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Artificial Intelligence

Problems nr 4

**Problem 1:A map with numbers and lines

AI-generated content may be incorrect.**

Notation: [sum of g and h, [route], g, h]

*Step 1.*

[3015, [1], 0, 3015]

*Step 2.*

Extending: [3015, [1], 0, 3015]

[3250, [1,4], 870, 2380], [3320, [1,2], 830, 2490]

*Step 3.*

Extending: [3250, [1,4], 870, 2380]

[3320, [1,2], 830, 2490], [3675, [1,4,5], 2065, 1610], ~~[4480, [1,4,2], 1990, 2380],~~

~~[4755, [1,4,1], 1740, 3015]~~

*Step 4.*

Extending: [3320, [1,2], 830, 2490]

[3320, [1,2,5], 1710, 1610], ~~[3675, [1,4,5], 2065, 1610],~~ [3675, [1,2,3], 1170, 2505],

~~[4330, [1,2,4], 1950, 2380], [4675, [1,2,1], 1660, 3015]~~

*Step 5.*

Extending: [3320, [1,2,5], 1710, 1610]

[3380, [1,2,5,8], 2225, 1155], [3675, [1,2,3], 1170, 2505], [3900, [1,2,5,6], 2230, 1670],

~~[…, [1,2,5,4], …, …], […, [1,2,5,2], …, …], […, [1,2,5,3], …, …]~~

*Step 6.*

Extending: [3380, [1,2,5,8], 2225, 1155],

[3380, [1,2,5,8, Moscow], 3380, 0], [3675, [1,2,3], 1170, 2505], [3900, [1,2,5,6], 2230, 1670],

~~[…, [1,2,5,8,5], …, …], […, [1,2,5,8,6], …, …]~~

**Problem 2:**

Price per liter **(*P*):** 0.75 euros / liter

Fuel usage per km **(*F*)**: 12 liters / km

Minimum taxes per facility **(T)**: 6000 euros

Distance between A and B: **D(A, B)**

*Cost(A, B) = P \* F \* D(A, B) + T*

*h(n) = P \* F \* D(n, goal) + T*

*g(h) = sum of all Cost(A,B) from the route*

**Problem 3:**

b\* from h1 ~ 1.5 (best)

b\* from h2 ~ 3 (worst)

b\* from h3 ~ 1.75 (2nd)

b\* from h4 ~ 2.5 (3rd)

**Problem 4:**

b\* from h5 ~ 2 (worst)

b\* from h6 ~ 1.75 (3rd)

b\* from h7 ~ 1. 5 (2nd)

b\* from h8 ~ 1.25 (best)

**Problem 5:**

Best to worst:

h8, h1, h7, h6, h3, h5, h4, h2