Zadání 1. úkolu do předmětu IZU

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Pomocí metody A* najděte nejkratší cestu v mapě složené z pravidelných buněk, kde cena přechodu mezi dvěma stavy (buňkami) je dána číslem, uvedeným v Tabulce 1 (a je stejná pro všechny přechody ze sousedních míst do příslušné buňky). Nepřekročitelné buňky mají hodnotu "Z"(jako "zeď"). Po každém kroku vypište nové hodnoty seznamů Open a Closed. Do pomocné tabulky s ohodnocením uzlů zapisujte aktuálně zkoumaný uzel, cenu cesty do aktuálního uzlu „g“, heuristiku „h“ a celkovou cenu cesty „f“. Heuristiku počítejte jako přímou vzdálenost středů dvou buněk, kde velikost strany jedné buňky je rovna jedné. Uzly generujte v pořadí zleva doprava a shora dolů, uvažujte 8-okolí buňky (tzn. operátory $\nwarrow, \uparrow, \nearrow, \leftarrow, \rightarrow, \swarrow, \downarrow, \searrow$). Výslednou cestu zapište do tabulky Výsledná cesta. Uzel se skládá ze souřadnic, z ohodnocení f a souřadnic uzlu, ze kterého byl vygenerován nebo z operátoru, který byl použit (aby bylo možné nalézt cestu od startu k cíli).

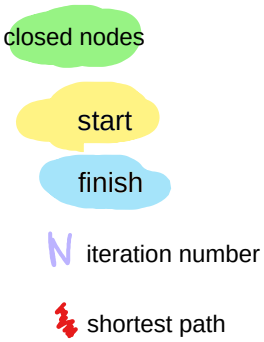
Uzly zapisujte: ([sloupec, řádek], celkové ohodnocení f, [souřadnice otcovského uzlu nebo operátor])

Start: ([6, 3], 5.0, [null])
Cíl: ([2, 6], X, [?, ?])

Výsledná cesta:

[6, 3]	[6,4]	[5,5]	[4,4]	[3,5]
[2,6]				

y/x	0	1	2	3	4	5	6	7	8	9
0	8	8	8	8	Z	9	7	7	8	9
1	7	7	7	5	Z	8	7	8	7	9
2	6	6	5	7	Z	Z	Z	Z	7	8
3	9	9	8	8	Z	9	2	8	8	9
4	3	3	3	3	3	9	4	7	9	7
5	9	Z	5	4	Z	3	3	3	3	3
6	9	Z	2	6	Z	8	9	9	9	6
7	9	Z	Z	Z	Z	Z	Z	Z	9	7
8	9	9	9	9	Z	9	9	9	9	9
9	8	8	6	7	Z	9	9	9	9	9



Tabulka 1: Mapa přechodů. Např. cena přechodu do cílové buňky je rovna 2 pro všechny buňky s cílovou buňkou sousedící.

Pomocná tabulka:

	Uzel	g	h	f		Uzel	g	h	f
01.	[6, 3]	0	5.0	5.0	16.	[8,6]	16	6	22
02.	[5,3]	9	4.24	13.24	17.	[8,3]	15	6.71	21.71
03.	[7,3]	8	5.83	13.83	18.	[3,3]	18	3.16	21.16
04.	[5,4]	9	3.61	12.61	19.	[3,4]	13	2.24	15.24
05.	[6,4]	4	4.47	8.47	20.	[3,5]	14	1.41	15.41
06.	[7,4]	7	5.39	12.39	21.	[8,2]	15	7.21	22.21
07.	[5,5]	7	3.16	10.16	22.				
08.	[6,5]	7	4.12	11.12	23.				
09.	[7,5]	7	5.1	12.1	24.				
10.	[4,4]	10	2.83	12.83	25.				
11.	[5,6]	15	3	18	26.				
12.	[6,6]	16	4	20	27.				
13.	[7,6]	16	5	21	28.				
14.	[8,4]	16	6.32	22.32	29.				
15.	[8,5]	10	6.08	16.08	30.				

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1. iterace

Open:

[6, 3], 5.0, NULL				

Closed:

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2. iterace

Open:

[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]	[5,4], 12.61, [6,3]	[6,4], 8.47, [6,3]	[7,4], 12.39, [6,3]

Closed:

[6,3], 5.0, NULL				

3. iterace

Open:

[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]	[5,4], 12.61, [6,3]	[7,4], 12.39, [6,3]	[5,5], 10.16 [6,4]
[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]			

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]			

4. iterace

Open:

[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]	[5,4], 12.61, [6,3]	[7,4], 12.39, [6,3]	[6,5], 11.12, [6,4]
[7,5], 12.1, [6,4]	[4,4], 12.83, [5,5]	[5,6], 18, [5,5]	[6,6], 20, [5,5]	

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]		

5. iterace

Open:

[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]	[5,4], 12.61, [6,3]	[7,4], 12.39, [6,3]	[7,5], 12.1, [6,4]
[4,4], 12.83, [5,5]	[5,6], 18, [5,5]	[6,6], 20, [5,5]	[7,6], 21, [6,5]	

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	

6. iterace

Open:

[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]	[5,4], 12.61, [6,3]	[7,4], 12.39, [6,3]	[4,4], 12.83, [5,5]
[5,6], 18, [5,5]	[6,6], 20, [5,5]	[7,6], 21, [6,5]	[8,4], 22.32, [7,5]	[8,5], 16.08, [7,5]
[8,6], 22, [7,5]				

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]

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7. iterace

Open:

[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]	[5,4], 12.61, [6,3]	[4,4], 12.83, [5,5]	[5,6], 18, [5,5]
[6,6], 20, [5,5]	[7,6], 21, [6,5]	[8,4], 22.32, [7,5]	[8,5], 16.08, [7,5]	[8,6], 22, [7,5]
[8,3], 21.71, [7,4]				

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]
[7,4], 12.39, [6,3]				

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8. iterace

Open:

[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]	[4,4], 12.83, [5,5]	[5,6], 18, [5,5]	[6,6], 20, [5,5]
[7,6], 21, [6,5]	[8,4], 22.32, [7,5]	[8,5], 16.08, [7,5]	[8,6], 22, [7,5]	[8,3], 21.71, [7,4]

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]
[7,4], 12.39, [6,3]	[5,4], 12.61, [6,3]			

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9. iterace

Open:

[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]	[5,6], 18, [5,5]	[6,6], 20, [5,5]	[7,6], 21, [6,5]
[8,4], 22.32, [7,5]	[8,5], 16.08, [7,5]	[8,6], 22, [7,5]	[8,3], 21.71, [7,4]	[3,3], 21.16, [4,4]
[3,4], 15.24, [4,4]	[3,5], 15.41, [4,4]			

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]
[7,4], 12.39, [6,3]	[5,4], 12.61, [6,3]	[4,4], 12.83, [5,5]		

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10. iterace

Open:

[7,3], 13.83, [6,3]	[5,6], 18, [5,5]	[6,6], 20, [5,5]	[7,6], 21, [6,5]	[8,4], 22.32, [7,5]
[8,5], 16.08, [7,5]	[8,6], 22, [7,5]	[8,3], 21.71, [7,4]	[3,3], 21.16, [4,4]	[3,4], 15.24, [4,4]
[3,5], 15.41, [4,4]				

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]
[7,4], 12.39, [6,3]	[5,4], 12.61, [6,3]	[4,4], 12.83, [5,5]	[5,3], 13.24, [6,3]	

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11. iterace

Open:

[5,6], 18, [5,5]	[6,6], 20, [5,5]	[7,6], 21, [6,5]	[8,4], 22.32, [7,5]	[8,5], 16.08, [7,5]
[8,6], 22, [7,5]	[8,3], 21.71, [7,4]	[3,3], 21.16, [4,4]	[3,4], 15.24, [4,4]	[3,5], 15.41, [4,4]
[8,2], 22.21,[7,3]				

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]
[7,4], 12.39, [6,3]	[5,4], 12.61, [6,3]	[4,4], 12.83, [5,5]	[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]

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12. iterace

Open:

[5,6], 18, [5,5]	[6,6], 20, [5,5]	[7,6], 21, [6,5]	[8,4], 22.32, [7,5]	[8,5], 16.08, [7,5]
[8,6], 22, [7,5]	[8,3], 21.71, [7,4]	[3,3], 21.16, [4,4]	[3,5], 15.41, [4,4]	[8,2], 22.21,[7,3]
[2,3], 24, [3,4]	[2,4], 18, [3,4]	[2,5], 19, [3,4]		

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]
[7,4], 12.39, [6,3]	[5,4], 12.61, [6,3]	[4,4], 12.83, [5,5]	[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]
[3,4], 15.24, [4,4]				

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13. iterace

Open:

[5,6], 18, [5,5]	[6,6], 20, [5,5]	[7,6], 21, [6,5]	[8,4], 22.32, [7,5]	[8,5], 16.08, [7,5]
[8,6], 22, [7,5]	[8,3], 21.71, [7,4]	[3,3], 21.16, [4,4]	[8,2], 22.21,[7,3]	[2,3], 24, [3,4]
[2,4], 18, [3,4]	[2,5], 19, [3,4]	[2,6], 16, [3,5]	[3,6], 21, [3,5]	

Closed:

[6,3], 5.0, NULL	[6,4], 8.47, [6,3]	[5,5], 10.16 [6,4]	[6,5], 11.12, [6,4]	[7,5], 12.1, [6,4]
[7,4], 12.39, [6,3]	[5,4], 12.61, [6,3]	[4,4], 12.83, [5,5]	[5,3], 13.24, [6,3]	[7,3], 13.83, [6,3]
[3,4], 15.24, [4,4]	[3,5], 15.41, [4,4]			

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14. iterace

Open:

Closed:

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15. iterace

Open:

Closed:

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16. iterace

Open:

Closed:
