routes: 287700
4169 Total Time of all routes: 8424 seconds
4170 5
4171 Start point is: 5
4172 16
4173 31
4174 (5.04, 4.76) (7.06, 3.02)
4175 15 15
4176 The travel time for UGV from depot B to NW UGV stop
      is: 3798
4177 The UGV travel time between two UGV stops is: 3879
4178 17336076.0
4179 End node is [24]
4180 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4181 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45, 46]
4182 Objective: 5447
4183 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17

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```
4183 18 19 20 21 23
4184 47
4185 47
4186 47
4187 47
4188 47
4189 47
4190 47
4191 47
4192 47
4193 47
4194 47
4195 47
4196 47
4197 47
4198 47
4199 47
4200 47
4201 47
4202 47
4203 47
4204 47
4205 47
4206 47
4207 47
4208 47
4209 47
4210 Route for vehicle 0:
4211 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
    Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2927,3407
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3124,3484) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3323,3563
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3599,3719) Slack(0) FuelSlack(0,0
```

```
4211 ) Distance(80437) -> 12 Fuel(31050) Time(3798,3798
      ) Slack(825) FuelSlack(170508,170508) Distance(
        83049) -> 46 Fuel(148242) Time(5327,5327) Slack(0)
        FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
        Time(5368,5368) Slack(0) FuelSlack(0,0) Distance(
          107674) -> 44 Fuel(131304) Time(5411,5411) Slack(0
        ) FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012
        ) Time(5452,5452) Slack(0) FuelSlack(0,0) Distance(
          110497) -> 42 Fuel(114408) Time(5495,5495) Slack(0
        ) FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116
        ) Time(5536,5536) Slack(0) FuelSlack(0,0) Distance(
          113313) -> 40 Fuel(97470) Time(5579,5579) Slack(0
        ) FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
        Time(5620,5620) Slack(0) FuelSlack(0,0) Distance(
          116136) -> 38 Fuel(80574) Time(5663,5663) Slack(0
        ) FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
        Time(5704,5704) Slack(0) FuelSlack(0,0) Distance(
          118952) -> 36 Fuel(63636) Time(5747,5747) Slack(0
        ) FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
        Time(5788,5788) Slack(0) FuelSlack(0,0) Distance(
          121775) -> 34 Fuel(46740) Time(5831,5831) Slack(0
        ) FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
        Time(5872,5872) Slack(0) FuelSlack(0,0) Distance(
          124591) -> 32 Fuel(30114) Time(5914,5914) Slack(0
        ) FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
        Time(5957,5957) Slack(855) FuelSlack(21510,287700)
        Distance(127414) -> 24 Fuel(287700) Time(8412,8412
      ) Distance(180214)

4212 Distance of the route: 180214 ft
4213 Remaining Fuel of the route: 287700
4214 Total Time of the route: 8412 seconds
4215
4216 Total Distance of all routes: 180214 ft
4217 Total Fuel remaining of all routes: 287700
4218 Total Time of all routes: 8412 seconds
4219 5
4220 Start point is: 5
4221 16
4222 31
4223 (5.04, 4.76) (7.06, 3.02)
4224 14 14
```

```
4225 The travel time for UGV from depot B to NW UGV stop  
      is: 4069  
4226 The UGV travel time between two UGV stops is: 4090  
4227 18188877.0  
4228 End node is [24]  
4229 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
      15, 16, 17, 18, 19, 20, 21, 22, 23]  
4230 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37  
      , 38, 39, 40, 41, 42, 43, 44, 45, 46]  
4231 Objective: 5447  
4232 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17  
      18 19 20 21 23  
4233 47  
4234 47  
4235 47  
4236 47  
4237 47  
4238 47  
4239 47  
4240 47  
4241 47  
4242 47  
4243 47  
4244 47  
4245 47  
4246 47  
4247 47  
4248 47  
4249 47  
4250 47  
4251 47  
4252 47  
4253 47  
4254 47  
4255 47  
4256 47  
4257 47  
4258 47  
4259 Route for vehicle 0:  
4260 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
      Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
```

```

4260 0) FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
      Time(1220,1400) Slack(776) FuelSlack(147858,193914
      ) Distance(40274) -> 25 Fuel(139842) Time(2802,3071
      ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
      Fuel(124476) Time(2999,3268) Slack(0) FuelSlack(0,0
      ) Distance(67478) -> 27 Fuel(108804) Time(3198,3467
      ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
      Fuel(93438) Time(3395,3664) Slack(0) FuelSlack(0,0
      ) Distance(72651) -> 29 Fuel(77766) Time(3594,3834
      ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
      Fuel(46722) Time(3870,3990) Slack(0) FuelSlack(0,0
      ) Distance(80437) -> 12 Fuel(31050) Time(4069,4069
      ) Slack(825) FuelSlack(170508,170508) Distance(
      83049) -> 46 Fuel(148242) Time(5598,5598) Slack(0)
      FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
      Time(5639,5639) Slack(0) FuelSlack(0,0) Distance(
      107674) -> 44 Fuel(131304) Time(5682,5682) Slack(0
      ) FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012
      ) Time(5723,5723) Slack(0) FuelSlack(0,0) Distance(
      110497) -> 42 Fuel(114408) Time(5766,5766) Slack(0
      ) FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116
      ) Time(5807,5807) Slack(0) FuelSlack(0,0) Distance(
      113313) -> 40 Fuel(97470) Time(5850,5850) Slack(0)
      FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
      Time(5891,5891) Slack(0) FuelSlack(0,0) Distance(
      116136) -> 38 Fuel(80574) Time(5934,5934) Slack(0)
      FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
      Time(5975,5975) Slack(0) FuelSlack(0,0) Distance(
      118952) -> 36 Fuel(63636) Time(6018,6018) Slack(0)
      FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
      Time(6059,6059) Slack(0) FuelSlack(0,0) Distance(
      121775) -> 34 Fuel(46740) Time(6102,6102) Slack(0)
      FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
      Time(6143,6143) Slack(0) FuelSlack(0,0) Distance(
      124591) -> 32 Fuel(30114) Time(6185,6185) Slack(0)
      FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
      Time(6228,6228) Slack(855) FuelSlack(21510,287700)
      Distance(127414) -> 24 Fuel(287700) Time(8683,8683
      ) Distance(180214)

4261 Distance of the route: 180214 ft
4262 Remaining Fuel of the route: 287700

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4263 Total Time of the route: 8683 seconds
4264
4265 Total Distance of all routes: 180214 ft
4266 Total Fuel remaining of all routes: 287700
4267 Total Time of all routes: 8683 seconds
4268 4
4269 Start point is: 4
4270 31
4271 16
4272 (7.98, 3.78) (5.4, 6.19)
4273 15 14
4274 The travel time for UGV from depot B to NW UGV stop
    is: 4586
4275 The UGV travel time between two UGV stops is: 5100
4276 19803780.0
4277 End node is [24]
4278 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4279 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42]
4280 Objective: 18000000
4281 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42
4282 43
4283 Route for vehicle 0:
4284 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
4285 Distance of the route: 0 ft
4286 Remaining Fuel of the route: 287700
4287 Total Time of the route: 0 seconds
4288
4289 Total Distance of all routes: 0 ft
4290 Total Fuel remaining of all routes: 287700
4291 Total Time of all routes: 0 seconds
4292 2
4293 Start point is: 2
4294 16
4295 16
4296 (8.29, 4.03) (5.28, 5.71)
```

```
4297 14 15
4298 The travel time for UGV from depot B to NW UGV stop
      is: 3616
4299 The UGV travel time between two UGV stops is: 4787
4300 24472209.0
4301 End node is [24]
4302 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4303 [25, 26, 27, 28, 29, 30, 31]
4304 Objective: 70000000
4305 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
4306 32
4307 Route for vehicle 0:
4308 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
4309 Distance of the route: 0 ft
4310 Remaining Fuel of the route: 287700
4311 Total Time of the route: 0 seconds
4312
4313 Total Distance of all routes: 0 ft
4314 Total Fuel remaining of all routes: 287700
4315 Total Time of all routes: 0 seconds
4316 5
4317 Start point is: 5
4318 16
4319 31
4320 (5.52, 6.66) (8.91, 4.54)
4321 14 15
4322 The travel time for UGV from depot B to NW UGV stop
      is: 4808
4323 The UGV travel time between two UGV stops is: 5414
4324 20859288.0
4325 End node is [24]
4326 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4327 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39]
4328 Objective: 15000000
4329 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

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4329 16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
      34 35 36 37 38 39
4330 40
4331 Route for vehicle 0:
4332 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
      )
4333 Distance of the route: 0 ft
4334 Remaining Fuel of the route: 287700
4335 Total Time of the route: 0 seconds
4336
4337 Total Distance of all routes: 0 ft
4338 Total Fuel remaining of all routes: 287700
4339 Total Time of all routes: 0 seconds
4340 5
4341 Start point is: 5
4342 16
4343 31
4344 (5.16, 5.24) (7.37, 3.27)
4345 15 15
4346 The travel time for UGV from depot B to NW UGV stop
      is: 3974
4347 The UGV travel time between two UGV stops is: 4196
4348 18100794.0
4349 End node is [24]
4350 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4351 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45]
4352 Objective: 5447
4353 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 13 14 15 16 17
      18 19 20 21 22
4354 46
4355 46
4356 46
4357 46
4358 46
4359 46
4360 46
4361 46
4362 46
```

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4363 46
4364 46
4365 46
4366 46
4367 46
4368 46
4369 46
4370 46
4371 46
4372 46
4373 46
4374 46
4375 46
4376 46
4377 46
4378 46
4379 Route for vehicle 0:
4380 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
        0) FuelSlack(0,0) Distance(20137) -> 6 Fuel(46056)
        Time(1235,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2906,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
        Fuel(124476) Time(3103,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(3302,3467
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
        Fuel(93438) Time(3499,3664) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3698,3818
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 12
        Fuel(46722) Time(3974,3974) Slack(774) FuelSlack(
            201852,201852) Distance(80437) -> 45 Fuel(132570)
            Time(5531,5531) Slack(0) FuelSlack(0,0) Distance(
                106292) -> 44 Fuel(124278) Time(5572,5572) Slack(0
            ) FuelSlack(0,0) Distance(107674) -> 43 Fuel(115632
            ) Time(5615,5615) Slack(0) FuelSlack(0,0) Distance(
                109115) -> 42 Fuel(107340) Time(5656,5656) Slack(0
            ) FuelSlack(0,0) Distance(110497) -> 41 Fuel(98736
            ) Time(5699,5699) Slack(0) FuelSlack(0,0) Distance(
                111931) -> 40 Fuel(90444) Time(5740,5740) Slack(0
            ) FuelSlack(0,0) Distance(113313) -> 39 Fuel(81798)
            Time(5783,5783) Slack(0) FuelSlack(0,0) Distance(
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4380 114754) -> 38 Fuel(73506) Time(5824,5824) Slack(0)
  FuelSlack(0,0) Distance(116136) -> 37 Fuel(64902)
  Time(5867,5867) Slack(0) FuelSlack(0,0) Distance(
  117570) -> 36 Fuel(56610) Time(5908,5908) Slack(0)
  FuelSlack(0,0) Distance(118952) -> 35 Fuel(47964)
  Time(5951,5951) Slack(0) FuelSlack(0,0) Distance(
  120393) -> 34 Fuel(39672) Time(5992,5992) Slack(0)
  FuelSlack(0,0) Distance(121775) -> 33 Fuel(31068)
  Time(6035,6035) Slack(0) FuelSlack(0,0) Distance(
  123209) -> 32 Fuel(22776) Time(6076,6076) Slack(0)
  FuelSlack(0,0) Distance(124591) -> 31 Fuel(14442)
  Time(6118,6118) Slack(0) FuelSlack(0,0) Distance(
  125980) -> 23 Fuel(5838) Time(6161,6161) Slack(906
) FuelSlack(5838,287700) Distance(127414) -> 24
  Fuel(287700) Time(8667,8667) Distance(180214)
4381 Distance of the route: 180214 ft
4382 Remaining Fuel of the route: 287700
4383 Total Time of the route: 8667 seconds
4384
4385 Total Distance of all routes: 180214 ft
4386 Total Fuel remaining of all routes: 287700
4387 Total Time of all routes: 8667 seconds
4388 5
4389 Start point is: 5
4390 16
4391 31
4392 (4.92, 4.29) (7.37, 3.27)
4393 15 14
4394 The travel time for UGV from depot B to NW UGV stop
  is: 3629
4395 The UGV travel time between two UGV stops is: 4060
4396 17227138.5
4397 End node is [24]
4398 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
  15, 16, 17, 18, 19, 20, 21, 22, 23]
4399 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]
4400 Objective: 15003229
4401 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17
  18 19 20 21 22 23 33 34 35 36 37 38 39 40 41 42 43
  44 45 46 47

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4402 48
4403 48
4404 48
4405 48
4406 48
4407 48
4408 48
4409 48
4410 48
4411 48
4412 48
4413 Route for vehicle 0:
4414 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 31 Fuel(166848) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20142) -> 2 Fuel(45996)
    Time(1220,1400) Slack(777) FuelSlack(147858,193854
    ) Distance(40284) -> 25 Fuel(139842) Time(2743,3005
    ) Slack(0) FuelSlack(0,0) Distance(64927) -> 26
    Fuel(124476) Time(2820,3082) Slack(0) FuelSlack(0,0
    ) Distance(67488) -> 27 Fuel(108804) Time(2899,3161
    ) Slack(0) FuelSlack(0,0) Distance(70100) -> 28
    Fuel(93438) Time(2976,3238) Slack(0) FuelSlack(0,0
    ) Distance(72661) -> 29 Fuel(77766) Time(3055,3317
    ) Slack(0) FuelSlack(0,0) Distance(75273) -> 30
    Fuel(62094) Time(3156,3396) Slack(0) FuelSlack(0,0
    ) Distance(77885) -> 32 Fuel(31050) Time(3432,3552
    ) Slack(0) FuelSlack(0,0) Distance(83059) -> 12
    Fuel(15684) Time(3629,3629) Slack(874) FuelSlack(
    15684,287700) Distance(85620) -> 24 Fuel(287700)
    Time(5142,5142) Distance(106729)
4415 Distance of the route: 106729 ft
4416 Remaining Fuel of the route: 287700
4417 Total Time of the route: 5142 seconds
4418
4419 Total Distance of all routes: 106729 ft
4420 Total Fuel remaining of all routes: 287700
4421 Total Time of all routes: 5142 seconds
4422 2
4423 Start point is: 2
4424 16
4425 16
```

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4426 (8.29, 4.03) (4.8, 3.81)
4427 14 15
4428 The travel time for UGV from depot B to NW UGV stop
    is: 3616
4429 The UGV travel time between two UGV stops is: 4097
4430 21714819.0
4431 End node is [24]
4432 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4433 [25, 26]
4434 Objective: 2000000
4435 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26
4436 27
4437 Route for vehicle 0:
4438 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
4439 Distance of the route: 0 ft
4440 Remaining Fuel of the route: 287700
4441 Total Time of the route: 0 seconds
4442
4443 Total Distance of all routes: 0 ft
4444 Total Fuel remaining of all routes: 287700
4445 Total Time of all routes: 0 seconds
4446 2
4447 Start point is: 2
4448 16
4449 16
4450 (5.76, 7.62) (7.98, 3.78)
4451 14 15
4452 The travel time for UGV from depot B to NW UGV stop
    is: 4280
4453 The UGV travel time between two UGV stops is: 5340
4454 ****
    ***
4455 UGV route goes infeasible although UAV has a
    solution
4456 ****
    ***
4457 27452034.0
```

```
4458 End node is [24]
4459 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4460 [25, 26, 27, 28]
4461 Objective: 4000000
4462 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28
4463 29
4464 Route for vehicle 0:
4465 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
4466 Distance of the route: 0 ft
4467 Remaining Fuel of the route: 287700
4468 Total Time of the route: 0 seconds
4469
4470 Total Distance of all routes: 0 ft
4471 Total Fuel remaining of all routes: 287700
4472 Total Time of all routes: 0 seconds
4473 2
4474 Start point is: 2
4475 16
4476 16
4477 (8.6, 4.29) (5.04, 4.76)
4478 15 14
4479 The travel time for UGV from depot B to NW UGV stop
      is: 3516
4480 The UGV travel time between two UGV stops is: 4844
4481 24068965.5
4482 End node is [24]
4483 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4484 [25, 26, 27, 28, 29, 30, 31, 32]
4485 Objective: 8000000
4486 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32
4487 33
4488 Route for vehicle 0:
4489 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
```

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4490 Distance of the route: 0 ft
4491 Remaining Fuel of the route: 287700
4492 Total Time of the route: 0 seconds
4493
4494 Total Distance of all routes: 0 ft
4495 Total Fuel remaining of all routes: 287700
4496 Total Time of all routes: 0 seconds
4497 5
4498 Start point is: 5
4499 16
4500 31
4501 (5.16, 5.24) (7.37, 3.27)
4502 14 15
4503 The travel time for UGV from depot B to NW UGV stop
    is: 4257
4504 The UGV travel time between two UGV stops is: 4196
4505 18658555.5
4506 End node is [24]
4507 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4508 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45]
4509 Objective: 5507
4510 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17
    18 19 21 22 23
4511 46
4512 46
4513 46
4514 46
4515 46
4516 46
4517 46
4518 46
4519 46
4520 46
4521 46
4522 46
4523 46
4524 46
4525 46
4526 46
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4527 46
4528 46
4529 46
4530 46
4531 46
4532 46
4533 46
4534 46
4535 46
4536 Route for vehicle 0:
4537 0 Fuel(253693) Time(58,58) Slack(60) FuelSlack(0,0)
) Distance(0) -> 28 Fuel(126859) Time(758,758)
Slack(120) FuelSlack(0,0) Distance(21139) -> 2 Fuel
(25) Time(1518,1518) Slack(925) FuelSlack(147858,
147883) Distance(42278) -> 25 Fuel(139842) Time(
3189,3189) Slack(120) FuelSlack(0,0) Distance(66921
) -> 26 Fuel(124476) Time(3386,3386) Slack(120)
FuelSlack(0,0) Distance(69482) -> 27 Fuel(108804)
Time(3585,3585) Slack(120) FuelSlack(0,0) Distance(
72094) -> 29 Fuel(77760) Time(3861,3861) Slack(120
) FuelSlack(0,0) Distance(77268) -> 30 Fuel(62088)
Time(4060,4060) Slack(120) FuelSlack(0,0) Distance(
79880) -> 12 Fuel(46722) Time(4257,4257) Slack(774
) FuelSlack(201852,201852) Distance(82441) -> 45
Fuel(132570) Time(5814,5814) Slack(0) FuelSlack(0,0
) Distance(108296) -> 44 Fuel(124278) Time(5855,
5855) Slack(0) FuelSlack(0,0) Distance(109678) ->
43 Fuel(115632) Time(5898,5898) Slack(0) FuelSlack(
0,0) Distance(111119) -> 42 Fuel(107340) Time(5939,
5939) Slack(0) FuelSlack(0,0) Distance(112501) ->
41 Fuel(98736) Time(5982,5982) Slack(0) FuelSlack(0
,0) Distance(113935) -> 40 Fuel(90444) Time(6023,
6023) Slack(0) FuelSlack(0,0) Distance(115317) ->
39 Fuel(81798) Time(6066,6066) Slack(0) FuelSlack(0
,0) Distance(116758) -> 38 Fuel(73506) Time(6107,
6107) Slack(0) FuelSlack(0,0) Distance(118140) ->
37 Fuel(64902) Time(6150,6150) Slack(0) FuelSlack(0
,0) Distance(119574) -> 36 Fuel(56610) Time(6191,
6191) Slack(0) FuelSlack(0,0) Distance(120956) ->
35 Fuel(47964) Time(6234,6234) Slack(0) FuelSlack(0
,0) Distance(122397) -> 34 Fuel(39672) Time(6275,
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4537 6275) Slack(0) FuelSlack(0,0) Distance(123779) ->
    33 Fuel(31068) Time(6318,6318) Slack(0) FuelSlack(0
    ,0) Distance(125213) -> 32 Fuel(22776) Time(6359,
    6359) Slack(0) FuelSlack(0,0) Distance(126595) ->
    31 Fuel(14442) Time(6401,6401) Slack(0) FuelSlack(0
    ,0) Distance(127984) -> 20 Fuel(5838) Time(6444,
    6444) Slack(906) FuelSlack(5838,287700) Distance(
    129418) -> 24 Fuel(287700) Time(8950,8950) Distance
    (182218)
4538 Distance of the route: 182218 ft
4539 Remaining Fuel of the route: 287700
4540 Total Time of the route: 8950 seconds
4541
4542 Total Distance of all routes: 182218 ft
4543 Total Fuel remaining of all routes: 287700
4544 Total Time of all routes: 8950 seconds
4545 5
4546 Start point is: 5
4547 16
4548 31
4549 (5.04, 4.76) (7.06, 3.02)
4550 15 14
4551 The travel time for UGV from depot B to NW UGV stop
    is: 3798
4552 The UGV travel time between two UGV stops is: 4090
4553 17803546.5
4554 End node is [24]
4555 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4556 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45, 46]
4557 Objective: 5447
4558 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17
    18 19 20 21 23
4559 47
4560 47
4561 47
4562 47
4563 47
4564 47
4565 47
```

```
4566 47
4567 47
4568 47
4569 47
4570 47
4571 47
4572 47
4573 47
4574 47
4575 47
4576 47
4577 47
4578 47
4579 47
4580 47
4581 47
4582 47
4583 47
4584 47
4585 Route for vehicle 0:
4586 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
        0) FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
        Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
        Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2927,3407
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
        Fuel(93438) Time(3124,3484) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3323,3563
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
        Fuel(46722) Time(3599,3719) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 12 Fuel(31050) Time(3798,3798
    ) Slack(825) FuelSlack(170508,170508) Distance(
        83049) -> 46 Fuel(148242) Time(5327,5327) Slack(0)
        FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
        Time(5368,5368) Slack(0) FuelSlack(0,0) Distance(
            107674) -> 44 Fuel(131304) Time(5411,5411) Slack(0
        ) FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012
        ) Time(5452,5452) Slack(0) FuelSlack(0,0) Distance(
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4586 110497) -> 42 Fuel(114408) Time(5495,5495) Slack(0)
    ) FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116
    ) Time(5536,5536) Slack(0) FuelSlack(0,0) Distance(
    113313) -> 40 Fuel(97470) Time(5579,5579) Slack(0)
    FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
    Time(5620,5620) Slack(0) FuelSlack(0,0) Distance(
    116136) -> 38 Fuel(80574) Time(5663,5663) Slack(0)
    FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
    Time(5704,5704) Slack(0) FuelSlack(0,0) Distance(
    118952) -> 36 Fuel(63636) Time(5747,5747) Slack(0)
    FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
    Time(5788,5788) Slack(0) FuelSlack(0,0) Distance(
    121775) -> 34 Fuel(46740) Time(5831,5831) Slack(0)
    FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
    Time(5872,5872) Slack(0) FuelSlack(0,0) Distance(
    124591) -> 32 Fuel(30114) Time(5914,5914) Slack(0)
    FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
    Time(5957,5957) Slack(855) FuelSlack(21510,287700)
    Distance(127414) -> 24 Fuel(287700) Time(8412,8412
    ) Distance(180214)

4587 Distance of the route: 180214 ft
4588 Remaining Fuel of the route: 287700
4589 Total Time of the route: 8412 seconds
4590
4591 Total Distance of all routes: 180214 ft
4592 Total Fuel remaining of all routes: 287700
4593 Total Time of all routes: 8412 seconds
4594 2
4595 Start point is: 2
4596 16
4597 16
4598 (7.98, 3.78) (5.4, 6.19)
4599 15 15
4600 The travel time for UGV from depot B to NW UGV stop
    is: 3234
4601 The UGV travel time between two UGV stops is: 4822
4602 24027808.5
4603 End node is [24]
4604 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4605 [25, 26, 27, 28, 29, 30, 31]

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4606 Objective: 7000000
4607 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
4608 32
4609 Route for vehicle 0:
4610 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
4611 Distance of the route: 0 ft
4612 Remaining Fuel of the route: 287700
4613 Total Time of the route: 0 seconds
4614
4615 Total Distance of all routes: 0 ft
4616 Total Fuel remaining of all routes: 287700
4617 Total Time of all routes: 0 seconds
4618 4
4619 Start point is: 4
4620 31
4621 16
4622 (7.37, 3.27) (5.64, 7.14)
4623 14 15
4624 The travel time for UGV from depot B to NW UGV stop
    is: 4612
4625 The UGV travel time between two UGV stops is: 4886
4626 19231266.0
4627 End node is [24]
4628 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4629 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44]
4630 Objective: 20000000
4631 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
    34 35 36 37 38 39 40 41 42 43 44
4632 45
4633 Route for vehicle 0:
4634 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
4635 Distance of the route: 0 ft
4636 Remaining Fuel of the route: 287700
```

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4637 Total Time of the route: 0 seconds
4638
4639 Total Distance of all routes: 0 ft
4640 Total Fuel remaining of all routes: 287700
4641 Total Time of all routes: 0 seconds
4642 2
4643 Start point is: 2
4644 16
4645 16
4646 (8.29, 4.03) (4.8, 3.81)
4647 15 15
4648 The travel time for UGV from depot B to NW UGV stop
    is: 3375
4649 The UGV travel time between two UGV stops is: 4097
4650 21007333.5
4651 End node is [24]
4652 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4653 [25, 26]
4654 Objective: 2000000
4655 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26
4656 27
4657 Route for vehicle 0:
4658 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
4659 Distance of the route: 0 ft
4660 Remaining Fuel of the route: 287700
4661 Total Time of the route: 0 seconds
4662
4663 Total Distance of all routes: 0 ft
4664 Total Fuel remaining of all routes: 287700
4665 Total Time of all routes: 0 seconds
4666 5
4667 Start point is: 5
4668 16
4669 31
4670 (5.52, 6.66) (8.91, 4.54)
4671 15 14
4672 The travel time for UGV from depot B to NW UGV stop
```

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4672 is: 4488
4673 The UGV travel time between two UGV stops is: 5734
4674 21015288.0
4675 End node is [24]
4676 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4677 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39]
4678 Objective: 15000000
4679 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
      34 35 36 37 38 39
4680 40
4681 Route for vehicle 0:
4682 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
4683 Distance of the route: 0 ft
4684 Remaining Fuel of the route: 287700
4685 Total Time of the route: 0 seconds
4686
4687 Total Distance of all routes: 0 ft
4688 Total Fuel remaining of all routes: 287700
4689 Total Time of all routes: 0 seconds
4690 4
4691 Start point is: 4
4692 31
4693 16
4694 (7.98, 3.78) (5.64, 7.14)
4695 14 15
4696 The travel time for UGV from depot B to NW UGV stop
      is: 4914
4697 The UGV travel time between two UGV stops is: 5167
4698 21074902.5
4699 End node is [24]
4700 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4701 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42]
4702 Objective: 18000000
4703 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

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4703 16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
      34 35 36 37 38 39 40 41 42
4704 43
4705 Route for vehicle 0:
4706 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
4707 Distance of the route: 0 ft
4708 Remaining Fuel of the route: 287700
4709 Total Time of the route: 0 seconds
4710
4711 Total Distance of all routes: 0 ft
4712 Total Fuel remaining of all routes: 287700
4713 Total Time of all routes: 0 seconds
4714 2
4715 Start point is: 2
4716 16
4717 16
4718 (8.6, 4.29) (5.04, 4.76)
4719 15 14
4720 The travel time for UGV from depot B to NW UGV stop
      is: 3516
4721 The UGV travel time between two UGV stops is: 4844
4722 23816965.5
4723 End node is [24]
4724 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4725 [25, 26, 27, 28, 29, 30, 31, 32]
4726 Objective: 8000000
4727 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32
4728 33
4729 Route for vehicle 0:
4730 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
4731 Distance of the route: 0 ft
4732 Remaining Fuel of the route: 287700
4733 Total Time of the route: 0 seconds
4734
4735 Total Distance of all routes: 0 ft
```

```
4736 Total Fuel remaining of all routes: 287700
4737 Total Time of all routes: 0 seconds
4738 5
4739 Start point is: 5
4740 16
4741 31
4742 (5.64, 7.14) (7.06, 3.02)
4743 14 14
4744 The travel time for UGV from depot B to NW UGV stop
    is: 4997
4745 The UGV travel time between two UGV stops is: 5018
4746 22300845.0
4747 End node is [24]
4748 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4749 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41]
4750 Objective: 16001408
4751 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 12 13 14 15 16
    17 18 19 20 21 22 23 25 27 28 29 30 31 32 33 34 35
    36 37 38 39 40 41
4752 42
4753 42
4754 42
4755 Route for vehicle 0:
4756 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 26 Fuel(148134) Time(704,704) Slack(
    0) FuelSlack(0,0) Distance(23261) -> 6 Fuel(8568)
    Time(1408,1408) Slack(897) FuelSlack(8423,287700)
    Distance(46522) -> 24 Fuel(287700) Time(2305,2305)
    Distance(46522)
4757 Distance of the route: 46522 ft
4758 Remaining Fuel of the route: 287700
4759 Total Time of the route: 2305 seconds
4760
4761 Total Distance of all routes: 46522 ft
4762 Total Fuel remaining of all routes: 287700
4763 Total Time of all routes: 2305 seconds
4764 2
4765 Start point is: 2
4766 16
```

```
4767 16
4768 (8.91, 4.54) (5.28, 5.71)
4769 14 14
4770 The travel time for UGV from depot B to NW UGV stop
    is: 3918
4771 The UGV travel time between two UGV stops is: 5364
4772 ****
4773 ***  
UGV route goes infeasible although UAV has a
    solution
4774 ****
4775 ***
4776 End node is [24]
4777 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4778 [25, 26, 27, 28, 29]
4779 Objective: 5000000
4780 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29
4781 30
4782 Route for vehicle 0:
4783 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
        )
4784 Distance of the route: 0 ft
4785 Remaining Fuel of the route: 287700
4786 Total Time of the route: 0 seconds
4787
4788 Total Distance of all routes: 0 ft
4789 Total Fuel remaining of all routes: 287700
4790 Total Time of all routes: 0 seconds
4791 2
4792 Start point is: 2
4793 16
4794 16
4795 (5.28, 5.71) (8.6, 4.29)
4796 15 15
4797 The travel time for UGV from depot B to NW UGV stop
    is: 3301
4798 The UGV travel time between two UGV stops is: 4928
```

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4799 24509494.5
4800 End node is [24]
4801 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4802 [25, 26, 27, 28, 29, 30]
4803 Objective: 6000000
4804 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30
4805 31
4806 Route for vehicle 0:
4807 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
4808 Distance of the route: 0 ft
4809 Remaining Fuel of the route: 287700
4810 Total Time of the route: 0 seconds
4811
4812 Total Distance of all routes: 0 ft
4813 Total Fuel remaining of all routes: 287700
4814 Total Time of all routes: 0 seconds
4815 5
4816 Start point is: 5
4817 16
4818 31
4819 (5.04, 4.76) (7.06, 3.02)
4820 15 15
4821 The travel time for UGV from depot B to NW UGV stop
      is: 3798
4822 The UGV travel time between two UGV stops is: 3879
4823 17552076.0
4824 End node is [24]
4825 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4826 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45, 46]
4827 Objective: 5447
4828 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17
      18 19 20 21 23
4829 47
4830 47
4831 47
```

```
4832 47
4833 47
4834 47
4835 47
4836 47
4837 47
4838 47
4839 47
4840 47
4841 47
4842 47
4843 47
4844 47
4845 47
4846 47
4847 47
4848 47
4849 47
4850 47
4851 47
4852 47
4853 47
4854 47
4855 Route for vehicle 0:
4856 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
        0) FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
        Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
        Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2927,3407
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
        Fuel(93438) Time(3124,3484) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3323,3563
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
        Fuel(46722) Time(3599,3719) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 12 Fuel(31050) Time(3798,3798
    ) Slack(825) FuelSlack(170508,170508) Distance(
        83049) -> 46 Fuel(148242) Time(5327,5327) Slack(0)
        FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
```

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4856 Time(5368,5368) Slack(0) FuelSlack(0,0) Distance(
    107674) -> 44 Fuel(131304) Time(5411,5411) Slack(0
) FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012
) Time(5452,5452) Slack(0) FuelSlack(0,0) Distance(
    110497) -> 42 Fuel(114408) Time(5495,5495) Slack(0
) FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116
) Time(5536,5536) Slack(0) FuelSlack(0,0) Distance(
    113313) -> 40 Fuel(97470) Time(5579,5579) Slack(0
) FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
Time(5620,5620) Slack(0) FuelSlack(0,0) Distance(
    116136) -> 38 Fuel(80574) Time(5663,5663) Slack(0
) FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
Time(5704,5704) Slack(0) FuelSlack(0,0) Distance(
    118952) -> 36 Fuel(63636) Time(5747,5747) Slack(0
) FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
Time(5788,5788) Slack(0) FuelSlack(0,0) Distance(
    121775) -> 34 Fuel(46740) Time(5831,5831) Slack(0
) FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
Time(5872,5872) Slack(0) FuelSlack(0,0) Distance(
    124591) -> 32 Fuel(30114) Time(5914,5914) Slack(0
) FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
Time(5957,5957) Slack(855) FuelSlack(21510,287700)
Distance(127414) -> 24 Fuel(287700) Time(8412,8412
) Distance(180214)

4857 Distance of the route: 180214 ft
4858 Remaining Fuel of the route: 287700
4859 Total Time of the route: 8412 seconds
4860
4861 Total Distance of all routes: 180214 ft
4862 Total Fuel remaining of all routes: 287700
4863 Total Time of all routes: 8412 seconds
4864 2
4865 Start point is: 2
4866 16
4867 16
4868 (8.29, 4.03) (4.8, 3.81)
4869 15 14
4870 The travel time for UGV from depot B to NW UGV stop
    is: 3375
4871 The UGV travel time between two UGV stops is: 4324
4872 21700785.0

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```
4873 End node is [24]
4874 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4875 [25, 26]
4876 Objective: 2000000
4877 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26
4878 27
4879 Route for vehicle 0:
4880 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
4881 Distance of the route: 0 ft
4882 Remaining Fuel of the route: 287700
4883 Total Time of the route: 0 seconds
4884
4885 Total Distance of all routes: 0 ft
4886 Total Fuel remaining of all routes: 287700
4887 Total Time of all routes: 0 seconds
4888 5
4889 Start point is: 5
4890 16
4891 31
4892 (5.04, 4.76) (7.06, 3.02)
4893 15 15
4894 The travel time for UGV from depot B to NW UGV stop
      is: 3798
4895 The UGV travel time between two UGV stops is: 3879
4896 17336076.0
4897 End node is [24]
4898 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
4899 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45, 46]
4900 Objective: 5447
4901 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17
      18 19 20 21 23
4902 47
4903 47
4904 47
4905 47
```

```
4906 47
4907 47
4908 47
4909 47
4910 47
4911 47
4912 47
4913 47
4914 47
4915 47
4916 47
4917 47
4918 47
4919 47
4920 47
4921 47
4922 47
4923 47
4924 47
4925 47
4926 47
4927 47
4928 Route for vehicle 0:
4929 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
        0) FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
        Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
        Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2927,3407
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
        Fuel(93438) Time(3124,3484) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3323,3563
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
        Fuel(46722) Time(3599,3719) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 12 Fuel(31050) Time(3798,3798
    ) Slack(825) FuelSlack(170508,170508) Distance(
        83049) -> 46 Fuel(148242) Time(5327,5327) Slack(0)
        FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
        Time(5368,5368) Slack(0) FuelSlack(0,0) Distance(
```

```
4929 107674) -> 44 Fuel(131304) Time(5411,5411) Slack(0
    ) FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012
    ) Time(5452,5452) Slack(0) FuelSlack(0,0) Distance(
    110497) -> 42 Fuel(114408) Time(5495,5495) Slack(0
    ) FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116
    ) Time(5536,5536) Slack(0) FuelSlack(0,0) Distance(
    113313) -> 40 Fuel(97470) Time(5579,5579) Slack(0
    ) FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
    Time(5620,5620) Slack(0) FuelSlack(0,0) Distance(
    116136) -> 38 Fuel(80574) Time(5663,5663) Slack(0
    ) FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
    Time(5704,5704) Slack(0) FuelSlack(0,0) Distance(
    118952) -> 36 Fuel(63636) Time(5747,5747) Slack(0
    ) FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
    Time(5788,5788) Slack(0) FuelSlack(0,0) Distance(
    121775) -> 34 Fuel(46740) Time(5831,5831) Slack(0
    ) FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
    Time(5872,5872) Slack(0) FuelSlack(0,0) Distance(
    124591) -> 32 Fuel(30114) Time(5914,5914) Slack(0
    ) FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
    Time(5957,5957) Slack(855) FuelSlack(21510,287700)
    Distance(127414) -> 24 Fuel(287700) Time(8412,8412
    ) Distance(180214)

4930 Distance of the route: 180214 ft
4931 Remaining Fuel of the route: 287700
4932 Total Time of the route: 8412 seconds
4933
4934 Total Distance of all routes: 180214 ft
4935 Total Fuel remaining of all routes: 287700
4936 Total Time of all routes: 8412 seconds
4937 3
4938 Start point is: 3
4939 16
4940 16
4941 (4.92, 4.29) (8.29, 4.03)
4942 14 15
4943 The travel time for UGV from depot B to NW UGV stop
    is: 3015
4944 The UGV travel time between two UGV stops is: 4273
4945 ****
***
```

```
4946 UGV route goes infeasible although UAV has a
      solution
4947 ****
      ***
4948 40694107.5
4949 End node is [18]
4950 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
4951 [25, 26, 27, 28]
4952 Objective: 2005931
4953 Dropped nodes: 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
      27 28
4954 29
4955 29
4956 29
4957 29
4958 29
4959 29
4960 29
4961 29
4962 29
4963 29
4964 29
4965 Route for vehicle 0:
4966 0 Fuel(248281) Time(1594,1594) Slack(60) FuelSlack(
      0,0) Distance(0) -> 23 Fuel(62107) Time(2594,2594)
      Slack(120) FuelSlack(0,0) Distance(31029) -> 1 Fuel
      (25) Time(3027,3027) Slack(925) FuelSlack(5663,5713
      ) Distance(41376) -> 22 Fuel(282037) Time(4344,4344
      ) Slack(120) FuelSlack(0,0) Distance(54336) -> 24
      Fuel(250687) Time(4622,4622) Slack(120) FuelSlack(0
      ,0) Distance(59561) -> 26 Fuel(219643) Time(4898,
      4898) Slack(120) FuelSlack(0,0) Distance(64735) ->
      17 Fuel(25) Time(6127,6127) Slack(925) FuelSlack(0,
      8425) Distance(101338) -> 21 Fuel(287700) Time(8507
      ,8507) Slack(120) FuelSlack(0,0) Distance(149380
      ) -> 19 Fuel(256656) Time(8783,8783) Slack(120)
      FuelSlack(0,0) Distance(154554) -> 20 Fuel(241290)
      Time(8980,8980) Slack(120) FuelSlack(0,0) Distance(
      157115) -> 25 Fuel(163530) Time(9492,9492) Slack(
      120) FuelSlack(0,0) Distance(170075) -> 18 Fuel(
```

```
4966 8400) Time(10395,10395) Distance(195930)
4967 Distance of the route: 195930 ft
4968 Remaining Fuel of the route: 8400
4969 Total Time of the route: 10395 seconds
4970
4971 Total Distance of all routes: 195930 ft
4972 Total Fuel remaining of all routes: 8400
4973 Total Time of all routes: 10395 seconds
4974 5
4975 Start point is: 5
4976 16
4977 31
4978 (5.4, 6.19) (7.37, 3.27)
4979 14 15
4980 The travel time for UGV from depot B to NW UGV stop
    is: 4627
4981 The UGV travel time between two UGV stops is: 4541
4982 20434638.0
4983 End node is [24]
4984 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
4985 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43]
4986 Objective: 15004294
4987 Dropped nodes: 1 2 3 4 7 8 9 10 11 13 14 15 16 17
    18 19 20 21 22 23 29 30 31 32 33 34 35 36 37 38 39
    40 41 42 43
4988 44
4989 44
4990 44
4991 44
4992 44
4993 44
4994 44
4995 44
4996 Route for vehicle 0:
4997 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 28 Fuel(160866) Time(640,640) Slack(
    0) FuelSlack(0,0) Distance(21139) -> 6 Fuel(34032)
    Time(1280,1280) Slack(815) FuelSlack(166273,166380
    ) Distance(42278) -> 27 Fuel(155352) Time(2763,2763
```

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4997 ) Slack(0) FuelSlack(0,0) Distance(64336) -> 5 Fuel
      (23004) Time(3431,3431) Slack(851) FuelSlack(170862
      ,170862) Distance(86394) -> 25 Fuel(139842) Time(
      5028,5028) Slack(0) FuelSlack(0,0) Distance(111037
      ) -> 26 Fuel(124476) Time(5105,5105) Slack(0)
      FuelSlack(0,0) Distance(113598) -> 12 Fuel(77760)
      Time(5340,5340) Slack(675) FuelSlack(77760,287700)
      Distance(121384) -> 24 Fuel(287700) Time(6635,6635
      ) Distance(141862)
4998 Distance of the route: 141862 ft
4999 Remaining Fuel of the route: 287700
5000 Total Time of the route: 6635 seconds
5001
5002 Total Distance of all routes: 141862 ft
5003 Total Fuel remaining of all routes: 287700
5004 Total Time of all routes: 6635 seconds
5005 2
5006 Start point is: 2
5007 16
5008 16
5009 (8.91, 4.54) (5.88, 8.09)
5010 14 14
5011 The travel time for UGV from depot B to NW UGV stop
      is: 3918
5012 The UGV travel time between two UGV stops is: 6292
5013 ****
      ***
5014 UGV route goes infeasible although UAV has a
      solution
5015 ****
      ***
5016 30974694.0
5017 End node is [24]
5018 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5019 []
5020 Objective: 0
5021 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23
5022 25
5023 Route for vehicle 0:

```

```
5024 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5025 Distance of the route: 0 ft
5026 Remaining Fuel of the route: 287700
5027 Total Time of the route: 0 seconds
5028
5029 Total Distance of all routes: 0 ft
5030 Total Fuel remaining of all routes: 287700
5031 Total Time of all routes: 0 seconds
5032 3
5033 Start point is: 3
5034 16
5035 16
5036 (4.92, 4.29) (7.37, 3.27)
5037 14 14
5038 The travel time for UGV from depot B to NW UGV stop
      is: 3015
5039 The UGV travel time between two UGV stops is: 4060
5040 ****
      ***
5041 UGV route goes infeasible although UAV has a
      solution
5042 ****
      ***
5043 46305568.5
5044 End node is [18]
5045 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
5046 [25, 26, 27, 28, 29, 30, 31]
5047 Objective: 6418
5048 Dropped nodes: 2 4 5 6 7 8 9 10 12 14 15 16 17
5049 32
5050 32
5051 32
5052 32
5053 32
5054 32
5055 32
5056 32
5057 32
```

```
5058 32
5059 32
5060 32
5061 32
5062 32
5063 32
5064 32
5065 32
5066 32
5067 Route for vehicle 0:
5068 0 Fuel(287700) Time(1537,1537) Slack(0) FuelSlack(0,0) Distance(0) -> 25 Fuel(132570) Time(2320,2380) Slack(46) FuelSlack(0,0) Distance(25855) -> 23 Fuel(101526) Time(2582,2656) Slack(46) FuelSlack(0,0) Distance(31029) -> 3 Fuel(39444) Time(3015,3089) Slack(798) FuelSlack(168180,280734) Distance(41376) -> 24 Fuel(119520) Time(4047,4248) Slack(0) FuelSlack(0,0) Distance(49111) -> 1 Fuel(73110) Time(4367,4602) Slack(690) FuelSlack(15366,88476) Distance(56846) -> 26 Fuel(272334) Time(5369,5604) Slack(0) FuelSlack(0,0) Distance(59407) -> 13 Fuel(52716) Time(6598,6833) Slack(755) FuelSlack(52716,82914) Distance(96010) -> 22 Fuel(287700) Time(8738,8973) Slack(0) FuelSlack(0,0) Distance(141724) -> 21 Fuel(272334) Time(8935,9170) Slack(0) FuelSlack(0,0) Distance(144285) -> 20 Fuel(256662) Time(9134,9369) Slack(0) FuelSlack(0,0) Distance(146897) -> 19 Fuel(241296) Time(9331,9566) Slack(0) FuelSlack(0,0) Distance(149458) -> 31 Fuel(93438) Time(10197,10432) Slack(0) FuelSlack(0,0) Distance(174101) -> 30 Fuel(80820) Time(10380,10615) Slack(0) FuelSlack(0,0) Distance(176204) -> 29 Fuel(68004) Time(10564,10799) Slack(0) FuelSlack(0,0) Distance(178340) -> 28 Fuel(55386) Time(10747,10982) Slack(0) FuelSlack(0,0) Distance(180443) -> 11 Fuel(30198) Time(10994,11212) Slack(827) FuelSlack(12816,43014) Distance(184641) -> 27 Fuel(274884) Time(11983,12103) Slack(0) FuelSlack(0,0) Distance(186777) -> 18 Fuel(122934) Time(12870,12870) Distance(212102)
5069 Distance of the route: 212102 ft
5070 Remaining Fuel of the route: 122934
```

```
5071 Total Time of the route: 12870 seconds
5072
5073 Total Distance of all routes: 212102 ft
5074 Total Fuel remaining of all routes: 122934
5075 Total Time of all routes: 12870 seconds
5076 2
5077 Start point is: 2
5078 16
5079 16
5080 (8.29, 4.03) (4.8, 3.81)
5081 15 15
5082 The travel time for UGV from depot B to NW UGV stop
      is: 3375
5083 The UGV travel time between two UGV stops is: 4097
5084 20815333.5
5085 End node is [24]
5086 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5087 [25, 26]
5088 Objective: 2000000
5089 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26
5090 27
5091 Route for vehicle 0:
5092 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5093 Distance of the route: 0 ft
5094 Remaining Fuel of the route: 287700
5095 Total Time of the route: 0 seconds
5096
5097 Total Distance of all routes: 0 ft
5098 Total Fuel remaining of all routes: 287700
5099 Total Time of all routes: 0 seconds
5100 5
5101 Start point is: 5
5102 16
5103 31
5104 (5.16, 5.24) (7.37, 3.27)
5105 14 14
5106 The travel time for UGV from depot B to NW UGV stop
```

```
5106 is: 4257
5107 The UGV travel time between two UGV stops is: 4429
5108 19390767.0
5109 End node is [24]
5110 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5111 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45]
5112 Objective: 5507
5113 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17
      18 19 21 22 23
5114 46
5115 46
5116 46
5117 46
5118 46
5119 46
5120 46
5121 46
5122 46
5123 46
5124 46
5125 46
5126 46
5127 46
5128 46
5129 46
5130 46
5131 46
5132 46
5133 46
5134 46
5135 46
5136 46
5137 46
5138 46
5139 Route for vehicle 0:
5140 0 Fuel(253693) Time(58,58) Slack(60) FuelSlack(0,0
      ) Distance(0) -> 28 Fuel(126859) Time(758,758)
      Slack(120) FuelSlack(0,0) Distance(21139) -> 2 Fuel
      (25) Time(1518,1518) Slack(925) FuelSlack(147858,
```

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5140 147883) Distance(42278) -> 25 Fuel(139842) Time(
    3189,3189) Slack(120) FuelSlack(0,0) Distance(66921
) -> 26 Fuel(124476) Time(3386,3386) Slack(120)
FuelSlack(0,0) Distance(69482) -> 27 Fuel(108804)
Time(3585,3585) Slack(120) FuelSlack(0,0) Distance(
72094) -> 29 Fuel(77760) Time(3861,3861) Slack(120
) FuelSlack(0,0) Distance(77268) -> 30 Fuel(62088)
Time(4060,4060) Slack(120) FuelSlack(0,0) Distance(
79880) -> 12 Fuel(46722) Time(4257,4257) Slack(774
) FuelSlack(201852,201852) Distance(82441) -> 45
Fuel(132570) Time(5814,5814) Slack(0) FuelSlack(0,0
) Distance(108296) -> 44 Fuel(124278) Time(5855,
5855) Slack(0) FuelSlack(0,0) Distance(109678) ->
43 Fuel(115632) Time(5898,5898) Slack(0) FuelSlack(
0,0) Distance(111119) -> 42 Fuel(107340) Time(5939,
5939) Slack(0) FuelSlack(0,0) Distance(112501) ->
41 Fuel(98736) Time(5982,5982) Slack(0) FuelSlack(0
,0) Distance(113935) -> 40 Fuel(90444) Time(6023,
6023) Slack(0) FuelSlack(0,0) Distance(115317) ->
39 Fuel(81798) Time(6066,6066) Slack(0) FuelSlack(0
,0) Distance(116758) -> 38 Fuel(73506) Time(6107,
6107) Slack(0) FuelSlack(0,0) Distance(118140) ->
37 Fuel(64902) Time(6150,6150) Slack(0) FuelSlack(0
,0) Distance(119574) -> 36 Fuel(56610) Time(6191,
6191) Slack(0) FuelSlack(0,0) Distance(120956) ->
35 Fuel(47964) Time(6234,6234) Slack(0) FuelSlack(0
,0) Distance(122397) -> 34 Fuel(39672) Time(6275,
6275) Slack(0) FuelSlack(0,0) Distance(123779) ->
33 Fuel(31068) Time(6318,6318) Slack(0) FuelSlack(0
,0) Distance(125213) -> 32 Fuel(22776) Time(6359,
6359) Slack(0) FuelSlack(0,0) Distance(126595) ->
31 Fuel(14442) Time(6401,6401) Slack(0) FuelSlack(0
,0) Distance(127984) -> 20 Fuel(5838) Time(6444,
6444) Slack(906) FuelSlack(5838,287700) Distance(
129418) -> 24 Fuel(287700) Time(8950,8950) Distance
(182218)

5141 Distance of the route: 182218 ft
5142 Remaining Fuel of the route: 287700
5143 Total Time of the route: 8950 seconds
5144
5145 Total Distance of all routes: 182218 ft

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5146 Total Fuel remaining of all routes: 287700
5147 Total Time of all routes: 8950 seconds
5148 2
5149 Start point is: 2
5150 16
5151 16
5152 (8.29, 4.03) (4.8, 3.81)
5153 15 14
5154 The travel time for UGV from depot B to NW UGV stop
      is: 3375
5155 The UGV travel time between two UGV stops is: 4324
5156 21196785.0
5157 End node is [24]
5158 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5159 [25, 26]
5160 Objective: 20000000
5161 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26
5162 27
5163 Route for vehicle 0:
5164 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5165 Distance of the route: 0 ft
5166 Remaining Fuel of the route: 287700
5167 Total Time of the route: 0 seconds
5168
5169 Total Distance of all routes: 0 ft
5170 Total Fuel remaining of all routes: 287700
5171 Total Time of all routes: 0 seconds
5172 5
5173 Start point is: 5
5174 16
5175 31
5176 (5.04, 4.76) (7.06, 3.02)
5177 14 14
5178 The travel time for UGV from depot B to NW UGV stop
      is: 4069
5179 The UGV travel time between two UGV stops is: 4090
5180 18692877.0
```

```
5181 End node is [24]
5182 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5183 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45, 46]
5184 Objective: 5447
5185 Dropped nodes: 1 2 3 5 6 7 8 9 10 11 13 14 15 16 17
      18 19 20 21 23
5186 47
5187 47
5188 47
5189 47
5190 47
5191 47
5192 47
5193 47
5194 47
5195 47
5196 47
5197 47
5198 47
5199 47
5200 47
5201 47
5202 47
5203 47
5204 47
5205 47
5206 47
5207 47
5208 47
5209 47
5210 47
5211 47
5212 Route for vehicle 0:
5213 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
      0) FuelSlack(0,0) Distance(20137) -> 4 Fuel(46056)
      Time(1220,1400) Slack(776) FuelSlack(147858,193914
      ) Distance(40274) -> 25 Fuel(139842) Time(2802,3071
      ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
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5213 Fuel(124476) Time(2999,3268) Slack(0) FuelSlack(0,0)
    ) Distance(67478) -> 27 Fuel(108804) Time(3198,3467
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3395,3664) Slack(0) FuelSlack(0,0)
    ) Distance(72651) -> 29 Fuel(77766) Time(3594,3834
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3870,3990) Slack(0) FuelSlack(0,0)
    ) Distance(80437) -> 12 Fuel(31050) Time(4069,4069
    ) Slack(825) FuelSlack(170508,170508) Distance(
        83049) -> 46 Fuel(148242) Time(5598,5598) Slack(0)
    FuelSlack(0,0) Distance(106292) -> 45 Fuel(139950)
    Time(5639,5639) Slack(0) FuelSlack(0,0) Distance(
        107674) -> 44 Fuel(131304) Time(5682,5682) Slack(0)
    ) FuelSlack(0,0) Distance(109115) -> 43 Fuel(123012
    ) Time(5723,5723) Slack(0) FuelSlack(0,0) Distance(
        110497) -> 42 Fuel(114408) Time(5766,5766) Slack(0
    ) FuelSlack(0,0) Distance(111931) -> 41 Fuel(106116
    ) Time(5807,5807) Slack(0) FuelSlack(0,0) Distance(
        113313) -> 40 Fuel(97470) Time(5850,5850) Slack(0)
    FuelSlack(0,0) Distance(114754) -> 39 Fuel(89178)
    Time(5891,5891) Slack(0) FuelSlack(0,0) Distance(
        116136) -> 38 Fuel(80574) Time(5934,5934) Slack(0)
    FuelSlack(0,0) Distance(117570) -> 37 Fuel(72282)
    Time(5975,5975) Slack(0) FuelSlack(0,0) Distance(
        118952) -> 36 Fuel(63636) Time(6018,6018) Slack(0)
    FuelSlack(0,0) Distance(120393) -> 35 Fuel(55344)
    Time(6059,6059) Slack(0) FuelSlack(0,0) Distance(
        121775) -> 34 Fuel(46740) Time(6102,6102) Slack(0)
    FuelSlack(0,0) Distance(123209) -> 33 Fuel(38448)
    Time(6143,6143) Slack(0) FuelSlack(0,0) Distance(
        124591) -> 32 Fuel(30114) Time(6185,6185) Slack(0)
    FuelSlack(0,0) Distance(125980) -> 22 Fuel(21510)
    Time(6228,6228) Slack(855) FuelSlack(21510,287700)
    Distance(127414) -> 24 Fuel(287700) Time(8683,8683
    ) Distance(180214)

5214 Distance of the route: 180214 ft
5215 Remaining Fuel of the route: 287700
5216 Total Time of the route: 8683 seconds
5217
5218 Total Distance of all routes: 180214 ft
5219 Total Fuel remaining of all routes: 287700

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```
5220 Total Time of all routes: 8683 seconds
5221 2
5222 Start point is: 2
5223 16
5224 16
5225 (8.91, 4.54) (5.88, 8.09)
5226 14 14
5227 The travel time for UGV from depot B to NW UGV stop
      is: 3918
5228 The UGV travel time between two UGV stops is: 6292
5229 ****
      ***
5230 UGV route goes infeasible although UAV has a
      solution
5231 ****
      ***
5232 30974694.0
5233 End node is [24]
5234 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5235 []
5236 Objective: 0
5237 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23
5238 25
5239 Route for vehicle 0:
5240 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5241 Distance of the route: 0 ft
5242 Remaining Fuel of the route: 287700
5243 Total Time of the route: 0 seconds
5244
5245 Total Distance of all routes: 0 ft
5246 Total Fuel remaining of all routes: 287700
5247 Total Time of all routes: 0 seconds
5248 3
5249 Start point is: 3
5250 16
5251 16
5252 (4.8, 3.81) (7.06, 3.02)
```

```
5253 15 15
5254 The travel time for UGV from depot B to NW UGV stop
      is: 2740
5255 The UGV travel time between two UGV stops is: 3534
5256 ****
      ***
5257 UGV route goes infeasible although UAV has a
      solution
5258 ****
      ***
5259 38790237.0
5260 End node is [18]
5261 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
5262 []
5263 Objective: 5554
5264 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 13 14 15 16
5265 25
5266 25
5267 25
5268 25
5269 25
5270 25
5271 25
5272 25
5273 25
5274 25
5275 Route for vehicle 0:
5276 0 Fuel(268383) Time(1537,1537) Slack(0) FuelSlack(0
      ,0) Distance(0) -> 19 Fuel(129249) Time(2239,2299)
      Slack(21) FuelSlack(0,0) Distance(23189) -> 6 Fuel(
      46053) Time(2740,2839) Slack(777) FuelSlack(0,65979
      ) Distance(37055) -> 20 Fuel(287700) Time(4078,4226
      ) Slack(0) FuelSlack(0,0) Distance(52333) -> 17
      Fuel(19926) Time(5550,5698) Slack(861) FuelSlack(
      165789,231768) Distance(96962) -> 24 Fuel(121911)
      Time(8075,8223) Slack(0) FuelSlack(0,0) Distance(
      149762) -> 23 Fuel(109293) Time(8258,8406) Slack(0
      ) FuelSlack(0,0) Distance(151865) -> 22 Fuel(96477
      ) Time(8442,8590) Slack(0) FuelSlack(0,0) Distance(
      154001) -> 21 Fuel(83859) Time(8625,8773) Slack(0)
```

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5276 FuelSlack(0,0) Distance(156104) -> 12 Fuel(46053)
    Time(8935,9083) Slack(777) FuelSlack(0,287700)
    Distance(162405) -> 18 Fuel(287700) Time(10498,
    10498) Distance(183491)
5277 Distance of the route: 183491 ft
5278 Remaining Fuel of the route: 287700
5279 Total Time of the route: 10498 seconds
5280
5281 Total Distance of all routes: 183491 ft
5282 Total Fuel remaining of all routes: 287700
5283 Total Time of all routes: 10498 seconds
5284 2
5285 Start point is: 2
5286 16
5287 16
5288 (8.91, 4.54) (5.88, 8.09)
5289 14 15
5290 The travel time for UGV from depot B to NW UGV stop
    is: 3918
5291 The UGV travel time between two UGV stops is: 5934
5292 ****
      ***
5293 UGV route goes infeasible although UAV has a
    solution
5294 ****
      ***
5295 29757091.5
5296 End node is [24]
5297 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
5298 []
5299 Objective: 0
5300 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23
5301 25
5302 Route for vehicle 0:
5303 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
5304 Distance of the route: 0 ft
5305 Remaining Fuel of the route: 287700
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5306 Total Time of the route: 0 seconds
5307
5308 Total Distance of all routes: 0 ft
5309 Total Fuel remaining of all routes: 287700
5310 Total Time of all routes: 0 seconds
5311 2
5312 Start point is: 2
5313 16
5314 16
5315 (7.37, 3.27) (5.64, 7.14)
5316 14 14
5317 The travel time for UGV from depot B to NW UGV stop
      is: 3164
5318 The UGV travel time between two UGV stops is: 5168
5319 ****
      ***
5320 UGV route goes infeasible although UAV has a
      solution
5321 ****
      ***
5322 25996465.5
5323 End node is [24]
5324 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5325 [25, 26, 27, 28, 29, 30, 31]
5326 Objective: 7000000
5327 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31
5328 32
5329 Route for vehicle 0:
5330 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0)
      )
5331 Distance of the route: 0 ft
5332 Remaining Fuel of the route: 287700
5333 Total Time of the route: 0 seconds
5334
5335 Total Distance of all routes: 0 ft
5336 Total Fuel remaining of all routes: 287700
5337 Total Time of all routes: 0 seconds
5338 3
```

```
5339 Start point is: 3
5340 16
5341 16
5342 (5.16, 5.24) (7.37, 3.27)
5343 14 15
5344 The travel time for UGV from depot B to NW UGV stop
    is: 3385
5345 The UGV travel time between two UGV stops is: 4196
5346 ****
***  
5347 UGV route goes infeasible although UAV has a
    solution
5348 ****
***  
5349 40477729.5
5350 End node is [18]
5351 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17]
5352 [25, 26, 27, 28, 29]
5353 Objective: 2005601
5354 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 12 13 14 15 16
    28 29
5355 30
5356 30
5357 30
5358 30
5359 30
5360 30
5361 30
5362 30
5363 30
5364 30
5365 30
5366 30
5367 Route for vehicle 0:
5368 0 Fuel(287700) Time(1537,1537) Slack(60) FuelSlack(
    0,0) Distance(0) -> 25 Fuel(135750) Time(2364,2364
    ) Slack(120) FuelSlack(0,0) Distance(25325) -> 26
    Fuel(123378) Time(2546,2546) Slack(120) FuelSlack(0
    ,0) Distance(27387) -> 27 Fuel(110760) Time(2729,
    2729) Slack(120) FuelSlack(0,0) Distance(29490) ->
```

5368 6 Fuel(4452) Time(3385,3385) Slack(910) FuelSlack(9576,45775) Distance(47208) -> 24 Fuel(278124) Time(4372,4387) Slack(18) FuelSlack(0,0) Distance(49769) -> 17 Fuel(31747) Time(5649,5751) Slack(823) FuelSlack(0,71197) Distance(90832) -> 19 Fuel(287700) Time(8174,8276) Slack(18) FuelSlack(0,0) Distance(143638) -> 20 Fuel(272334) Time(8371,8473) Slack(18) FuelSlack(0,0) Distance(146199) -> 21 Fuel(256662) Time(8570,8672) Slack(18) FuelSlack(0,0) Distance(148811) -> 22 Fuel(241296) Time(8767,8869) Slack(18) FuelSlack(0,0) Distance(151372) -> 23 Fuel(225624) Time(8966,9068) Slack(18) FuelSlack(0,0) Distance(153984) -> 18 Fuel(39450) Time(10026,10026) Distance(185013)

5369 Distance of the route: 185013 ft

5370 Remaining Fuel of the route: 39450

5371 Total Time of the route: 10026 seconds

5372

5373 Total Distance of all routes: 185013 ft

5374 Total Fuel remaining of all routes: 39450

5375 Total Time of all routes: 10026 seconds

5376 5

5377 Start point is: 5

5378 16

5379 31

5380 (4.92, 4.29) (7.37, 3.27)

5381 14 14

5382 The travel time for UGV from depot B to NW UGV stop is: 3888

5383 The UGV travel time between two UGV stops is: 4060

5384 18151728.0

5385 End node is [24]

5386 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]

5387 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]

5388 Objective: 15003229

5389 Dropped nodes: 1 3 4 5 6 7 8 9 10 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47

5390 48

```
5391 48
5392 48
5393 48
5394 48
5395 48
5396 48
5397 48
5398 48
5399 48
5400 48
5401 Route for vehicle 0:
5402 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20137) -> 2 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
    Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2898,3420
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3017,3497) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3216,3576
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3492,3732) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 32 Fuel(31050) Time(3691,3811
    ) Slack(0) FuelSlack(0,0) Distance(83049) -> 11
    Fuel(15684) Time(3888,3888) Slack(874) FuelSlack(
    15684,287700) Distance(85610) -> 24 Fuel(287700)
    Time(5401,5401) Distance(106719)
5403 Distance of the route: 106719 ft
5404 Remaining Fuel of the route: 287700
5405 Total Time of the route: 5401 seconds
5406
5407 Total Distance of all routes: 106719 ft
5408 Total Fuel remaining of all routes: 287700
5409 Total Time of all routes: 5401 seconds
5410 3
5411 Start point is: 3
5412 16
5413 16
5414 (7.68, 3.53) (5.04, 4.76)
```

```
5415 14 14
5416 The travel time for UGV from depot B to NW UGV stop
      is: 3347
5417 The UGV travel time between two UGV stops is: 4395
5418 ****
      ***
5419 UGV route goes infeasible although UAV has a
      solution
5420 ****
      ***
5421 46951027.5
5422 End node is [18]
5423 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
5424 [25, 26, 27, 28, 29]
5425 Objective: 2007073
5426 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 14 15 16 17 28
      29
5427 30
5428 30
5429 30
5430 30
5431 30
5432 30
5433 30
5434 30
5435 30
5436 30
5437 30
5438 30
5439 30
5440 Route for vehicle 0:
5441 0 Fuel(286453) Time(1593,1593) Slack(60) FuelSlack(
      0,0) Distance(0) -> 25 Fuel(131323) Time(2436,2436
      ) Slack(120) FuelSlack(0,0) Distance(25855) -> 27
      Fuel(25015) Time(3092,3092) Slack(120) FuelSlack(0,
      0) Distance(43573) -> 26 Fuel(12397) Time(3275,3275
      ) Slack(120) FuelSlack(0,0) Distance(45676) -> 6
      Fuel(25) Time(3457,3457) Slack(925) FuelSlack(13391
      ,13441) Distance(47738) -> 22 Fuel(274309) Time(
      4991,4991) Slack(120) FuelSlack(0,0) Distance(67861
```

```
5441 ) -> 13 Fuel(25) Time(6496,6496) Slack(925)
      FuelSlack(178877,178927) Distance(113575) -> 19
      Fuel(108823) Time(9021,9021) Slack(120) FuelSlack(0
      ,0) Distance(166381) -> 20 Fuel(93457) Time(9218,
      9218) Slack(120) FuelSlack(0,0) Distance(168942
      ) -> 12 Fuel(25) Time(9809,9809) Slack(925)
      FuelSlack(0,23791) Distance(184514) -> 24 Fuel(
      287700) Time(10890,10890) Slack(120) FuelSlack(0,0
      ) Distance(189688) -> 21 Fuel(240984) Time(11245,
      11245) Slack(120) FuelSlack(0,0) Distance(197474
      ) -> 23 Fuel(209940) Time(11521,11521) Slack(120)
      FuelSlack(0,0) Distance(202648) -> 18 Fuel(23766)
      Time(12581,12581) Distance(233677)
5442 Distance of the route: 233677 ft
5443 Remaining Fuel of the route: 23766
5444 Total Time of the route: 12581 seconds
5445
5446 Total Distance of all routes: 233677 ft
5447 Total Fuel remaining of all routes: 23766
5448 Total Time of all routes: 12581 seconds
5449 5
5450 Start point is: 5
5451 16
5452 31
5453 (5.16, 5.24) (7.37, 3.27)
5454 14 14
5455 The travel time for UGV from depot B to NW UGV stop
      is: 4257
5456 The UGV travel time between two UGV stops is: 4429
5457 19174767.0
5458 End node is [24]
5459 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5460 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45]
5461 Objective: 5507
5462 Dropped nodes: 1 3 4 5 6 7 8 9 10 11 13 14 15 16 17
      18 19 21 22 23
5463 46
5464 46
5465 46
```

```
5466 46
5467 46
5468 46
5469 46
5470 46
5471 46
5472 46
5473 46
5474 46
5475 46
5476 46
5477 46
5478 46
5479 46
5480 46
5481 46
5482 46
5483 46
5484 46
5485 46
5486 46
5487 46
5488 Route for vehicle 0:
5489 0 Fuel(253693) Time(58,58) Slack(60) FuelSlack(0,0)
) Distance(0) -> 28 Fuel(126859) Time(758,758)
Slack(120) FuelSlack(0,0) Distance(21139) -> 2 Fuel
(25) Time(1518,1518) Slack(925) FuelSlack(147858,
147883) Distance(42278) -> 25 Fuel(139842) Time(
3189,3189) Slack(120) FuelSlack(0,0) Distance(66921
) -> 26 Fuel(124476) Time(3386,3386) Slack(120)
FuelSlack(0,0) Distance(69482) -> 27 Fuel(108804)
Time(3585,3585) Slack(120) FuelSlack(0,0) Distance(
72094) -> 29 Fuel(77760) Time(3861,3861) Slack(120
) FuelSlack(0,0) Distance(77268) -> 30 Fuel(62088)
Time(4060,4060) Slack(120) FuelSlack(0,0) Distance(
79880) -> 12 Fuel(46722) Time(4257,4257) Slack(774
) FuelSlack(201852,201852) Distance(82441) -> 45
Fuel(132570) Time(5814,5814) Slack(0) FuelSlack(0,0
) Distance(108296) -> 44 Fuel(124278) Time(5855,
5855) Slack(0) FuelSlack(0,0) Distance(109678) ->
43 Fuel(115632) Time(5898,5898) Slack(0) FuelSlack(
```

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5489 0,0) Distance(111119) -> 42 Fuel(107340) Time(5939,
      5939) Slack(0) FuelSlack(0,0) Distance(112501) ->
      41 Fuel(98736) Time(5982,5982) Slack(0) FuelSlack(0
      ,0) Distance(113935) -> 40 Fuel(90444) Time(6023,
      6023) Slack(0) FuelSlack(0,0) Distance(115317) ->
      39 Fuel(81798) Time(6066,6066) Slack(0) FuelSlack(0
      ,0) Distance(116758) -> 38 Fuel(73506) Time(6107,
      6107) Slack(0) FuelSlack(0,0) Distance(118140) ->
      37 Fuel(64902) Time(6150,6150) Slack(0) FuelSlack(0
      ,0) Distance(119574) -> 36 Fuel(56610) Time(6191,
      6191) Slack(0) FuelSlack(0,0) Distance(120956) ->
      35 Fuel(47964) Time(6234,6234) Slack(0) FuelSlack(0
      ,0) Distance(122397) -> 34 Fuel(39672) Time(6275,
      6275) Slack(0) FuelSlack(0,0) Distance(123779) ->
      33 Fuel(31068) Time(6318,6318) Slack(0) FuelSlack(0
      ,0) Distance(125213) -> 32 Fuel(22776) Time(6359,
      6359) Slack(0) FuelSlack(0,0) Distance(126595) ->
      31 Fuel(14442) Time(6401,6401) Slack(0) FuelSlack(0
      ,0) Distance(127984) -> 20 Fuel(5838) Time(6444,
      6444) Slack(906) FuelSlack(5838,287700) Distance(
      129418) -> 24 Fuel(287700) Time(8950,8950) Distance
      (182218)

5490 Distance of the route: 182218 ft
5491 Remaining Fuel of the route: 287700
5492 Total Time of the route: 8950 seconds
5493
5494 Total Distance of all routes: 182218 ft
5495 Total Fuel remaining of all routes: 287700
5496 Total Time of all routes: 8950 seconds
5497 4
5498 Start point is: 4
5499 31
5500 16
5501 (7.06, 3.02) (5.4, 6.19)
5502 14 15
5503 The travel time for UGV from depot B to NW UGV stop
      is: 4461
5504 The UGV travel time between two UGV stops is: 4400
5505 18083992.5
5506 End node is [24]
5507 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,

```

```
5507 [15, 16, 17, 18, 19, 20, 21, 22, 23]
5508 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45]
5509 Objective: 21000000
5510 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
                  16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
                  34 35 36 37 38 39 40 41 42 43 44 45
5511 46
5512 Route for vehicle 0:
5513 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5514 Distance of the route: 0 ft
5515 Remaining Fuel of the route: 287700
5516 Total Time of the route: 0 seconds
5517
5518 Total Distance of all routes: 0 ft
5519 Total Fuel remaining of all routes: 287700
5520 Total Time of all routes: 0 seconds
5521 2
5522 Start point is: 2
5523 16
5524 16
5525 (4.92, 4.29) (8.6, 4.29)
5526 15 15
5527 The travel time for UGV from depot B to NW UGV stop
      is: 2787
5528 The UGV travel time between two UGV stops is: 4414
5529 21955960.5
5530 End node is [24]
5531 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5532 [25, 26, 27, 28, 29, 30, 31, 32, 33]
5533 Objective: 9000000
5534 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
                  16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
5535 34
5536 Route for vehicle 0:
5537 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
```

```
5538 Distance of the route: 0 ft
5539 Remaining Fuel of the route: 287700
5540 Total Time of the route: 0 seconds
5541
5542 Total Distance of all routes: 0 ft
5543 Total Fuel remaining of all routes: 287700
5544 Total Time of all routes: 0 seconds
5545 4
5546 Start point is: 4
5547 31
5548 16
5549 (8.6, 4.29) (5.52, 6.66)
5550 15 14
5551 The travel time for UGV from depot B to NW UGV stop
      is: 4868
5552 The UGV travel time between two UGV stops is: 5583
5553 21258637.5
5554 End node is [24]
5555 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5556 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40]
5557 Objective: 16000000
5558 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
      34 35 36 37 38 39 40
5559 41
5560 Route for vehicle 0:
5561 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5562 Distance of the route: 0 ft
5563 Remaining Fuel of the route: 287700
5564 Total Time of the route: 0 seconds
5565
5566 Total Distance of all routes: 0 ft
5567 Total Fuel remaining of all routes: 287700
5568 Total Time of all routes: 0 seconds
5569 2
5570 Start point is: 2
5571 16
```

```
5572 16
5573 (8.91, 4.54) (5.88, 8.09)
5574 14 14
5575 The travel time for UGV from depot B to NW UGV stop
      is: 3918
5576 The UGV travel time between two UGV stops is: 6292
5577 ****
      ***
5578 UGV route goes infeasible although UAV has a
      solution
5579 ****
      ***
5580 30974694.0
5581 End node is [24]
5582 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5583 []
5584 Objective: 0
5585 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23
5586 25
5587 Route for vehicle 0:
5588 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5589 Distance of the route: 0 ft
5590 Remaining Fuel of the route: 287700
5591 Total Time of the route: 0 seconds
5592
5593 Total Distance of all routes: 0 ft
5594 Total Fuel remaining of all routes: 287700
5595 Total Time of all routes: 0 seconds
5596 2
5597 Start point is: 2
5598 16
5599 16
5600 (8.29, 4.03) (5.4, 6.19)
5601 14 14
5602 The travel time for UGV from depot B to NW UGV stop
      is: 3616
5603 The UGV travel time between two UGV stops is: 5251
```

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5604 ****
      ***
5605 UGV route goes infeasible although UAV has a
      solution
5606 ****
      ***
5607 26338023.0
5608 End node is [24]
5609 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5610 [25, 26, 27, 28, 29, 30]
5611 Objective: 6000000
5612 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30
5613 31
5614 Route for vehicle 0:
5615 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5616 Distance of the route: 0 ft
5617 Remaining Fuel of the route: 287700
5618 Total Time of the route: 0 seconds
5619
5620 Total Distance of all routes: 0 ft
5621 Total Fuel remaining of all routes: 287700
5622 Total Time of all routes: 0 seconds
5623 2
5624 Start point is: 2
5625 16
5626 16
5627 (5.88, 8.09) (7.98, 3.78)
5628 14 15
5629 The travel time for UGV from depot B to NW UGV stop
      is: 4465
5630 The UGV travel time between two UGV stops is: 5512
5631 ****
      ***
5632 UGV route goes infeasible although UAV has a
      solution
5633 ****
      ***
```

```
5634 28038967.5
5635 End node is [24]
5636 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5637 [25, 26, 27]
5638 Objective: 3000000
5639 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27
5640 28
5641 Route for vehicle 0:
5642 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5643 Distance of the route: 0 ft
5644 Remaining Fuel of the route: 287700
5645 Total Time of the route: 0 seconds
5646
5647 Total Distance of all routes: 0 ft
5648 Total Fuel remaining of all routes: 287700
5649 Total Time of all routes: 0 seconds
5650 3
5651 Start point is: 3
5652 16
5653 16
5654 (4.92, 4.29) (7.37, 3.27)
5655 14 14
5656 The travel time for UGV from depot B to NW UGV stop
      is: 3015
5657 The UGV travel time between two UGV stops is: 4060
5658 ****
      ***
5659 UGV route goes infeasible although UAV has a
      solution
5660 ****
      ***
5661 46305568.5
5662 End node is [18]
5663 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
5664 [25, 26, 27, 28, 29, 30, 31]
5665 Objective: 6418
```

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5666 Dropped nodes: 2 4 5 6 7 8 9 10 12 14 15 16 17
5667 32
5668 32
5669 32
5670 32
5671 32
5672 32
5673 32
5674 32
5675 32
5676 32
5677 32
5678 32
5679 32
5680 32
5681 32
5682 32
5683 32
5684 32
5685 Route for vehicle 0:
5686 0 Fuel(287700) Time(1537,1537) Slack(0) FuelSlack(0
,0) Distance(0) -> 25 Fuel(132570) Time(2320,2380)
Slack(46) FuelSlack(0,0) Distance(25855) -> 23 Fuel
(101526) Time(2582,2656) Slack(46) FuelSlack(0,0)
Distance(31029) -> 3 Fuel(39444) Time(3015,3089)
Slack(798) FuelSlack(168180,280734) Distance(41376
) -> 24 Fuel(119520) Time(4047,4248) Slack(0)
FuelSlack(0,0) Distance(49111) -> 1 Fuel(73110)
Time(4367,4602) Slack(690) FuelSlack(15366,88476)
Distance(56846) -> 26 Fuel(272334) Time(5369,5604)
Slack(0) FuelSlack(0,0) Distance(59407) -> 13 Fuel(
52716) Time(6598,6833) Slack(755) FuelSlack(52716,
82914) Distance(96010) -> 22 Fuel(287700) Time(8738
,8973) Slack(0) FuelSlack(0,0) Distance(141724) ->
21 Fuel(272334) Time(8935,9170) Slack(0) FuelSlack(
0,0) Distance(144285) -> 20 Fuel(256662) Time(9134,
9369) Slack(0) FuelSlack(0,0) Distance(146897) ->
19 Fuel(241296) Time(9331,9566) Slack(0) FuelSlack(
0,0) Distance(149458) -> 31 Fuel(93438) Time(10197,
10432) Slack(0) FuelSlack(0,0) Distance(174101) ->
30 Fuel(80820) Time(10380,10615) Slack(0) FuelSlack
```

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5686 (0,0) Distance(176204) -> 29 Fuel(68004) Time(10564  
,10799) Slack(0) FuelSlack(0,0) Distance(178340  
) -> 28 Fuel(55386) Time(10747,10982) Slack(0)  
FuelSlack(0,0) Distance(180443) -> 11 Fuel(30198)  
Time(10994,11212) Slack(827) FuelSlack(12816,43014  
) Distance(184641) -> 27 Fuel(274884) Time(11983,  
12103) Slack(0) FuelSlack(0,0) Distance(186777) ->  
18 Fuel(122934) Time(12870,12870) Distance(212102)  
5687 Distance of the route: 212102 ft  
5688 Remaining Fuel of the route: 122934  
5689 Total Time of the route: 12870 seconds  
5690  
5691 Total Distance of all routes: 212102 ft  
5692 Total Fuel remaining of all routes: 122934  
5693 Total Time of all routes: 12870 seconds  
5694 2  
5695 Start point is: 2  
5696 16  
5697 16  
5698 (8.29, 4.03) (4.8, 3.81)  
5699 15 14  
5700 The travel time for UGV from depot B to NW UGV stop  
is: 3375  
5701 The UGV travel time between two UGV stops is: 4324  
5702 21700785.0  
5703 End node is [24]  
5704 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
15, 16, 17, 18, 19, 20, 21, 22, 23]  
5705 [25, 26]  
5706 Objective: 2000000  
5707 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
16 17 18 19 20 21 22 23 25 26  
5708 27  
5709 Route for vehicle 0:  
5710 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0  
)  
5711 Distance of the route: 0 ft  
5712 Remaining Fuel of the route: 287700  
5713 Total Time of the route: 0 seconds  
5714
```

```
5715 Total Distance of all routes: 0 ft
5716 Total Fuel remaining of all routes: 287700
5717 Total Time of all routes: 0 seconds
5718 2
5719 Start point is: 2
5720 16
5721 16
5722 (5.52, 6.66) (7.37, 3.27)
5723 14 14
5724 The travel time for UGV from depot B to NW UGV stop
    is: 3907
5725 The UGV travel time between two UGV stops is: 4980
5726 ****
5727 ***
5728 UGV route goes infeasible although UAV has a
    solution
5729 ****
5730 ***
5731 25161222.0
5732 End node is [24]
5733 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
5734 [25, 26, 27, 28, 29]
5735 Objective: 5000000
5736 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26 27 28 29
5737 30
5738 Route for vehicle 0:
5739 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
5740 Distance of the route: 0 ft
5741 Remaining Fuel of the route: 287700
5742 Total Time of the route: 0 seconds
5743 0
5744 Total Distance of all routes: 0 ft
5745 Total Fuel remaining of all routes: 287700
5746 Total Time of all routes: 0 seconds
5747 3
5748 Start point is: 3
5749 ****
5750 16
```

```
5748 16
5749 (7.06, 3.02) (5.4, 6.19)
5750 14 14
5751 The travel time for UGV from depot B to NW UGV stop
      is: 3041
5752 The UGV travel time between two UGV stops is: 4648
5753 ****
      ***
5754 UGV route goes infeasible although UAV has a
      solution
5755 ****
      ***
5756 46503133.5
5757 End node is [18]
5758 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17]
5759 [25, 26, 27, 28]
5760 Objective: 6077
5761 Dropped nodes: 2 3 4 5 6 7 8 10 12 13 14 15 16
5762 29
5763 29
5764 29
5765 29
5766 29
5767 29
5768 29
5769 29
5770 29
5771 29
5772 29
5773 29
5774 29
5775 29
5776 29
5777 Route for vehicle 0:
5778 0 Fuel(287700) Time(1537,1537) Slack(0) FuelSlack(0
      ,0) Distance(0) -> 25 Fuel(123378) Time(2366,2426)
      Slack(32) FuelSlack(0,0) Distance(27387) -> 26 Fuel
      (110760) Time(2521,2609) Slack(32) FuelSlack(0,0)
      Distance(29490) -> 28 Fuel(85326) Time(2769,2857)
      Slack(32) FuelSlack(0,0) Distance(33729) -> 27 Fuel
```

```

5778 (72708) Time(2952,3040) Slack(32) FuelSlack(0,0)
  Distance(35832) -> 24 Fuel(34902) Time(3262,3350)
  Slack(32) FuelSlack(0,0) Distance(42133) -> 1 Fuel(
  9468) Time(3510,3598) Slack(894) FuelSlack(4875,
  41736) Distance(46372) -> 23 Fuel(282825) Time(4498
  ,4586) Slack(32) FuelSlack(0,0) Distance(48475) ->
  17 Fuel(27393) Time(5908,5996) Slack(837) FuelSlack(
  198225,253011) Distance(91047) -> 19 Fuel(89475)
  Time(8433,8521) Slack(32) FuelSlack(0,0) Distance(
  143853) -> 20 Fuel(74109) Time(8630,8718) Slack(32
  ) FuelSlack(0,0) Distance(146414) -> 9 Fuel(27393)
  Time(8985,9073) Slack(837) FuelSlack(246812,287700
  ) Distance(154200) -> 22 Fuel(40888) Time(9989,
  10077) Slack(32) FuelSlack(0,0) Distance(156812
  ) -> 11 Fuel(25216) Time(10188,10269) Slack(844)
  FuelSlack(0,95704) Distance(159424) -> 21 Fuel(
  287700) Time(11269,11350) Slack(39) FuelSlack(0,0)
  Distance(164598) -> 18 Fuel(70488) Time(12486,12486
  ) Distance(200800)

5779 Distance of the route: 200800 ft
5780 Remaining Fuel of the route: 70488
5781 Total Time of the route: 12486 seconds
5782
5783 Total Distance of all routes: 200800 ft
5784 Total Fuel remaining of all routes: 70488
5785 Total Time of all routes: 12486 seconds
5786 2
5787 Start point is: 2
5788 16
5789 16
5790 (5.88, 8.09) (7.98, 3.78)
5791 14 14
5792 The travel time for UGV from depot B to NW UGV stop
  is: 4465
5793 The UGV travel time between two UGV stops is: 5840
5794 ****
  ***
5795 UGV route goes infeasible although UAV has a
  solution
5796 ****
  ***

```

```
5797 29499882.0
5798 End node is [24]
5799 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5800 [25, 26, 27]
5801 Objective: 3000000
5802 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27
5803 28
5804 Route for vehicle 0:
5805 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5806 Distance of the route: 0 ft
5807 Remaining Fuel of the route: 287700
5808 Total Time of the route: 0 seconds
5809
5810 Total Distance of all routes: 0 ft
5811 Total Fuel remaining of all routes: 287700
5812 Total Time of all routes: 0 seconds
5813 2
5814 Start point is: 2
5815 16
5816 16
5817 (5.76, 7.62) (7.98, 3.78)
5818 15 14
5819 The travel time for UGV from depot B to NW UGV stop
      is: 3995
5820 The UGV travel time between two UGV stops is: 5655
5821 ****
      ***
5822 UGV route goes infeasible although UAV has a
      solution
5823 ****
      ***
5824 27263179.5
5825 End node is [24]
5826 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5827 [25, 26, 27, 28]
5828 Objective: 4000000
```

```
5829 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
      16 17 18 19 20 21 22 23 25 26 27 28  
5830 29  
5831 Route for vehicle 0:  
5832 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)  
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0  
      )  
5833 Distance of the route: 0 ft  
5834 Remaining Fuel of the route: 287700  
5835 Total Time of the route: 0 seconds  
5836  
5837 Total Distance of all routes: 0 ft  
5838 Total Fuel remaining of all routes: 287700  
5839 Total Time of all routes: 0 seconds  
5840 3  
5841 Start point is: 3  
5842 16  
5843 16  
5844 (7.68, 3.53) (5.04, 4.76)  
5845 14 15  
5846 The travel time for UGV from depot B to NW UGV stop  
      is: 3347  
5847 The UGV travel time between two UGV stops is: 4164  
5848 *****  
      ***  
5849 UGV route goes infeasible although UAV has a  
      solution  
5850 *****  
      ***  
5851 42493086.0  
5852 End node is [18]  
5853 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,  
      15, 16, 17]  
5854 [25, 26, 27, 28, 29]  
5855 Objective: 2006057  
5856 Dropped nodes: 1 2 3 4 5 7 8 9 10 11 13 14 15 16 28  
      29  
5857 30  
5858 30  
5859 30  
5860 30
```

```
5861 30
5862 30
5863 30
5864 30
5865 30
5866 30
5867 30
5868 30
5869 30
5870 Route for vehicle 0:
5871 0 Fuel(287700) Time(1537,1537) Slack(6) FuelSlack(0
,0) Distance(0) -> 25 Fuel(132570) Time(2326,2380)
Slack(66) FuelSlack(0,0) Distance(25855) -> 27 Fuel
(26262) Time(2982,3036) Slack(66) FuelSlack(0,0)
Distance(43573) -> 26 Fuel(13644) Time(3165,3219)
Slack(66) FuelSlack(0,0) Distance(45676) -> 6 Fuel(
1272) Time(3347,3401) Slack(920) FuelSlack(0,42595
) Distance(47738) -> 24 Fuel(287700) Time(4785,4844
) Slack(0) FuelSlack(0,0) Distance(64857) -> 17
Fuel(41323) Time(6029,6208) Slack(792) FuelSlack(
153692,220231) Distance(105920) -> 19 Fuel(134008)
Time(8421,8733) Slack(0) FuelSlack(0,0) Distance(
158726) -> 20 Fuel(118642) Time(8498,8901) Slack(0
) FuelSlack(0,0) Distance(161287) -> 21 Fuel(102970
) Time(8577,8980) Slack(0) FuelSlack(0,0) Distance(
163899) -> 22 Fuel(87604) Time(8736,9057) Slack(0)
FuelSlack(0,0) Distance(166460) -> 23 Fuel(71932)
Time(8935,9136) Slack(0) FuelSlack(0,0) Distance(
169072) -> 12 Fuel(25216) Time(9290,9371) Slack(844
) FuelSlack(0,287700) Distance(176858) -> 18 Fuel(
287700) Time(10919,10919) Distance(200101)
5872 Distance of the route: 200101 ft
5873 Remaining Fuel of the route: 287700
5874 Total Time of the route: 10919 seconds
5875
5876 Total Distance of all routes: 200101 ft
5877 Total Fuel remaining of all routes: 287700
5878 Total Time of all routes: 10919 seconds
5879 5
5880 Start point is: 5
5881 16
```

```
5882 31
5883 (7.06, 3.02) (5.52, 6.66)
5884 15 14
5885 The travel time for UGV from depot B to NW UGV stop
      is: 841
5886 The UGV travel time between two UGV stops is: 4829
5887 10834332.0
5888 End node is [24]
5889 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5890 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39]
5891 Objective: 15000000
5892 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29 30 31 32 33
      34 35 36 37 38 39
5893 40
5894 Route for vehicle 0:
5895 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5896 Distance of the route: 0 ft
5897 Remaining Fuel of the route: 287700
5898 Total Time of the route: 0 seconds
5899
5900 Total Distance of all routes: 0 ft
5901 Total Fuel remaining of all routes: 287700
5902 Total Time of all routes: 0 seconds
5903 2
5904 Start point is: 2
5905 16
5906 16
5907 (8.6, 4.29) (5.4, 6.19)
5908 14 15
5909 The travel time for UGV from depot B to NW UGV stop
      is: 3767
5910 The UGV travel time between two UGV stops is: 5104
5911 ****
      ***
5912 UGV route goes infeasible although UAV has a
      solution
```

```
5913 ****
      ***
5914 26702991.0
5915 End node is [24]
5916 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5917 [25, 26, 27, 28, 29]
5918 Objective: 5000000
5919 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      16 17 18 19 20 21 22 23 25 26 27 28 29
5920 30
5921 Route for vehicle 0:
5922 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
      )
5923 Distance of the route: 0 ft
5924 Remaining Fuel of the route: 287700
5925 Total Time of the route: 0 seconds
5926
5927 Total Distance of all routes: 0 ft
5928 Total Fuel remaining of all routes: 287700
5929 Total Time of all routes: 0 seconds
5930 5
5931 Start point is: 5
5932 16
5933 31
5934 (4.92, 4.29) (7.37, 3.27)
5935 14 14
5936 The travel time for UGV from depot B to NW UGV stop
      is: 3888
5937 The UGV travel time between two UGV stops is: 4060
5938 17479728.0
5939 End node is [24]
5940 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
      15, 16, 17, 18, 19, 20, 21, 22, 23]
5941 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
      , 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]
5942 Objective: 15003229
5943 Dropped nodes: 1 3 4 5 6 7 8 9 10 12 13 14 15 16 17
      18 19 20 21 22 23 33 34 35 36 37 38 39 40 41 42 43
      44 45 46 47
```

```
5944 48
5945 48
5946 48
5947 48
5948 48
5949 48
5950 48
5951 48
5952 48
5953 48
5954 48
5955 Route for vehicle 0:
5956 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
    0) FuelSlack(0,0) Distance(20137) -> 2 Fuel(46056)
    Time(1220,1400) Slack(776) FuelSlack(147858,193914
    ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
    ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
    Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
    ) Distance(67478) -> 27 Fuel(108804) Time(2898,3420
    ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
    Fuel(93438) Time(3017,3497) Slack(0) FuelSlack(0,0
    ) Distance(72651) -> 29 Fuel(77766) Time(3216,3576
    ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
    Fuel(46722) Time(3492,3732) Slack(0) FuelSlack(0,0
    ) Distance(80437) -> 32 Fuel(31050) Time(3691,3811
    ) Slack(0) FuelSlack(0,0) Distance(83049) -> 11
    Fuel(15684) Time(3888,3888) Slack(874) FuelSlack(
    15684,287700) Distance(85610) -> 24 Fuel(287700)
    Time(5401,5401) Distance(106719)
5957 Distance of the route: 106719 ft
5958 Remaining Fuel of the route: 287700
5959 Total Time of the route: 5401 seconds
5960
5961 Total Distance of all routes: 106719 ft
5962 Total Fuel remaining of all routes: 287700
5963 Total Time of all routes: 5401 seconds
5964 2
5965 Start point is: 2
5966 16
5967 16
```

```
5968 (8.29, 4.03) (4.8, 3.81)
5969 15 15
5970 The travel time for UGV from depot B to NW UGV stop
    is: 3375
5971 The UGV travel time between two UGV stops is: 4097
5972 21367333.5
5973 End node is [24]
5974 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
5975 [25, 26]
5976 Objective: 2000000
5977 Dropped nodes: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    16 17 18 19 20 21 22 23 25 26
5978 27
5979 Route for vehicle 0:
5980 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
    Distance(0) -> 24 Fuel(287700) Time(0,0) Distance(0
    )
5981 Distance of the route: 0 ft
5982 Remaining Fuel of the route: 287700
5983 Total Time of the route: 0 seconds
5984
5985 Total Distance of all routes: 0 ft
5986 Total Fuel remaining of all routes: 287700
5987 Total Time of all routes: 0 seconds
5988 5
5989 Start point is: 5
5990 16
5991 31
5992 (4.92, 4.29) (7.37, 3.27)
5993 14 14
5994 The travel time for UGV from depot B to NW UGV stop
    is: 3888
5995 The UGV travel time between two UGV stops is: 4060
5996 17479728.0
5997 End node is [24]
5998 [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
    15, 16, 17, 18, 19, 20, 21, 22, 23]
5999 [25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
    , 38, 39, 40, 41, 42, 43, 44, 45, 46, 47]
6000 Objective: 15003229
```

```

6001 Dropped nodes: 1 3 4 5 6 7 8 9 10 12 13 14 15 16 17
      18 19 20 21 22 23 33 34 35 36 37 38 39 40 41 42 43
      44 45 46 47
6002 48
6003 48
6004 48
6005 48
6006 48
6007 48
6008 48
6009 48
6010 48
6011 48
6012 48
6013 Route for vehicle 0:
6014 0 Fuel(287700) Time(0,0) Slack(0) FuelSlack(0,0)
      Distance(0) -> 30 Fuel(166878) Time(610,670) Slack(
      0) FuelSlack(0,0) Distance(20137) -> 2 Fuel(46056)
      Time(1220,1400) Slack(776) FuelSlack(147858,193914
      ) Distance(40274) -> 25 Fuel(139842) Time(2742,3071
      ) Slack(0) FuelSlack(0,0) Distance(64917) -> 26
      Fuel(124476) Time(2819,3268) Slack(0) FuelSlack(0,0
      ) Distance(67478) -> 27 Fuel(108804) Time(2898,3420
      ) Slack(0) FuelSlack(0,0) Distance(70090) -> 28
      Fuel(93438) Time(3017,3497) Slack(0) FuelSlack(0,0
      ) Distance(72651) -> 29 Fuel(77766) Time(3216,3576
      ) Slack(0) FuelSlack(0,0) Distance(75263) -> 31
      Fuel(46722) Time(3492,3732) Slack(0) FuelSlack(0,0
      ) Distance(80437) -> 32 Fuel(31050) Time(3691,3811
      ) Slack(0) FuelSlack(0,0) Distance(83049) -> 11
      Fuel(15684) Time(3888,3888) Slack(874) FuelSlack(
      15684,287700) Distance(85610) -> 24 Fuel(287700)
      Time(5401,5401) Distance(106719)
6015 Distance of the route: 106719 ft
6016 Remaining Fuel of the route: 287700
6017 Total Time of the route: 5401 seconds
6018
6019 Total Distance of all routes: 106719 ft
6020 Total Fuel remaining of all routes: 287700
6021 Total Time of all routes: 5401 seconds
6022 The best fitness obtained in the current generation

```

```
6022 is: 5446
6023
6024 Process finished with exit code 0
6025
```