

Explanation of the Algorithm

My code creates a 3d string array that has dimensions: rows, columns, and heights. Heights are the numbers given in the board cells. Until the number given, for each cell, "Soil" is written to each height index. So, a 3d terrain is formed. Then "Water" is written to remaining heights until the max height, just like a rain fills remaining space with water, but since the terrain is floating, excess water must leak from edges. To do so I call the "leakTerrain" method for each edge cell in 3D that transforms the current cell to "Air" and recurses through all 8 directions until edges, "Air", or "Soil" is found (since water cannot leak through soils).

My lake finding algorithm starts upon finding a "Water" when iterating through each cell again, from left to right, up to bottom, and high to low. When a "Water" is found, it first labels the cell with lake label in 2D lake name array, counts to lower heights that contains "Water" to increase the lake volume and recurses through all 8 directions until edges, "Air", "Soil", or already labeled cell is found.

Example Input 1:

```
7 7
3 3 3 3 3 3
3 1 2 3 1 2 3
3 3 3 1 3 3 3
3 3 3 3 3 3 3
3 1 2 3 1 2 3
3 3 3 3 3 3 3
3 3 3 3 3 2
```

Modifications:

```
d3
d4
d5
e5
f5
g5
g4
g3
f3
e3
```

Example Output 1:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	3	3	3	3
4	3	1	2	3	1	2	3
5	3	3	3	3	3	3	3
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 1 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	3	3	3
4	3	1	2	3	1	2	3
5	3	3	3	3	3	3	3
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 2 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	3	3	3
4	3	1	2	4	1	2	3
5	3	3	3	3	3	3	3
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 3 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	3	3	3
4	3	1	2	4	1	2	3
5	3	3	3	4	3	3	3
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 4 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	3	3	3
4	3	1	2	4	1	2	3
5	3	3	3	4	4	3	3
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 5 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3

2	3	3	3	1	3	3	3
3	3	3	3	4	3	3	3
4	3	1	2	4	1	2	3
5	3	3	3	4	4	4	3
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 6 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	3	3	3
4	3	1	2	4	1	2	3
5	3	3	3	4	4	4	4
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 7 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	3	3	3
4	3	1	2	4	1	2	4
5	3	3	3	4	4	4	4
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 8 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	3	3	4
4	3	1	2	4	1	2	4
5	3	3	3	4	4	4	4
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 9 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	3	4	4
4	3	1	2	4	1	2	4
5	3	3	3	4	4	4	4
6	3	3	3	3	3	3	2
	a	b	c	d	e	f	g

Add stone 10 / 10 to coordinate:

0	3	3	3	3	3	3	3
1	3	1	2	3	1	2	3
2	3	3	3	1	3	3	3
3	3	3	3	4	4	4	4
4	3	1	2	4	1	2	4
5	3	3	3	4	4	4	4

Final Score: 6.80

37 78

[illegible]

[illegible]

Modifications:

d3

d4

d5

e5

f5

gg5

g4

399

f3

e3

Example Output 2:

[illegible]

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	aa	ab	ac	ad	ae	af	ag	ah	ai	aj	ak		
Add stone 1 / 10 to coordinate:																																							
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	0	1	1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	1	0	1	0	1	0																																	

[illegible]

63	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
64	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
65	1	1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
66	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
67	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
68	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
69	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
71	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
72	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
73	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
74	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
75	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
76	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
77	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	aa	ab	ac	ad	ae	af	ag	ah	ai	aj	ak

Add stone 6 / 10 to coordinate:

[illegible]

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65 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1

[illegible]

Final Score: 680.00

0 4 5 6 6

1	4	1	0	3
2	3	3	3	2
	a	b	c	d

Add stone 2 / 10 to coordinate:

0	4	5	6	6
1	5	1	0	3
2	3	3	3	2
	a	b	c	d

Add stone 3 / 10 to coordinate:

0	4	5	6	6
1	5	1	0	3
2	4	3	3	2
	a	b	c	d

Add stone 4 / 10 to coordinate:

0	4	6	6	6
1	5	1	0	3
2	4	3	3	2
	a	b	c	d

Add stone 5 / 10 to coordinate:

0	4	6	6	6
1	5	2	0	3
2	4	3	3	2
	a	b	c	d

Add stone 6 / 10 to coordinate:

0	4	6	6	6
1	5	2	0	3
2	4	4	3	2
	a	b	c	d

Add stone 7 / 10 to coordinate:

0	4	6	7	6
1	5	2	0	3
2	4	4	3	2
	a	b	c	d

Add stone 8 / 10 to coordinate:

0	4	6	7	6
1	5	2	0	3
2	4	4	4	2
	a	b	c	d

Add stone 9 / 10 to coordinate:

0	4	6	7	7
1	5	2	0	3
2	4	4	4	2
	a	b	c	d

Add stone 10 / 10 to coordinate:

0	4	6	7	7
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1	5	2	0	4
2	4	4	4	2
	a	b	c	d

0	4	6	7	7
1	5	2	A	4
2	4	4	4	2
	a	b	c	d

Final Score: 1.41