

Component	Points
csce322h0mework03part01.hs	
Compilation	10
Test Cases	1×10
Total	20
csce322h0mework03part02.hs	
Compilation	10
Test Cases	1×10
Total	20
csce322h0mework03part03.hs	
Compilation	10
Test Cases	1×20
Total	30
csce322h0mework03part04.hs	
Compilation	10
Test Cases	1×20
Total	30
Total	100

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Chapter 1

Metadata

1.1 Submitted Files

				handin.time	
1	03/30/2017	09:59:04	skasper:	csce322h0mework03part01.hs	- OK
2	03/30/2017	09:59:08	skasper:	csce322h0mework03part02.hs	- OK
3	03/30/2017	09:59:12	skasper:	csce322h0mework03part03.hs	- OK
4	03/30/2017	09:59:17	skasper:	csce322h0mework03part04.hs	- OK
5	03/31/2017	23:03:47	skasper:	csce322h0mework03part01.hs	- OK
6	03/31/2017	23:08:35	skasper:	csce322h0mework03part01.hs	- OK
7	04/01/2017	00:42:44	skasper:	csce322h0mework03part01.hs	- 1 day late
8	04/01/2017	00:44:26	skasper:	csce322h0mework03part01.hs	- 1 day late
9	04/01/2017	00:45:37	skasper:	csce322h0mework03part01.hs	- 1 day late
10	04/01/2017	00:46:53	skasper:	csce322h0mework03part01.hs	- 1 day late
11	04/01/2017	00:49:24	skasper:	csce322h0mework03part01.hs	- 1 day late
12	04/01/2017	00:51:57	skasper:	csce322h0mework03part01.hs	- 1 day late
13	04/01/2017	00:53:53	skasper:	csce322h0mework03part01.hs	- 1 day late
14	04/01/2017	14:17:09	skasper:	csce322h0mework03part01.hs	- 1 day late
15	04/01/2017	14:19:25	skasper:	csce322h0mework03part01.hs	- 1 day late
16	04/01/2017	14:20:58	skasper:	csce322h0mework03part01.hs	- 1 day late
17	04/01/2017	14:23:29	skasper:	csce322h0mework03part01.hs	- 1 day late
18	04/01/2017	14:24:49	skasper:	csce322h0mework03part01.hs	- 1 day late
19	04/01/2017	14:26:10	skasper:	csce322h0mework03part01.hs	- 1 day late
20	04/01/2017	14:27:19	skasper:	csce322h0mework03part01.hs	- 1 day late
21	04/01/2017	14:30:47	skasper:	csce322h0mework03part01.hs	- 1 day late
22	04/01/2017	14:33:48	skasper:	csce322h0mework03part01.hs	- 1 day late
23	04/01/2017	14:35:15	skasper:	csce322h0mework03part01.hs	- 1 day late
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26	04/01/2017	14:42:48	skasper:	csce322h0mework03part01.hs	- 1 day late
27	04/01/2017	14:45:32	skasper:	csce322h0mework03part01.hs	- 1 day late
28	04/01/2017	14:46:43	skasper:	csce322h0mework03part01.hs	- 1 day late
29	04/01/2017	14:47:53	skasper:	csce322h0mework03part01.hs	- 1 day late
30	04/01/2017	14:49:46	skasper:	csce322h0mework03part01.hs	- 1 day late
31	04/01/2017	14:51:52	skasper:	csce322h0mework03part01.hs	- 1 day late
32	04/01/2017	14:52:46	skasper:	csce322h0mework03part01.hs	- 1 day late
33	04/01/2017	14:54:47	skasper:	csce322h0mework03part01.hs	- 1 day late
34	04/01/2017	15:02:55	skasper:	csce322h0mework03part01.hs	- 1 day late
35	04/01/2017	15:07:33	skasper:	csce322h0mework03part01.hs	- 1 day late
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42	04/01/2017	15:51:49	skasper:	csce322h0mework03part01.hs	- 1 day late
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51	04/01/2017	17:41:05	skasper:	csce322h0mework03part01.hs	- 1 day late
52	04/01/2017	17:42:21	skasper:	csce322h0mework03part01.hs	- 1 day late
53	04/01/2017	17:43:51	skasper:	csce322h0mework03part01.hs	- 1 day late
54	04/01/2017	17:59:11	skasper:	csce322h0mework03part01.hs	- 1 day late
55	04/01/2017	18:12:58	skasper:	csce322h0mework03part01.hs	- 1 day late
56	04/01/2017	18:23:19	skasper:	csce322h0mework03part01.hs	- 1 day late
57	04/01/2017	18:26:23	skasper:	csce322h0mework03part01.hs	- 1 day late
58	04/01/2017	18:39:19	skasper:	csce322h0mework03part01.hs	- 1 day late
59	04/01/2017	18:41:51	skasper:	csce322h0mework03part03.hs	- 1 day late
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62	04/01/2017	19:21:30	skasper:	csce322h0mework03part04.hs	- 1 day late
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65	04/01/2017	19:29:23	skasper:	csce322h0mework03part04.hs	- 1 day late
66	04/01/2017	19:31:35	skasper:	csce322h0mework03part04.hs	- 1 day late
67	04/01/2017	19:34:50	skasper:	csce322h0mework03part04.hs	- 1 day late
68	04/01/2017	19:42:07	skasper:	csce322h0mework03part04.hs	- 1 day late
69	04/01/2017	19:48:47	skasper:	csce322h0mework03part04.hs	- 1 day late
70	04/01/2017	19:42:07	skasper:	csce322h0mework03part04.hs	- Deleted by User
71	04/01/2017	19:49:06	skasper:	csce322h0mework03part04.hs	- 1 day late
72	04/01/2017	22:55:53	skasper:	csce322h0mework03part04.hs	- 1 day late
73	04/01/2017	22:59:14	skasper:	csce322h0mework03part04.hs	- 1 day late
74	04/01/2017	23:02:43	skasper:	csce322h0mework03part04.hs	- 1 day late
75	04/01/2017	23:05:36	skasper:	csce322h0mework03part04.hs	- 1 day late
76	04/02/2017	03:30:34	skasper:	csce322h0mework03part04.hs	- 2 days late
77	04/02/2017	03:32:23	skasper:	csce322h0mework03part04.hs	- 2 days late
78	04/02/2017	03:33:25	skasper:	csce322h0mework03part04.hs	- 2 days late
79	04/02/2017	03:35:39	skasper:	csce322h0mework03part04.hs	- 2 days late
80	04/02/2017	03:37:07	skasper:	csce322h0mework03part04.hs	- 2 days late
81	04/02/2017	03:40:36	skasper:	csce322h0mework03part04.hs	- 2 days late
82	04/02/2017	03:43:17	skasper:	csce322h0mework03part04.hs	- 2 days late
83	04/02/2017	03:45:56	skasper:	csce322h0mework03part04.hs	- 2 days late
84	04/02/2017	03:56:41	skasper:	csce322h0mework03part04.hs	- 2 days late
85	04/02/2017	13:44:25	skasper:	csce322h0mework03part04.hs	- 2 days late
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88	04/02/2017	13:49:55	skasper:	csce322h0mework03part04.hs	- 2 days late
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93	04/02/2017	14:09:52	skasper:	csce322h0mework03part04.hs	- 2 days late
94	04/02/2017	14:23:43	skasper:	csce322h0mework03part04.hs	- 2 days late
95	04/02/2017	14:25:31	skasper:	csce322h0mework03part04.hs	- 2 days late
96	04/02/2017	14:33:46	skasper:	csce322h0mework03part04.hs	- 2 days late
97	04/02/2017	14:35:22	skasper:	csce322h0mework03part04.hs	- 2 days late
98	04/02/2017	14:38:13	skasper:	csce322h0mework03part04.hs	- 2 days late
99	04/02/2017	14:44:53	skasper:	csce322h0mework03part04.hs	- 2 days late
100	04/02/2017	15:50:37	skasper:	csce322h0mework03part04.hs	- 2 days late
101	04/02/2017	15:51:50	skasper:	csce322h0mework03part04.hs	- 2 days late

102	04/02/2017	15:53:07	skasper:	csce322h0mework03part04.hs	- 2 days late
103	04/02/2017	15:54:31	skasper:	csce322h0mework03part04.hs	- 2 days late
104	04/02/2017	15:56:37	skasper:	csce322h0mework03part04.hs	- 2 days late
105	04/02/2017	17:22:23	skasper:	csce322h0mework03part04.hs	- 2 days late
106	04/02/2017	17:31:14	skasper:	csce322h0mework03part04.hs	- 2 days late
107	04/02/2017	17:35:17	skasper:	csce322h0mework03part02.hs	- 2 days late
108	04/02/2017	17:40:35	skasper:	csce322h0mework03part02.hs	- 2 days late
109	04/02/2017	17:40:42	skasper:	csce322h0mework03part01.hs	- 2 days late
110	04/02/2017	17:42:03	skasper:	csce322h0mework03part02.hs	- 2 days late
111	04/02/2017	17:47:37	skasper:	csce322h0mework03part03.hs	- 2 days late

1.2 webgrader Runs

			webgrader.time	
1	2017-03-30T09:59:54-0500	129.93.4.26	skasper	0003
2	2017-03-30T21:01:22-0500	76.84.143.92	skasper	0003
3	2017-03-31T23:04:05-0500	76.84.143.92	skasper	0003
4	2017-03-31T23:08:40-0500	76.84.143.92	skasper	0003
5	2017-03-31T23:11:04-0500	76.84.143.92	skasper	0003
6	2017-04-01T00:42:52-0500	76.84.143.92	skasper	0003
7	2017-04-01T00:44:29-0500	76.84.143.92	skasper	0003
8	2017-04-01T00:45:43-0500	76.84.143.92	skasper	0003
9	2017-04-01T00:46:58-0500	76.84.143.92	skasper	0003
10	2017-04-01T00:49:35-0500	76.84.143.92	skasper	0003
11	2017-04-01T00:51:39-0500	76.84.143.92	skasper	0003
12	2017-04-01T00:52:03-0500	76.84.143.92	skasper	0003
13	2017-04-01T00:53:58-0500	76.84.143.92	skasper	0003
14	2017-04-01T14:17:16-0500	76.84.143.92	skasper	0003
15	2017-04-01T14:19:31-0500	76.84.143.92	skasper	0003
16	2017-04-01T14:21:09-0500	76.84.143.92	skasper	0003
17	2017-04-01T14:23:36-0500	76.84.143.92	skasper	0003
18	2017-04-01T14:24:53-0500	76.84.143.92	skasper	0003
19	2017-04-01T14:26:14-0500	76.84.143.92	skasper	0003
20	2017-04-01T14:27:22-0500	76.84.143.92	skasper	0003
21	2017-04-01T14:30:58-0500	76.84.143.92	skasper	0003
22	2017-04-01T14:33:52-0500	76.84.143.92	skasper	0003
23	2017-04-01T14:35:19-0500	76.84.143.92	skasper	0003
24	2017-04-01T14:37:07-0500	76.84.143.92	skasper	0003
25	2017-04-01T14:41:02-0500	76.84.143.92	skasper	0003
26	2017-04-01T14:42:58-0500	76.84.143.92	skasper	0003
27	2017-04-01T14:45:35-0500	76.84.143.92	skasper	0003
28	2017-04-01T14:46:47-0500	76.84.143.92	skasper	0003
29	2017-04-01T14:47:57-0500	76.84.143.92	skasper	0003
30	2017-04-01T14:49:52-0500	76.84.143.92	skasper	0003
31	2017-04-01T14:51:55-0500	76.84.143.92	skasper	0003
32	2017-04-01T14:52:53-0500	76.84.143.92	skasper	0003
33	2017-04-01T14:54:51-0500	76.84.143.92	skasper	0003
34	2017-04-01T15:02:58-0500	76.84.143.92	skasper	0003
35	2017-04-01T15:07:39-0500	76.84.143.92	skasper	0003
36	2017-04-01T15:11:20-0500	76.84.143.92	skasper	0003
37	2017-04-01T15:16:39-0500	76.84.143.92	skasper	0003
38	2017-04-01T15:18:37-0500	76.84.143.92	skasper	0003
39	2017-04-01T15:26:19-0500	76.84.143.92	skasper	0003
40	2017-04-01T15:28:20-0500	76.84.143.92	skasper	0003
41	2017-04-01T15:50:41-0500	76.84.143.92	skasper	0003
42	2017-04-01T15:51:54-0500	76.84.143.92	skasper	0003
43	2017-04-01T15:55:14-0500	76.84.143.92	skasper	0003
44	2017-04-01T15:57:09-0500	76.84.143.92	skasper	0003
45	2017-04-01T17:17:31-0500	76.84.143.92	skasper	0003

46	2017-04-01T17:20:44-0500	76.84.143.92	skasper	0003
47	2017-04-01T17:27:32-0500	76.84.143.92	skasper	0003
48	2017-04-01T17:28:51-0500	76.84.143.92	skasper	0003
49	2017-04-01T17:30:42-0500	76.84.143.92	skasper	0003
50	2017-04-01T17:34:31-0500	76.84.143.92	skasper	0003
51	2017-04-01T17:41:08-0500	76.84.143.92	skasper	0003
52	2017-04-01T17:42:24-0500	76.84.143.92	skasper	0003
53	2017-04-01T17:43:55-0500	76.84.143.92	skasper	0003
54	2017-04-01T17:59:17-0500	76.84.143.92	skasper	0003
55	2017-04-01T18:13:01-0500	76.84.143.92	skasper	0003
56	2017-04-01T18:23:23-0500	76.84.143.92	skasper	0003
57	2017-04-01T18:26:26-0500	76.84.143.92	skasper	0003
58	2017-04-01T18:39:22-0500	76.84.143.92	skasper	0003
59	2017-04-01T18:41:57-0500	76.84.143.92	skasper	0003
60	2017-04-01T19:18:45-0500	76.84.143.92	skasper	0003
61	2017-04-01T19:20:00-0500	76.84.143.92	skasper	0003
62	2017-04-01T19:21:34-0500	76.84.143.92	skasper	0003
63	2017-04-01T19:22:52-0500	76.84.143.92	skasper	0003
64	2017-04-01T19:25:41-0500	76.84.143.92	skasper	0003
65	2017-04-01T19:29:27-0500	76.84.143.92	skasper	0003
66	2017-04-01T19:31:39-0500	76.84.143.92	skasper	0003
67	2017-04-01T19:34:54-0500	76.84.143.92	skasper	0003
68	2017-04-01T19:36:07-0500	76.84.143.92	skasper	0003
69	2017-04-01T19:41:19-0500	76.84.143.92	skasper	0003
70	2017-04-01T19:42:35-0500	76.84.143.92	skasper	0003
71	2017-04-01T19:49:24-0500	76.84.143.92	skasper	0003
72	2017-04-01T20:01:52-0500	76.84.143.92	skasper	0003
73	2017-04-01T20:18:19-0500	76.84.143.92	skasper	0003
74	2017-04-01T22:56:04-0500	76.84.143.92	skasper	0003
75	2017-04-01T22:59:18-0500	76.84.143.92	skasper	0003
76	2017-04-01T23:02:48-0500	76.84.143.92	skasper	0003
77	2017-04-01T23:05:41-0500	76.84.143.92	skasper	0003
78	2017-04-02T03:29:15-0500	76.84.143.92	skasper	0003
79	2017-04-02T03:30:39-0500	76.84.143.92	skasper	0003
80	2017-04-02T03:32:29-0500	76.84.143.92	skasper	0003
81	2017-04-02T03:33:30-0500	76.84.143.92	skasper	0003
82	2017-04-02T03:35:45-0500	76.84.143.92	skasper	0003
83	2017-04-02T03:37:10-0500	76.84.143.92	skasper	0003
84	2017-04-02T03:40:40-0500	76.84.143.92	skasper	0003
85	2017-04-02T03:43:21-0500	76.84.143.92	skasper	0003
86	2017-04-02T03:46:01-0500	76.84.143.92	skasper	0003
87	2017-04-02T03:56:45-0500	76.84.143.92	skasper	0003
88	2017-04-02T13:45:29-0500	76.84.143.92	skasper	0003
89	2017-04-02T13:50:06-0500	76.84.143.92	skasper	0003
90	2017-04-02T13:57:04-0500	76.84.143.92	skasper	0003
91	2017-04-02T13:58:49-0500	76.84.143.92	skasper	0003
92	2017-04-02T14:01:44-0500	76.84.143.92	skasper	0003
93	2017-04-02T14:07:59-0500	76.84.143.92	skasper	0003
94	2017-04-02T14:09:56-0500	76.84.143.92	skasper	0003
95	2017-04-02T14:23:55-0500	76.84.143.92	skasper	0003
96	2017-04-02T14:25:35-0500	76.84.143.92	skasper	0003
97	2017-04-02T14:33:50-0500	76.84.143.92	skasper	0003
98	2017-04-02T14:35:28-0500	76.84.143.92	skasper	0003
99	2017-04-02T14:38:19-0500	76.84.143.92	skasper	0003
100	2017-04-02T14:45:00-0500	76.84.143.92	skasper	0003
101	2017-04-02T15:50:51-0500	76.84.143.92	skasper	0003
102	2017-04-02T15:51:53-0500	76.84.143.92	skasper	0003
103	2017-04-02T15:53:11-0500	76.84.143.92	skasper	0003
104	2017-04-02T15:54:35-0500	76.84.143.92	skasper	0003
105	2017-04-02T15:56:41-0500	76.84.143.92	skasper	0003

106	2017-04-02T17:22:27-0500	76.84.143.92	skasper	0003
107	2017-04-02T17:31:44-0500	76.84.143.92	skasper	0003
108	2017-04-02T17:35:21-0500	76.84.143.92	skasper	0003
109	2017-04-02T17:40:46-0500	76.84.143.92	skasper	0003
110	2017-04-02T17:42:07-0500	76.84.143.92	skasper	0003
111	2017-04-02T17:47:43-0500	76.84.143.92	skasper	0003

1.3 diffs

submission.diffs

Chapter 2

csce322homework03part01.hs

2.1 part01test01

2.1.1 Diff

part01test01.diff

2.1.2 Input File

part01test01.bff

```
(  
[28,27,23,22,19,16,14,13,11,10,9,8,6,4,3,2,1],  
[  
"2224242",  
"3123421",  
"1441314",  
"3442123",  
"1342134",  
"1112424"  
]  
)
```

2.1.3 Submission Output

part01test01.output

```
"Result "  
"2224242"  
"3123421"  
"1441314"  
"3442123"  
"1342134"  
"1112414"  
""
```

2.1.4 Solution Output

part01test01.output

```
"Result "  
"2224242"  
"3123421"  
"1441314"  
"3442123"  
"1342134"  
"1112414"  
""
```

2.1.5 stderr

part01test01.err

2.2 part01test02

2.2.1 Diff

part01test02.diff

2.2.2 Input File

part01test02.bff

```
(  
[86,83,81,80,70,67,64,55,39,36,33,31,25,20,14,13,7,6],  
[  
"1123233213442",  
"2144412142433",  
"4334243231123",  
"1211433221143",  
"1344123142313",  
"2234214324224",  
"2444211422124",  
"4111432421134",  
"1313333431444",  
"3344211241124",  
"4122213242444",  
"4322313243111",  
"2442331112123",  
"2141114211414"  
]  
)
```

2.2.3 Submission Output

part01test02.output

```
"Result "  
"1123233213442"  
"2144412142433"  
"4334243231123"  
"1211433221143"  
"1344123142313"  
"2234214324224"  
"2444211422124"  
"4111432421134"  
"1313333431444"  
"3344211241124"  
"4122213242444"  
"4322313243111"  
"2442331112123"  
"2141114111414"  
"
```

2.2.4 Solution Output

part01test02.output

```
"Result "  
"1123233213442"  
"2144412142433"
```

```
"4334243231123"
"1211433221143"
"1344123142313"
"2234214324224"
"2444211422124"
"4111432421134"
"1313333431444"
"3344211241124"
"4122213242444"
"4322313243111"
"2442331112123"
"2141114111414"
"
```

2.2.5 stderr

part01test02.err

2.3 part01test03

2.3.1 Diff

part01test03.diff

2.3.2 Input File

part01test03.bff

```
(
[14,13,11,4],
[
"121111112211",
"121121211222",
"111221221122",
"121221111112",
"222111112121",
"211111212212",
"112122111221",
"111121212112",
"222122212111",
"121222112122"
]
)
```

2.3.3 Submission Output

part01test03.output

```
"Result "
"121111112211"
"121121211222"
"111221221122"
"121221111112"
"222111112121"
"211111212212"
"111122111221"
"111121212112"
"222122212111"
"121222112122"
"
```


2.3.4 Solution Output

part01test03.output

```
"Result "  
"121111112211"  
"121121211222"  
"111221221122"  
"121221111112"  
"222111112121"  
"211111212212"  
"111122111221"  
"111121212112"  
"222122212111"  
"121222112122"  
"
```

2.3.5 stderr

part01test03.err

2.4 part01test04

2.4.1 Diff

part01test04.diff

2.4.2 Input File

part01test04.bff

```
(  
[21,8,3,2],  
[  
"2112121122",  
"2112122122",  
"2112212211",  
"2212111222",  
"1222121212",  
"1222211112",  
"1221212121",  
"2211211121",  
"2121111121",  
"1222211212",  
"1222122221"  
]  
)
```

2.4.3 Submission Output

part01test04.output

```
"Result "  
"2112121122"  
"2112122122"  
"2112212211"  
"2212111222"  
"1222121212"  
"1222211112"  
"1221212121"  
"2211211121"  
"2121111121"
```

```
"1222211212"
"1222122221"
"
```

2.4.4 Solution Output

part01test04.output

```
"Result "
"2112121122"
"2112122122"
"2112212211"
"2212111222"
"1222121212"
"1222211112"
"1221212121"
"2211211121"
"2121111121"
"1222211212"
"1222122221"
"
```

2.4.5 stderr

part01test04.err

2.5 part01test05

2.5.1 Diff

part01test05.diff

2.5.2 Input File

part01test05.bff

```
(
[12,10,9,8,6,5,4,3,2,1],
[
"1212211122",
"2122212212",
"1121122212",
"1121111222",
"1221111221",
"1211121222"
]
)
```

2.5.3 Submission Output

part01test05.output

```
"Result "
"1212211122"
"2122212212"
"1121122212"
"1121111222"
"1221111221"
"1211111222"
"
```

2.5.4 Solution Output

part01test05.output

```
"Result "  
"1212211122"  
"2122212212"  
"1121122212"  
"1121111222"  
"1221111221"  
"1211111222"  
""
```

2.5.5 stderr

part01test05.err

2.6 part01test06

2.6.1 Diff

part01test06.diff

2.6.2 Input File

part01test06.bff

```
(  
[86,85,83,82,81,79,78,77,74,73,71,70,69,68,67,66,64,62,61,60,59,58,54,53,51,50,49,48,46,42,4  
  
[  
"343214231434411",  
"123411442414111",  
"431141312333223",  
"441233113341234",  
"132321342423432",  
"324334433224233",  
"313324314423432",  
"142332322333233",  
"141432421332421",  
"414212322411133"  
]  
)
```

2.6.3 Submission Output

part01test06.output

```
"Result "  
"343214231434411"  
"123411442414111"  
"431141312333223"  
"441233113341234"  
"132321342423432"  
"324334433224233"  
"313324314423432"  
"142332322333233"  
"141432421332421"  
"414212322411111"  
""
```

2.6.4 Solution Output

part01test06.output

```
"Result "  
"343214231434411"  
"123411442414111"  
"431141312333223"  
"441233113341234"  
"132321342423432"  
"324334433224233"  
"313324314423432"  
"142332322333233"  
"141432421332421"  
"414212322411111"  
""
```

2.6.5 stderr

part01test06.err

2.7 part01test07

2.7.1 Diff

part01test07.diff

2.7.2 Input File

part01test07.bff

```
(  
[28,25,22,20,19,16,13,7,6,4],  
[  
"11213142",  
"41224421",  
"13122422",  
"13323122",  
"21432431",  
"31123112"  
]  
)
```

2.7.3 Submission Output

part01test07.output

```
"Result "  
"11213142"  
"41224421"  
"13122422"  
"13323122"  
"21432431"  
"31123112"  
""
```

2.7.4 Solution Output

part01test07.output

```
"Result "  
"11213142"  
"41224421"  
"13122422"  
"13323122"
```

```
"21432431"  
"31123112"  
""
```

2.7.5 stderr

part01test07.err

2.8 part01test08

2.8.1 Diff

part01test08.diff

2.8.2 Input File

part01test08.bff

```
(  
[12,11,10,8,5,4,3,2],  
[  
"12111222221111",  
"21122121111222",  
"21112211222222",  
"12112112211121",  
"12121112112222",  
"21111122212211"  
]  
)
```

2.8.3 Submission Output

part01test08.output

```
"Result "  
"12111222221111"  
"21122121111222"  
"21112211222222"  
"12112112211121"  
"12121112112222"  
"21111122212211"  
""
```

2.8.4 Solution Output

part01test08.output

```
"Result "  
"12111222221111"  
"21122121111222"  
"21112211222222"  
"12112112211121"  
"12121112112222"  
"21111122212211"  
""
```

2.8.5 stderr

part01test08.err

2.9 part01test09

2.9.1 Diff

part01test09.diff

2.9.2 Input File

part01test09.bff

```
(  
[28,25,17,7],  
[  
"22221112121",  
"12212111112",  
"12222211211",  
"22211112112",  
"21212211212",  
"11222122111",  
"21122222121",  
"22112211112",  
"22121111211",  
"12212221221",  
"21121122222",  
"22211212211",  
"12111212222"  
]  
)
```

2.9.3 Submission Output

part01test09.output

```
"Result "  
"22221112121"  
"12212111112"  
"12222211211"  
"22211112112"  
"21212211212"  
"11222122111"  
"21122222121"  
"22112211112"  
"22121111211"  
"12212221221"  
"21121122222"  
"22211212211"  
"12111212222"  
"
```

2.9.4 Solution Output

part01test09.output

```
"Result "  
"22221112121"  
"12212111112"  
"12222211211"  
"22211112112"  
"21212211212"  
"11222122111"  
"21122222121"  
"22112211112"  
"22121111211"  
"12212221221"  
"21121122222"  
"22211212211"
```

```
"12111212222"
"
```

2.9.5 stderr

part01test09.err

2.10 part01test10

2.10.1 Diff

part01test10.diff

2.10.2 Input File

part01test10.bff

```
(
[26,25,23,21,18,16,15,13,9,7,6,1],
[
"11211221121112",
"21221121211122",
"12211121111111",
"11122211212211",
"22221222221212",
"22211222122122",
"11222211212211",
"21221212212122",
"11211221222112"
]
)
```

2.10.3 Submission Output

part01test10.output

```
"Result "
"11211221121112"
"21221121211122"
"12211121111111"
"11122211212211"
"22221222221212"
"22211222122122"
"11222211212211"
"21221212212122"
"11211221222112"
"
```

2.10.4 Solution Output

part01test10.output

```
"Result "
"11211221121112"
"21221121211122"
"12211121111111"
"11122211212211"
"22221222221212"
"22211222122122"
"11222211212211"
"21221212212122"
"11211221222112"
"
```

2.10.5 stderr

part01test10.err

2.11 Source Code

csce322h0mework03part01.hs

```
1 import Prelude
2 import System.Environment ( getArgs )
3 import Data.List
4 import Helpers
5
6 -- The main method that will be used for testing / command line access
7 main = do
8     args <- getArgs
9     filename <- readFile (head args)
10    (moves,game) <- readBattleFloodFile filename
11    print "Result"
12    printGame (onePlayerOneMove game (head moves))
13
14 -- YOUR CODE SHOULD COME AFTER THIS POINT
15 onePlayerOneMove :: [[Char]] -> Int -> [[Char]]
16 onePlayerOneMove game move = changeCluster game (findCluster game [] [(0,0)] move 1)
    '1'
17
18 findCluster :: [[Char]] -> [(Int, Int)] -> [(Int, Int)] -> Int -> Int -> [(Int, Int)]
19 -- game checkedPositions currentPosition move counter = positions representing cluster
    number of move
20 findCluster game checkedPositions currentPosition move counter
21     | ((move*2) == counter) || ((move*2-1) == counter) = findNeighbors
    game currentPosition checkedPositions
22     | ((move*2) < counter) || ((move*2-1) < counter) = []
23     | otherwise = findCluster game (removeDuplicates (
    checkedPositions ++ (findNeighbors game currentPosition checkedPositions))) (
    removeDuplicates passingCurrent) move (counter+1)
24     where newPosition = [n|n<-(generatePositions game),(not (elem n
    checkedPositions))]
25     passingCurrent = [x|x<-newPosition, (x == (head newPosition))
    ]
26
27 generatePositions :: [[a]] -> [(Int,Int)]
28 -- generate all positions for a given game
29 -- 8x7 game should generate (0,0), (0,1), ..., (0,6), (1,0), ..., (7,6)
30 generatePositions game = positions
31     where nRows = length game
32           nCols = length (head game)
33           positions = [(r,c)|r<-[0..(nRows-1)],c<-[0..(nCols-1)]]
34
35 changeCluster :: [[Char]] -> [(Int, Int)] -> Char -> [[Char]]
36 -- game clusterPositions player = game with changed cluster to player
37 changeCluster game [] _ = game
38 changeCluster game (h:clusters) player = (changeCluster (set game h player) clusters
    player)
39
40 -- Code written together in class that is copied and pasted from the website...as I
    understand we are allowed to use this
41 findNeighbors :: [[Char]] -> [(Int,Int)] -> [(Int,Int)] -> [(Int,Int)]
42 -- findNeighbors game positionsToCheck positionsChecked
43 findNeighbors _ [] _ = []
```



```

44 findNeighbors game (position:positions) checked = position:(findNeighbors game (
    positions++usefulNeighbors) (position:checked))
45     where positionNeighbors = generateNeighbors position game
46     usefulNeighbors = [n|n<-positionNeighbors,(get game n)==(get game
    position),(not (elem n positions)),(not (elem n checked))]
47
48 generateNeighbors :: (Int,Int) -> [[a]] -> [(Int,Int)]
49 generateNeighbors (r,c) game = neighbors
50     where nRows = length game
51           nCols = length (head game)
52           above = [(row,col)|row<-[(r-1)],col<-[c],r>0]
53           below = [(row,col)|row<-[(r+1)],col<-[c],r<(nRows-1)]
54           left = [(row,col)|row<-[r],col<-[(c-1)],c>0]
55           right = [(row,col)|row<-[r],col<-[(c+1)],c<(nCols-1)]
56           neighbors = above ++ below ++ left ++ right
57
58
59 removeDuplicates :: Ord a => [a] -> [a]
60 -- remove duplicates from a list
61 -- abc
62 removeDuplicates [] = []
63 removeDuplicates [x] = [x]
64 removeDuplicates (h:t)
65     | h == n = removeDuplicates (h:ta)
66     | otherwise = h:(removeDuplicates t)
67     where n = head t
68           ta = tail t
69
70
71 set :: [[a]] -> (Int,Int) -> a -> [[a]]
72 -- set game position element = game with position replaced by element
73 set (row:rows) (0,c) el = (setCol row c el):rows
74 set (row:rows) (r,c) el = row:(set rows (r-1,c) el)
75
76 setCol :: [a] -> Int -> a -> [a]
77 setCol (_:cols) 0 el = el:cols
78 setCol (col:cols) c el = col:(setCol cols (c-1) el)
79
80
81 get :: [[a]] -> (Int,Int) -> a
82 -- get game position = element at that position in the game
83 get (row:_) (0,c) = getCol row c
84 get (_:rows) (r,c) = get rows ((r-1),c)
85
86 getCol :: [a] -> Int -> a
87 -- getCol row position = element at that position in the row
88 getCol (col:_) 0 = col
89 getCol (_:cols) c = getCol cols (c-1)

```

Chapter 3

csce322h0mework03part02.hs

3.1 part02test01

3.1.1 Diff

part02test01.diff

3.1.2 Input File

part02test01.bff

```
(
[92,91,90,89,88,87,86,85,84,83,81,80,79,78,77,76,75,74,73,71,70,69,68,67,66,65,64,63,62,61,60,59,58,57,56,55,54,53,52,51,50,49,48,47,46,45,44,43,42,41,40,39,38,37,36,35,34,33,32,31,30,29,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,0]
[
"41444234123243",
"23222144213241",
"43134223111122",
"43314244321211",
"14112232221223",
"23143441113124",
"43241212412222",
"24433343111143",
"14233332232434",
"24233132243112",
"13243243414443",
"11412134214414"
]
)
```

3.1.3 Submission Output

part02test01.output

[illegible]

3.1.4 Solution Output

part02test01.output

[illegible]

3.1.5 stderr

part02test01.err

3.2 part02test02

3.2.1 Diff

part02test02.diff

3.2.2 Input File

part02test02.bff

```
(
[55,53,51,50,49,48,47,44,43,42,41,40,39,38,37,36,35,34,33,32,30,29,28,27,26,25,24,22,21,20,1
[
"21211113312",
"1133133134",
"4213443333",
"4214443332",
"2233334412",
"1414323222",
"4211441234",
"3114213213",
"2433343231",
"3343142432",
"3141134324"
]
)
```

3.2.3 Submission Output

part02test02.output

```
"Result "  
"111111111111"  
"111111111111"  
"121144111111"  
"121444111111"  
"223333111111"  
"111131311111"
```

```
"1111111111"
"1111111111"
"1111111111"
"1111111111"
"1111114121"
""
```

3.2.4 Solution Output

part02test02.output

```
"Result "
"1111111111"
"1111111111"
"1211441111"
"1214441111"
"2233331111"
"1111313111"
"1111111111"
"1111111111"
"1111111111"
"1111111111"
"1111114121"
""
```

3.2.5 stderr

part02test02.err

3.3 part02test03

3.3.1 Diff

part02test03.diff

3.3.2 Input File

part02test03.bff

```
(
[73,72,71,70,69,68,67,66,65,64,63,62,61,60,59,58,57,56,55,54,53,52,51,50,49,48,47,46,45,44,43,42,41,40,39,38,37,36,35,34,33,32,31,30,29,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,0]
[
"24211314313",
"14341324143",
"43433331341",
"41134313414",
"41344113441",
"22414124114",
"21324213421",
"22232233241",
"21134431142",
"14344414442",
"44233213334",
"41134422132",
"44223343144"
]
)
```

3.3.3 Submission Output

part02test03.output

[illegible]

3.3.5 stderr

part02test04.diff

3.4.1 Diff

part02test04.bff

29

```
"21112121",
"11122112",
"21212221",
"12222111"
]
```

3.4.3 Submission Output

part02test04.output

```
"Result "
"11111111"
"11111111"
"22111111"
"11111111"
"11111111"
"11111111"
"11111112"
"21111111"
"11111112"
"11111111"
"11111111"
""
```

3.4.4 Solution Output

part02test04.output

```
"Result "
"11111111"
"11111111"
"22111111"
"11111111"
"11111111"
"11111111"
"11111112"
"21111111"
"11111112"
"11111111"
"11111111"
""
```

3.4.5 stderr

part02test04.err

3.5 part02test05

3.5.1 Diff

part02test05.diff

3.5.2 Input File

part02test05.bff

```
(
[18,17,16,14,13,6,4,1],
[
"1332111231",
"1331233233",
```

```
"1333133121",
"1211333221",
"3233313231",
"1121211213"
]
```

3.5.3 Submission Output

part02test05.output

```
"Result "
"1332111211"
"1331233211"
"1333133111"
"1211333111"
"1233313131"
"1121211113"
""
```

3.5.4 Solution Output

part02test05.output

```
"Result "
"1332111211"
"1331233211"
"1333133111"
"1211333111"
"1233313131"
"1121211113"
""
```

3.5.5 stderr

part02test05.err

3.6 part02test06

3.6.1 Diff

part02test06.diff

3.6.2 Input File

part02test06.bff

```
(
[42,41,40,39,38,37,36,35,34,33,32,31,30,29,28,27,26,25,24,23,22,21,19,18,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,0]
[
"44242121314",
"43434232111",
"22442433113",
"42341143131",
"11124433342",
"43313131134",
"44434411122"
]
)
```

3.6.3 Submission Output

part02test06.output

```
"Result "  
"111111111111"  
"111111111111"  
"111111111111"  
"111111111111"  
"111111111111"  
"111111111111"  
"111111111111"  
"
```

3.6.4 Solution Output

part02test06.output

```
"Result "  
"111111111111"  
"111111111111"  
"111111111111"  
"111111111111"  
"111111111111"  
"111111111111"  
"111111111111"  
"
```

3.6.5 stderr

part02test06.err

3.7 part02test07

3.7.1 Diff

part02test07.diff

3.7.2 Input File

part02test07.bff

```
(  
[60,59,58,56,54,53,52,51,50,49,38,37,36,34,33,30,29,28,27,25,24,22,21,20,19,18,17,14,13,10,8  
  
[  
"113232323",  
"233213333",  
"232323131",  
"113333212",  
"323311223",  
"311213132",  
"233231313",  
"212332332",  
"111221131",  
"212122113",  
"233221332",  
"321232133",  
"121113212"  
]  
)
```

3.7.3 Submission Output

part02test07.output

```
"Result "  
"113111313"  
"133113333"  
"131323131"  
"113333111"  
"113311111"  
"111111111"  
"211111111"  
"211111111"  
"111111111"  
"212111113"  
"233111331"  
"111111133"  
"111113111"  
"
```

3.7.4 Solution Output

part02test07.output

```
"Result "  
"113111313"  
"133113333"  
"131323131"  
"113333111"  
"113311111"  
"111111111"  
"211111111"  
"211111111"  
"111111111"  
"212111113"  
"233111331"  
"111111133"  
"111113111"  
"
```

3.7.5 stderr

part02test07.err

3.8 part02test08

3.8.1 Diff

part02test08.diff

3.8.2 Input File

part02test08.bff

```
(  
[75,70,68,67,64,61,60,54,52,49,47,45,44,42,40,37,31,29,23,20,19,13,12,10,5,4],  
[  
"3113141412",  
"2433414231",  
"4144114123",  
"3224143313",  
"4323412314",  
"1413111341",  
"3113333114",  

```

```
"2444312223",
"4122144213",
"4134132221",
"4124423223",
"3343143113",
"1321332233",
"1334131112"
]
)
```

3.8.3 Submission Output

part02test08.output

```
"Result "
"3113111412"
"1433114231"
"4111114121"
"3221143311"
"1321412314"
"1111111341"
"3111111114"
"1111111113"
"1122144113"
"1134131111"
"1124411113"
"3313111113"
"1311332233"
"1334131112"
""
```

3.8.4 Solution Output

part02test08.output

```
"Result "
"3113111412"
"1433114231"
"4111114121"
"3221143311"
"1321412314"
"1111111341"
"3111111114"
"1111111113"
"1122144113"
"1134131111"
"1124411113"
"3313111113"
"1311332233"
"1334131112"
""
```

3.8.5 stderr

part02test08.err

3.9 part02test09

3.9.1 Diff

part02test09.diff

3.9.2 Input File

part02test09.bff

```
(  
[22],  
[  
"1122221",  
"2211221",  
"1212112",  
"2122121",  
"1212221",  
"2222121",  
"2121111",  
"1211122",  
"2121222",  
"2222222",  
"2121122",  
"1112122",  
"1222111",  
"1121211",  
"2222222"  
]  
)
```

3.9.3 Submission Output

part02test09.output

```
"Result "  
"1122221"  
"2211221"  
"1212112"  
"2122121"  
"1212221"  
"2222121"  
"2121111"  
"1211122"  
"2121222"  
"2222222"  
"2121122"  
"1111122"  
"1111111"  
"1111111"  
"1111111"  
"1111111"  
""
```

3.9.4 Solution Output

part02test09.output

```
"Result "  
"1122221"  
"2211221"  
"1212112"  
"2122121"  
"1212221"  
"2222121"  
"2121111"  
"1211122"  
"2121222"  
"2222222"
```

```
"21211122"
"11111122"
"11111111"
"11111111"
"11111111"
""
```

3.9.5 stderr

part02test09.err

3.10 part02test10

3.10.1 Diff

part02test10.diff

3.10.2 Input File

part02test10.bff

```
(
[60,58,57,56,55,54,53,52,51,50,49,48,46,45,43,41,40,39,38,37,35,34,32,31,30,29,28,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,0]
[
"31321121111111",
"3312312424342",
"1221344243411",
"1313344121322",
"1443411143432",
"3212431334241",
"1142421432423",
"1442211234134"
]
)
```

3.10.3 Submission Output

part02test10.output

```
"Result "
"31111111111111"
"33111111111142"
"1221144111411"
"1111144111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
""
```

3.10.4 Solution Output

part02test10.output

```
"Result "
"31111111111111"
"33111111111142"
"1221144111411"
"1111144111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
```

```
"1111111111111111"
"1111111111111111"
""
```

3.10.5 stderr

part02test10.err

3.11 Source Code

csce322h0mework03part02.hs

```
1 import Prelude
2 import System.Environment ( getArgs )
3 import Data.List
4 import Helpers
5
6 -- The main method that will be used for testing / comgand line access
7 main = do
8     args <- getArgs
9     filename <- readFile (head args)
10    (moves,game) <- readBattleFloodFile filename
11    print "Result"
12    printGame (onePlayersManyMoves game moves "1")
13
14 -- YOUR CODE SHOULD COME AFTER THIS POINT
15 onePlayersManyMoves :: [[Char]] -> [Int] -> [Char] -> [[Char]]
16 onePlayersManyMoves game [] _ = game
17 onePlayersManyMoves game (move:moves) player = onePlayersManyMoves (changeCluster game
    (findCluster game [] [(0,0)] move 1) (head (player))) moves (incrementPlayer
    player)
18
19 incrementPlayer :: [Char] -> [Char]
20 incrementPlayer (h:t) = (t ++ [h])
21
22
23 findCluster :: [[Char]] -> [(Int, Int)] -> [(Int, Int)] -> Int -> Int -> [(Int, Int)]
24 -- game checkedPositions currentPosition move counter = positions representing cluster
    number of move
25 findCluster game checkedPositions currentPosition move counter
26     | ((move*2) == counter) || ((move*2-1) == counter) = findNeighbors
    game currentPosition checkedPositions
27     | ((move*2) < counter) || ((move*2-1) < counter) = []
28     | otherwise = findCluster game (removeDuplicates (
    checkedPositions ++ (findNeighbors game currentPosition checkedPositions))) (
    removeDuplicates passingCurrent) move (counter+1)
29     where newPosition = [n|n<-(generatePositions game),(not (elem n
    checkedPositions))]
30     passingCurrent = [x|x<-newPosition, (x == (head newPosition))
    ]
31
32 changeCluster :: [[Char]] -> [(Int, Int)] -> Char -> [[Char]]
33 -- game clusterPositions player = game with changed cluster to player
34 changeCluster game [] _ = game
35 changeCluster game (h:clusters) player = (changeCluster (set game h player) clusters
    player)
36
37 -- Code written together in class that is copied and pasted from the website...as I
    understand we are allowed to use this
38 findNeighbors :: [[Char]] -> [(Int,Int)] -> [(Int,Int)] -> [(Int,Int)]
```

```

39 -- findNeighbors game positionsToCheck positionsChecked
40 findNeighbors _ [] _ = []
41 findNeighbors game (position:positions) checked = position:(findNeighbors game (
    positions++usefulNeighbors) (position:checked))
42     where positionNeighbors = generateNeighbors position game
43           usefulNeighbors    = [n|n<-positionNeighbors,(get game n)==(get game
    position),(not (elem n positions)),(not (elem n checked))]
44
45 generatePositions :: [[a]] -> [(Int,Int)]
46 -- generate all positions for a given game
47 -- 8x7 game should generate (0,0), (0,1), ..., (0,6), (1,0), ..., (7,6)
48 generatePositions game = positions
49     where nRows          = length game
50           nCols          = length (head game)
51           positions      = [(r,c)|r<-[0..(nRows-1)],c<-[0..(nCols-1)]]
52
53 generateNeighbors :: (Int,Int) -> [[a]] -> [(Int,Int)]
54 generateNeighbors (r,c) game = neighbors
55     where nRows          = length game
56           nCols          = length (head game)
57           above          = [(row,col)|row<-[(r-1)],col<-[c],r>0]
58           below          = [(row,col)|row<-[(r+1)],col<-[c],r<(nRows-1)]
59           left           = [(row,col)|row<-[r],col<-[(c-1)],c>0]
60           right          = [(row,col)|row<-[r],col<-[(c+1)],c<(nCols-1)]
61           neighbors      = above ++ below ++ left ++ right
62
63
64 removeDuplicates :: Ord a => [a] -> [a]
65 -- remove duplicates from a list
66 -- abc
67 removeDuplicates []      = []
68 removeDuplicates [x]     = [x]
69 removeDuplicates (h:t)
70     | h == n      = removeDuplicates (h:ta)
71     | otherwise   = h:(removeDuplicates t)
72     where n      = head t
73           ta     = tail t
74
75
76 set :: [[a]] -> (Int,Int) -> a -> [[a]]
77 -- set game position element = game with position replaced by element
78 set (row:rows) (0,c) el = (setCol row c el):rows
79 set (row:rows) (r,c) el = row:(set rows (r-1,c) el)
80
81 setCol :: [a] -> Int -> a -> [a]
82 setCol (_,cols) 0 el = el:cols
83 setCol (col:cols) c el = col:(setCol cols (c-1) el)
84
85
86 get :: [[a]] -> (Int,Int) -> a
87 -- get game position = element at that position in the game
88 get (row:_) (0,c) = getCol row c
89 get (_,rows) (r,c) = get rows ((r-1),c)
90
91 getCol :: [a] -> Int -> a
92 -- getCol row position = element at that position in the row
93 getCol (col:_) 0 = col
94 getCol (_,cols) c = getCol cols (c-1)

```

Chapter 4

csce322h0mework03part03.hs

4.1 part03test01

4.1.1 Diff

part03test01.diff

4.1.2 Input File

part03test01.bff

```
(  
[26,25,21,20,19,17,16,14,13,12,8,4],  
[  
"111222231",  
"322222131",  
"231312132",  
"211123312",  
"111233132",  
"231333213",  
"112313313"  
]  
)
```

4.1.3 Submission Output

part03test01.output

```
"Result "  
"111222231"  
"322222131"  
"231312132"  
"211123312"  
"111233132"  
"231333213"  
"112313313"  
""
```

4.1.4 Solution Output

part03test01.output

```
"Result "  
"111222231"  
"322222131"  
"231312132"  
"211123312"  
"111233132"
```

```
"231333213"  
"112313313"  
"
```

4.1.5 stderr

part03test01.err

4.2 part03test02

4.2.1 Diff

part03test02.diff

4.2.2 Input File

part03test02.bff

```
(  
[24,11],  
[  
"232321",  
"131112",  
"332213",  
"133233",  
"231211",  
"213222",  
"321131",  
"213211"  
]  
)
```

4.2.3 Submission Output

part03test02.output

```
"Result "  
"232321"  
"131112"  
"332213"  
"133233"  
"231211"  
"213222"  
"321131"  
"213211"  
"
```

4.2.4 Solution Output

part03test02.output

```
"Result "  
"232321"  
"131112"  
"332213"  
"133233"  
"231211"  
"213222"  
"321131"  
"213211"  
"
```


4.2.5 stderr

part03test02.err

4.3 part03test03

4.3.1 Diff

part03test03.diff

4.3.2 Input File

part03test03.bff

```
(  
[44,40,39,38,35,34,33,32,31,30,28,27,25,24,22,21,20,19,17,16,14,13,12,11,10,9,8,7,6,5,4,3,2,  
  
[  
"224323",  
"232342",  
"223341",  
"313114",  
"131241",  
"321133",  
"332132",  
"333331",  
"142131",  
"244421",  
"441124",  
"124141",  
"243114",  
"221342"  
]  
)
```

4.3.3 Submission Output

part03test03.output

```
"Result "  
"224323"  
"232342"  
"223341"  
"313114"  
"131241"  
"321133"  
"332132"  
"333331"  
"142131"  
"244421"  
"441124"  
"124141"  
"243114"  
"221142"  
"
```

4.3.4 Solution Output

part03test03.output

```
"Result "  
"224323"
```

```
"232342"
"223341"
"313114"
"131241"
"321133"
"332132"
"333331"
"142131"
"244421"
"441124"
"124141"
"243114"
"221142"
"
```

4.3.5 stderr

part03test03.err

4.4 part03test04

4.4.1 Diff

part03test04.diff

4.4.2 Input File

part03test04.bff

```
(
[22,21,20,18,17,16,15,13,11,10,9,8,5,4,3,1],
[
"21112111",
"21111211",
"11211111",
"12122212",
"11122121",
"12222222",
"11211122",
"22121112",
"11121211",
"11221121",
"21221122",
"12112212"
]
)
```

4.4.3 Submission Output

part03test04.output

```
"Result "
"21112111"
"21111211"
"11211111"
"12122212"
"11122121"
"12222222"
"11211122"
"22121112"
"11121211"
```

```
"11221121"
"21221122"
"12112212"
""
```

4.4.4 Solution Output

part03test04.output

```
"Result"
"21112111"
"21111211"
"11211111"
"12122212"
"11122121"
"12222222"
"11211122"
"22121112"
"11121211"
"11221121"
"21221122"
"12112212"
""
```

4.4.5 stderr

part03test04.err

4.5 part03test05

4.5.1 Diff

part03test05.diff

4.5.2 Input File

part03test05.bff

```
(
[107,106,104,102,99,96,94,91,88,86,85,82,80,79,78,77,72,69,68,67,65,64,58,57,52,51,48,47,46,
[
"324244442111431",
"214343221213343",
"123143212234243",
"121122111131211",
"421213434141121",
"344344312332341",
"323311111132222",
"341214443312241",
"343443344431224",
"133324444411224",
"343333344411311",
"224434314443424",
"413224143223114",
"244131242241231",
"221431114312113"
]
)
```

4.5.3 Submission Output

part03test05.output

```
"Result "  
"324244442111431"  
"214343221213343"  
"123143212234243"  
"121122111131211"  
"421213434141121"  
"344344312332341"  
"323311111132222"  
"341214443312241"  
"343443344431224"  
"133324444411224"  
"343333344411311"  
"224434314443424"  
"413224143223114"  
"244131242241231"  
"221431114312113"  
"
```

4.5.4 Solution Output

part03test05.output

```
"Result "  
"324244442111431"  
"214343221213343"  
"123143212234243"  
"121122111131211"  
"421213434141121"  
"344344312332341"  
"323311111132222"  
"341214443312241"  
"343443344431224"  
"133324444411224"  
"343333344411311"  
"224434314443424"  
"413224143223114"  
"244131242241231"  
"221431114312113"  
"
```

4.5.5 stderr

part03test05.err

4.6 part03test06

4.6.1 Diff

part03test06.diff

4.6.2 Input File

part03test06.bff

```
(  
[42,41,40,38,37,36,35,34,33,31,30,29,28,26,25,24,23,22,20,19,18,16,15,12,11,10,9,8,6,5,4,3,2  
[  
"11111221211221",  
"12212221112211",
```

```

"12211211121122" ,
"11121122112112" ,
"21222221222221" ,
"11221112122221" ,
"21221121121112" ,
"12112112221112" ,
"21211212211112" ,
"11211212122111" ,
"11212121122112" ,
"22212212222211" ,
"21222222212122" ,
"22221111121121"
]
)

```

4.6.3 Submission Output

part03test06.output

```

"Result "
"11111221211221"
"12212221112211"
"12211211121122"
"11121122112112"
"21222221222221"
"11221112122221"
"21221121121112"
"12112112221112"
"21211212211112"
"11211212122111"
"11212121122112"
"22212212222211"
"21222222212122"
"22221111121121"
""

```

4.6.4 Solution Output

part03test06.output

```

"Result "
"11111221211221"
"12212221112211"
"12211211121122"
"11121122112112"
"21222221222221"
"11221112122221"
"21221121121112"
"12112112221112"
"21211212211112"
"11211212122111"
"11212121122112"
"22212212222211"
"21222222212122"
"22221111121121"
""

```

4.6.5 stderr

part03test06.err

4.7 part03test07

4.7.1 Diff

part03test07.diff

4.7.2 Input File

part03test07.bff

```
(  
[34,32,30,28,27,26,25,23,22,20,19,18,15,14,13,12,10,7,6,4,3,2,1],  
[  
"321341",  
"413143",  
"421244",  
"234121",  
"232321",  
"231111",  
"344231",  
"443344",  
"123343",  
"124412"  
]  
)
```

4.7.3 Submission Output

part03test07.output

```
"Result "  
"321341"  
"413143"  
"421244"  
"234121"  
"232321"  
"231111"  
"344231"  
"443344"  
"123343"  
"124411"  
""
```

4.7.4 Solution Output

part03test07.output

```
"Result "  
"321341"  
"413143"  
"421244"  
"234121"  
"232321"  
"231111"  
"344231"  
"443344"  
"123343"  
"124411"  
""
```

4.7.5 stderr

part03test07.err

4.8 part03test08

4.8.1 Diff

part03test08.diff

4.8.2 Input File

part03test08.bff

```
(  
[10,8,7,5,4,2],  
[  
"2212211111222",  
"1111212222212",  
"2111112212222",  
"1111212121112",  
"1222222221112",  
"1211121222211",  
"2222111211111"  
]  
)
```

4.8.3 Submission Output

part03test08.output

```
"Result "  
"2212211111222"  
"1111212222212"  
"2111112212222"  
"1111212121112"  
"1222222221112"  
"1211121222211"  
"2222111211111"  
""
```

4.8.4 Solution Output

part03test08.output

```
"Result "  
"2212211111222"  
"1111212222212"  
"2111112212222"  
"1111212121112"  
"1222222221112"  
"1211121222211"  
"2222111211111"  
""
```

4.8.5 stderr

part03test08.err

4.9 part03test09

4.9.1 Diff

part03test09.diff

4.9.2 Input File

part03test09.bff

```
(  
[15,14,12,11,10,9,8,7,6,5,4,3,2,1],  
[  
"12112111",  
"22211122",  
"12211222",  
"21122121",  
"22121211",  
"11222111",  
"11212221"  
]  
)
```

4.9.3 Submission Output

part03test09.output

```
"Result "  
"12112111"  
"22211122"  
"12211222"  
"21122121"  
"22121211"  
"11222111"  
"11212221"  
""
```

4.9.4 Solution Output

part03test09.output

```
"Result "  
"12112111"  
"22211122"  
"12211222"  
"21122121"  
"22121211"  
"11222111"  
"11212221"  
""
```

4.9.5 stderr

part03test09.err

4.10 part03test10

4.10.1 Diff

part03test10.diff

4.10.2 Input File

part03test10.bff

```
(  
[20,19,13,10,6,3,1],  
[
```



```
"22212212121122",
"21211211212122",
"11111122112212",
"22211111221111",
"11222211221211",
"22111211211221"
]
)
```

4.10.3 Submission Output

part03test10.output

```
"Result "
"22212212121122"
"21211211212122"
"11111122112212"
"22211111221111"
"11222211221211"
"22111211211221"
""
```

4.10.4 Solution Output

part03test10.output

```
"Result "
"22212212121122"
"21211211212122"
"11111122112212"
"22211111221111"
"11222211221211"
"22111211211221"
""
```

4.10.5 stderr

part03test10.err

4.11 part03test11

4.11.1 Diff

part03test11.diff

4.11.2 Input File

part03test11.bff

```
(
[30,29,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1],
[
"4134411",
"3411134",
"3123312",
"2313311",
"4431213",
"4131233",
"3321432",
"4233332"
]
)
```

4.11.3 Submission Output

part03test11.output

```
"Result "  
"4134411 "  
"3411134 "  
"3123312 "  
"2313311 "  
"4431213 "  
"4131233 "  
"3321432 "  
"4133332 "  
" "
```

4.11.4 Solution Output

part03test11.output

```
"Result "  
"4134411 "  
"3411134 "  
"3123312 "  
"2313311 "  
"4431213 "  
"4131233 "  
"3321432 "  
"4133332 "  
" "
```

4.11.5 stderr

part03test11.err

4.12 part03test12

4.12.1 Diff

part03test12.diff

4.12.2 Input File

part03test12.bff

```
(  
[19,12,10],  
[  
"3331422344124",  
"1444223311123",  
"1331433243422",  
"4421342412132",  
"4324331241423",  
"4423232334221",  
"1431223343244",  
"2231233244323",  
"2311143131133",  
"3422233114231"  
]  
)
```

4.12.3 Submission Output

part03test12.output

```
"Result "  
"3331422344124"  
"1444223311123"  
"1331433243122"  
"4421342412132"  
"4324331241423"  
"4423232334221"  
"1431223343244"  
"2231233244323"  
"2311143131133"  
"3422233114231"  
""
```

4.12.4 Solution Output

part03test12.output

```
"Result "  
"3331422344124"  
"1444223311123"  
"1331433243122"  
"4421342412132"  
"4324331241423"  
"4423232334221"  
"1431223343244"  
"2231233244323"  
"2311143131133"  
"3422233114231"  
""
```

4.12.5 stderr

part03test12.err

4.13 part03test13

4.13.1 Diff

part03test13.diff

4.13.2 Input File

part03test13.bff

```
(  
[107,106,105,104,102,101,98,97,96,95,94,93,91,90,89,85,83,82,81,80,79,78,73,71,70,69,64,62,6  
[  
"4221122112142",  
"3234424331242",  
"3331344214114",  
"4333431131233",  
"3112143131211",  
"2331424422132",  
"3142221412444",  
"4242112241343",  
"1231411342434",  
"2334144331421",  
"1434341444314",  
"1111114324412",
```

```
"4412143444441" ,
"2124414212433" ,
"2313243221143"
]
)
```

4.13.3 Submission Output

part03test13.output

```
"Result "
"4221122112142"
"3234424331242"
"3331344214114"
"4333431131233"
"3112143131211"
"2331424422132"
"3142221412444"
"4242112241343"
"1231411342434"
"2334144331421"
"1434341444314"
"1111114324412"
"4412143444441"
"2124414212433"
"2311243221143"
""
```

4.13.4 Solution Output

part03test13.output

```
"Result "
"4221122112142"
"3234424331242"
"3331344214114"
"4333431131233"
"3112143131211"
"2331424422132"
"3142221412444"
"4242112241343"
"1231411342434"
"2334144331421"
"1434341444314"
"1111114324412"
"4412143444441"
"2124414212433"
"2311243221143"
""
```

4.13.5 stderr

part03test13.err

4.14 part03test14

4.14.1 Diff

part03test14.diff

4.14.2 Input File

part03test14.bff

```
(  
[64,55,49,16],  
[  
"44111344",  
"43112233",  
"14134342",  
"33413121",  
"43441441",  
"41333431",  
"13214331",  
"31332342",  
"34423133",  
"22434431",  
"11213243",  
"14432132",  
"21331313",  
"22323221"  
]  
)
```

4.14.3 Submission Output

part03test14.output

```
"Result "  
"44111344"  
"43112233"  
"14134342"  
"33413121"  
"43441441"  
"41333431"  
"13214331"  
"31332342"  
"34423133"  
"22434431"  
"11213243"  
"14432132"  
"21331113"  
"22323221"  
"
```

4.14.4 Solution Output

part03test14.output

```
"Result "  
"44111344"  
"43112233"  
"14134342"  
"33413121"  
"43441441"  
"41333431"  
"13214331"  
"31332342"  
"34423133"  
"22434431"  
"11213243"  
"14432132"  
"21331113"  
"22323221"  
"
```

4.14.5 stderr

part03test14.err

4.15 part03test15

4.15.1 Diff

part03test15.diff

4.15.2 Input File

part03test15.bff

```
(  
[83,82,81,80,79,78,77,76,74,72,70,69,68,66,65,64,62,61,59,58,55,53,52,51,50,47,46,45,44,43,4  
[  
"333111342423",  
"124333211112",  
"433421333122",  
"442123414313",  
"244414342233",  
"133244443432",  
"434134322234",  
"412414241414",  
"214131143433",  
"434443334143",  
"121423431244",  
"241243223114"  
]  
)
```

4.15.3 Submission Output

part03test15.output

```
"Result "  
"333111342423"  
"124333211112"  
"433421333122"  
"442123414313"  
"244414342233"  
"133244443432"  
"434134322234"  
"412414241414"  
"214131143433"  
"434443334143"  
"121423431244"  
"241243221114"  
"
```

4.15.4 Solution Output

part03test15.output

```
"Result "  
"333111342423"  
"124333211112"  
"433421333122"  
"442123414313"  
"244414342233"
```

```
"133244443432"
"434134322234"
"412414241414"
"214131143433"
"434443334143"
"121423431244"
"241243221114"
""
```

4.15.5 stderr

part03test15.err

4.16 part03test16

4.16.1 Diff

part03test16.diff

4.16.2 Input File

part03test16.bff

```
(
[28,27,26,25,23,22,21,20,19,16,15,13,12,11,10,6,5,4,3,2,1],
[
"3141442",
"1242434",
"1442343",
"1114312",
"1331233",
"2414341"
]
)
```

4.16.3 Submission Output

part03test16.output

```
"Result "
"3141442"
"1242434"
"1442343"
"1114312"
"1331233"
"2414341"
""
```

4.16.4 Solution Output

part03test16.output

```
"Result "
"3141442"
"1242434"
"1442343"
"1114312"
"1331233"
"2414341"
""
```

4.16.5 stderr

part03test16.err

4.17 part03test17

4.17.1 Diff

part03test17.diff

4.17.2 Input File

part03test17.bff

```
(  
[25,23,22,21,20,16,15,13,12,11,10,9,8,7,6,5,4,3,2],  
[  
"22221111122222",  
"11112122221111",  
"12222121112121",  
"22121112211221",  
"22121121212111",  
"11221112221122",  
"12111122221221",  
"22211121212212",  
"22212212221112",  
"12222222121222",  
"11122122111221"  
]  
)
```

4.17.3 Submission Output

part03test17.output

```
"Result "  
"22221111122222"  
"11112122221111"  
"12222121112121"  
"22121112211221"  
"22121121212111"  
"11221112221122"  
"12111122221221"  
"22211121212212"  
"22212212221112"  
"12222222121222"  
"11122122111221"  
""
```

4.17.4 Solution Output

part03test17.output

```
"Result "  
"22221111122222"  
"11112122221111"  
"12222121112121"  
"22121112211221"  
"22121121212111"  
"11221112221122"  
"12111122221221"  
"22211121212212"  
"22212212221112"  
"12222222121222"
```



```
"11122122111221"  
"
```

4.17.5 stderr

part03test17.err

4.18 part03test18

4.18.1 Diff

part03test18.diff

4.18.2 Input File

part03test18.bff

```
(  
[28,27,26,24,23,22,21,19,18,17,15,13,12,11,9,8,7,5,3,1],  
[  
"113322",  
"232222",  
"311112",  
"331331",  
"111123",  
"323132",  
"323321",  
"231221",  
"311331",  
"133223",  
"211223"  
]  
)
```

4.18.3 Submission Output

part03test18.output

```
"Result "  
"113322"  
"232222"  
"311112"  
"331331"  
"111123"  
"323132"  
"323321"  
"231221"  
"311331"  
"133223"  
"111223"  
"
```

4.18.4 Solution Output

part03test18.output

```
"Result "  
"113322"  
"232222"  
"311112"  
"331331"  
"111123"
```

```
"323132"
"323321"
"231221"
"311331"
"133223"
"111223"
""
```

4.18.5 stderr

part03test18.err

4.19 part03test19

4.19.1 Diff

part03test19.diff

4.19.2 Input File

part03test19.bff

```
(
[26,25,24,22,12,11,7,6,2],
[
"221123",
"333111",
"312211",
"131321",
"223211",
"111121",
"112313",
"323311",
"111211",
"212331"
]
)
```

4.19.3 Submission Output

part03test19.output

```
"Result "
"221123"
"333111"
"312211"
"131321"
"223211"
"111121"
"112313"
"323311"
"111211"
"112331"
""
```

4.19.4 Solution Output

part03test19.output

```
"Result "
"221123"
"333111"
```

```
"312211"
"131321"
"223211"
"111121"
"112313"
"323311"
"111211"
"112331"
""
```

4.19.5 stderr

part03test19.err

4.20 part03test20

4.20.1 Diff

part03test20.diff

4.20.2 Input File

part03test20.bff

```
(
[14,12,10,9,8,7,6,3,2],
[
"2212121",
"2111211",
"2212211",
"1111212",
"2122212",
"2122212",
"2112212",
"2112122",
"1111111",
"2111112",
"1121111",
"2221212"
]
)
```

4.20.3 Submission Output

part03test20.output

```
"Result"
"2212121"
"2111211"
"2212211"
"1111212"
"2122212"
"2122212"
"2112212"
"2112122"
"1111111"
"2111112"
"1121111"
"2221211"
""
```

4.20.4 Solution Output

part03test20.output

```
"Result"  
"2212121"  
"2111211"  
"2212211"  
"1111212"  
"2122212"  
"2122212"  
"2112212"  
"2112122"  
"1111111"  
"2111112"  
"1121111"  
"2221211"  
""
```

4.20.5 stderr

part03test20.err

4.21 Source Code

csce322h0mework03part03.hs

```
1 import Prelude  
2 import System.Environment ( getArgs )  
3 import Data.List  
4 import Helpers  
5  
6 -- The main method that will be used for testing / command line access  
7 main = do  
8     args <- getArgs  
9     filename <- readFile (head args)  
10    (moves,game) <- readBattleFloodFile filename  
11    print "Result"  
12    printGame (manyPlayersOneMove game (head moves))  
13  
14 -- YOUR CODE SHOULD COME AFTER THIS POINT  
15 manyPlayersOneMove :: [[Char]] -> Int -> [[Char]]  
16 manyPlayersOneMove game move = changeCluster game (findCluster game [] [(0,0)] move 1)  
    '1'  
17  
18 findCluster :: [[Char]] -> [(Int, Int)] -> [(Int, Int)] -> Int -> Int -> [(Int, Int)]  
19 -- game checkedPositions currentPosition move counter = positions representing cluster  
    number of move  
20 findCluster game checkedPositions currentPosition move counter  
21     | ((move*2) == counter) || ((move*2-1) == counter) = findNeighbors  
    game currentPosition checkedPositions  
22     | ((move*2) < counter) || ((move*2-1) < counter) = []  
23     | otherwise = findCluster game (removeDuplicates (   
    checkedPositions ++ (findNeighbors game currentPosition checkedPositions))) (   
    removeDuplicates passingCurrent) move (counter+1)  
24     where newPosition = [n|n<-(generatePositions game),(not (elem n  
    checkedPositions))]  
25     passingCurrent = [x|x<-newPosition, (x == (head newPosition))  
    ]  
26  
27 generatePositions :: [[a]] -> [(Int,Int)]
```

```

28 -- generate all positions for a given game
29 -- 8x7 game should generate (0,0), (0,1), ..., (0,6), (1,0), ..., (7,6)
30 generatePositions game = positions
31     where nRows      = length game
32           nCols      = length (head game)
33           positions   = [(r,c)|r<-[0..(nRows-1)],c<-[0..(nCols-1)]]
34
35 changeCluster :: [[Char]] -> [(Int, Int)] -> Char -> [[Char]]
36 -- game clusterPositions player = game with changed cluster to player
37 changeCluster game [] _ = game
38 changeCluster game (h:clusters) player = (changeCluster (set game h player) clusters
    player)
39
40 -- Code written together in class that is copied and pasted from the website...as I
    understand we are allowed to use this
41 findNeighbors :: [[Char]] -> [(Int,Int)] -> [(Int,Int)] -> [(Int,Int)]
42 -- findNeighbors game positionsToCheck positionsChecked
43 findNeighbors _ [] _ = []
44 findNeighbors game (position:positions) checked = position:(findNeighbors game (
    positions++usefulNeighbors) (position:checked))
45     where positionNeighbors = generateNeighbors position game
46           usefulNeighbors   = [n|n<-positionNeighbors,(get game n)==(get game
    position),(not (elem n positions)),(not (elem n checked))]
47
48 generateNeighbors :: (Int,Int) -> [[a]] -> [(Int,Int)]
49 generateNeighbors (r,c) game      = neighbors
50     where nRows      = length game
51           nCols      = length (head game)
52           above      = [(row,col)|row<-[(r-1)],col<-[c],r>0]
53           below      = [(row,col)|row<-[(r+1)],col<-[c],r<(nRows-1)]
54           left       = [(row,col)|row<-[r],col<-[(c-1)],c>0]
55           right      = [(row,col)|row<-[r],col<-[(c+1)],c<(nCols-1)]
56           neighbors   = above ++ below ++ left ++ right
57
58
59 removeDuplicates :: Ord a => [a] -> [a]
60 -- remove duplicates from a list
61 -- abc
62 removeDuplicates []      = []
63 removeDuplicates [x]     = [x]
64 removeDuplicates (h:t)
65     | h == n      = removeDuplicates (h:ta)
66     | otherwise   = h:(removeDuplicates t)
67     where n      = head t
68           ta     = tail t
69
70
71 set :: [[a]] -> (Int,Int) -> a -> [[a]]
72 -- set game position element = game with position replaced by element
73 set (row:rows) (0,c) el = (setCol row c el):rows
74 set (row:rows) (r,c) el = row:(set rows (r-1,c) el)
75
76 setCol :: [a] -> Int -> a -> [a]
77 setCol (_,cols) 0 el     = el:cols
78 setCol (col:cols) c el   = col:(setCol cols (c-1) el)
79
80
81 get :: [[a]] -> (Int,Int) -> a
82 -- get game position = element at that position in the game
83 get (row:_) (0,c)      = getCol row c

```

```
84 get (_:rows) (r,c)    = get rows ((r-1),c)
85
86 getCol :: [a] -> Int -> a
87 -- getCol row position = element at that position in the row
88 getCol (col:_) 0      = col
89 getCol (_:cols) c     = getCol cols (c-1)
```

Chapter 5

csce322h0mework03part04.hs

5.1 part04test01

5.1.1 Diff

part04test01.diff

5.1.2 Input File

part04test01.bff

```
(  
[23,18,16,6,4,3,2],  
[  
"242431",  
"121112",  
"222422",  
"243114",  
"244334",  
"441223",  
"213243"  
]  
)
```

5.1.3 Submission Output

part04test01.output

```
"Result "  
"232134"  
"121112"  
"222422"  
"243114"  
"244334"  
"441223"  
"213213"  
""
```

5.1.4 Solution Output

part04test01.output

```
"Result "  
"232134"  
"121112"  
"222422"  
"243114"  
"244334"
```

```
"441223"  
"213213"  
"
```

5.1.5 stderr

part04test01.err

5.2 part04test02

5.2.1 Diff

part04test02.diff

5.2.2 Input File

part04test02.bff

```
(  
[31,24,4],  
[  
"33232332121",  
"32131223313",  
"13123122211",  
"32111113313",  
"12232111221",  
"22111333111",  
"32331121221",  
"22223221231",  
"33121322312",  
"22311111221",  
"13323122123"  
]  
)
```

5.2.3 Submission Output

part04test02.output

```
"Result "  
"33233332121"  
"32131223313"  
"13123122211"  
"32111113312"  
"12232111221"  
"22111111111"  
"32331121221"  
"22223221231"  
"33121322312"  
"22311111221"  
"13323122123"  
"
```

5.2.4 Solution Output

part04test02.output

```
"Result "  
"33233332121"  
"32131223313"  
"13123122211"  
"32111113312"
```



```
"12232111221"
"22111111111"
"32331121221"
"22223221231"
"33121322312"
"22311111221"
"13323122123"
""
```

5.2.5 stderr

part04test02.err

5.3 part04test03

5.3.1 Diff

part04test03.diff

5.3.2 Input File

part04test03.bff

```
(
[63,62,61,60,59,58,57,56,55,54,53,52,51,50,49,48,47,46,45,44,43,42,41,40,39,38,37,36,35,34,33,32,31,30,29,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,0]
[
"32243421314234",
"44211432332222",
"33222131233231",
"11144243341334",
"31324412342242",
"23424333333243",
"31111244433314",
"22242443313442",
"23333133124334"
]
)
```

5.3.3 Submission Output

part04test03.output

```
"Result"
"444444414422232"
"44444444442222"
"44444444444244"
"44444444444444"
"44444444444444"
"44444444444444"
"44444444444444"
"44444444444444"
"444444441124444"
"41111411144221"
""
```

5.3.4 Solution Output

part04test03.output

```
"Result"
"444444414422232"
"44444444442222"
```

```
"444444444444244"
"444444444444444"
"444444444444444"
"444444444444444"
"444444444444444"
"444444444444444"
"444444441124444"
"411111411144221"
""
```

5.3.5 stderr

part04test03.err

5.4 part04test04

5.4.1 Diff

part04test04.diff

5.4.2 Input File

part04test04.bff

```
(
[23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,5,4,3,2,1],
[
"1112213",
"1132321",
"1122223",
"1222121",
"1321133",
"1321113",
"1311233",
"2232212",
"3122232",
"1221223"
]
)
```

5.4.3 Submission Output

part04test04.output

```
"Result "
"1113333"
"1133333"
"1133333"
"1333133"
"1131133"
"1131113"
"1111333"
"3313333"
"1333333"
"1333333"
""
```

5.4.4 Solution Output

part04test04.output

```
"Result "
"1113333"
```

```
"1133333"
"1133333"
"1333133"
"1131133"
"1131113"
"1111333"
"3313333"
"1333333"
"1333333"
""
```

5.4.5 stderr

part04test04.err

5.5 part04test05

5.5.1 Diff

part04test05.diff

5.5.2 Input File

part04test05.bff

```
(
[48,47,46,45,44,43,42,41,40,39,38,37,36,35,34,33,32,31,30,29,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,0]
[
"121142",
"134141",
"134242",
"1111333",
"434232",
"322411",
"432234",
"224241",
"314314",
"122134",
"323342",
"132423",
"114411"
]
)
```

5.5.3 Submission Output

part04test05.output

```
"Result "
"4344444"
"4344444"
"4344444"
"4444444"
"4444444"
"4444444"
"4344444"
"4444444"
"4444444"
"4444444"
"4444444"
```

```
"4444444"
"4444444"
"
```

5.5.4 Solution Output

part04test05.output

```
"Result"
"4344444"
"4344444"
"4344444"
"4444444"
"4444444"
"4444444"
"4344444"
"4444444"
"4444444"
"4444444"
"4444444"
"4444444"
"4444444"
"
```

5.5.5 stderr

part04test05.err

5.6 part04test06

5.6.1 Diff

part04test06.diff

5.6.2 Input File

part04test06.bff

```
(
[77,75,72,69,68,67,66,64,61,56,55,49,40,31,29,22,17,11,10,4],
[
"23132321122",
"32232113222",
"23113323131",
"21322313131",
"22212321312",
"11122211233",
"32321213323",
"31213313333",
"21223221322",
"11132121222",
"33312122323",
"32123213133",
"11312133322",
"33122123133",
"23223113121"
]
)
```

5.6.3 Submission Output

part04test06.output

```
"Result "  
"23132321122"  
"33332111222"  
"23112221131"  
"21322211131"  
"22212221312"  
"11122211233"  
"32321213323"  
"31213313333"  
"21223221322"  
"11133121222"  
"33313122323"  
"32123213133"  
"11211333322"  
"11111323333"  
"21111333321"  
"
```

5.6.4 Solution Output

part04test06.output

```
"Result "  
"23132321122"  
"33332111222"  
"23112221131"  
"21322211131"  
"22212221312"  
"11122211233"  
"32321213323"  
"31213313333"  
"21223221322"  
"11133121222"  
"33313122323"  
"32123213133"  
"11211333322"  
"11111323333"  
"21111333321"  
"
```

5.6.5 stderr

part04test06.err

5.7 part04test07

5.7.1 Diff

part04test07.diff

5.7.2 Input File

part04test07.bff

```
(  
[15,13,12,8,7,5,4,1],  
[  
"1121221222122",  
"1122222221121",  
"1221222122121",
```

```
"1111212221122" ,
"1212112111121" ,
"2121111222111" ,
"1221222121222" ,
"1222221122121" ,
"1222221221211" ,
"2222211222112"
]
)
```

5.7.3 Submission Output

part04test07.output

```
"Result "
"2221221222222"
"2222222222221"
"2222222222221"
"2222222222222"
"2222222222222"
"2122222222222"
"1222222222222"
"1222222222222"
"1222222222222"
"2222222222222"
"
```

5.7.4 Solution Output

part04test07.output

```
"Result "
"2221221222222"
"2222222222221"
"2222222222221"
"2222222222222"
"2222222222222"
"2122222222222"
"1222222222222"
"1222222222222"
"1222222222222"
"2222222222222"
"
```

5.7.5 stderr

part04test07.err

5.8 part04test08

5.8.1 Diff

part04test08.diff

5.8.2 Input File

part04test08.bff

```
(
[52,51,50,49,48,46,45,44,43,42,40,37,36,33,20,19,18,16,15,14,12,11,10,8,7,5,2] ,
[
"321312112" ,
```

```

"231122223",
"332121231",
"313111232",
"221322221",
"111231223",
"112311222",
"231322122",
"222222111",
"313121212",
"213112321",
"121131213",
"211233313"
]
)

```

5.8.3 Submission Output

part04test08.output

```

"Result"
"331322113"
"331122221"
"333121232"
"313111232"
"331322221"
"111231223"
"112311222"
"231322122"
"222222111"
"312121113"
"212111111"
"111131113"
"211133313"
""

```

5.8.4 Solution Output

part04test08.output

```

"Result"
"331322113"
"331122221"
"333121232"
"313111232"
"331322221"
"111231223"
"112311222"
"231322122"
"222222111"
"312121113"
"212111111"
"111131113"
"211133313"
""

```

5.8.5 stderr

part04test08.err

5.9 part04test09

5.9.1 Diff

part04test09.diff

5.9.2 Input File

part04test09.bff

```
(
[68,67,65,63,61,59,56,55,51,50,48,46,45,44,43,42,41,40,38,37,35,34,32,31,30,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1]
[
"231423341243",
"312211442312",
"223342123111",
"324311432244",
"212211313131",
"211243114144",
"214432122124",
"114441143423",
"131431442124",
"211142114332"
]
)
```

5.9.3 Submission Output

part04test09.output

```
"Result "
"432421141244"
"332211442322"
"334442143222"
"334411133344"
"332211333341"
"333243333344"
"334432322334"
"334443343434"
"331433442333"
"211142334333"
""
```

5.9.4 Solution Output

part04test09.output

```
"Result "
"432421141244"
"332211442322"
"334442143222"
"334411133344"
"332211333341"
"333243333344"
"334432322334"
"334443343434"
"331433442333"
"211142334333"
""
```

5.9.5 stderr

part04test09.err

5.10 part04test10

5.10.1 Diff

part04test10.diff

5.10.2 Input File

part04test10.bff

```
(  
[96,64,62,40,37,34,33,26,23,22,21,9],  
[  
"3111244333111",  
"1443442443131",  
"2144134144211",  
"1312131231432",  
"3143141422231",  
"4144132132411",  
"3332111333242",  
"4334432332443",  
"4212113232424",  
"2323341332211",  
"3243114441344",  
"1331214233114",  
"1111314122414",  
"4111133223114",  
"4341133121422"  
]  
)
```

5.10.3 Submission Output

part04test10.output

```
"Result "  
"3111244333111"  
"1444442443131"  
"2144134144211"  
"1311132241432"  
"3131142411131"  
"4133142131411"  
"3332111333242"  
"4334432332443"  
"4212113232434"  
"2323341332211"  
"3243114441344"  
"1331214233114"  
"1111314122414"  
"4111133223114"  
"4341133121122"  
""
```

5.10.4 Solution Output

part04test10.output

```
"Result "  
"3111244333111"  
"1444442443131"  
"2144134144211"  
"1311132241432"
```

```
"3131142411131"
"4133142131411"
"3332111333242"
"4334432332443"
"4212113232434"
"2323341332211"
"3243114441344"
"1331214233114"
"1111314122414"
"4111133223114"
"4341133121122"
"
```

5.10.5 stderr

part04test10.err

5.11 part04test11

5.11.1 Diff

part04test11.diff

5.11.2 Input File

part04test11.bff

```
(
[60,39,36,32],
[
"333331233432",
"222132224313",
"432114124442",
"213324141222",
"311341332334",
"133342212422",
"132114124223",
"222223431243",
"244444144133",
"433341213314",
"114414412412"
]
)
```

5.11.3 Submission Output

part04test11.output

```
"Result"
"333331233432"
"222132224313"
"432114124442"
"213324141222"
"311341332334"
"433342212433"
"432112124333"
"222223431343"
"244444144133"
"433341213311"
"114414412412"
"
```

5.11.4 Solution Output

part04test11.output

```
"Result "  
"333331233432"  
"222132224313"  
"432114124442"  
"213324141222"  
"311341332334"  
"433342212433"  
"432112124333"  
"222223431343"  
"244444144133"  
"433341213311"  
"114414412412"  
"
```

5.11.5 stderr

part04test11.err

5.12 part04test12

5.12.1 Diff

part04test12.diff

5.12.2 Input File

part04test12.bff

```
(  
[40,38,37,36,34,33,32,31,29,28,27,24,22,21,20,19,18,17,16,15,14,13,12,11,8,6,5,4,3,1],  
[  
"132443",  
"213124",  
"132342",  
"412323",  
"432144",  
"333414",  
"413321",  
"214224",  
"232221",  
"332222",  
"131123",  
"421133"  
]  
)
```

5.12.3 Submission Output

part04test12.output

```
"Result "  
"231443"  
"211124"  
"121442"  
"111422"  
"111411"  
"111111"  
"111111"
```

```
"111111"
"111111"
"111111"
"211111"
"211111"
""
```

5.12.4 Solution Output

part04test12.output

```
"Result"
"231443"
"211124"
"121442"
"111422"
"111411"
"111111"
"111111"
"111111"
"111111"
"111111"
"211111"
"211111"
""
```

5.12.5 stderr

part04test12.err

5.13 part04test13

5.13.1 Diff

part04test13.diff

5.13.2 Input File

part04test13.bff

```
(
[28,27,26,25,24,23,22,21,20,19,18,17,16,15,13,11,10,8,7,6,5,4,2,1],
[
"112122112211212",
"111121122212211",
"211111121122211",
"122221112212111",
"122111221212112",
"121111212112212",
"222212211121111",
"112112111122211",
"121121221121221",
"112211112122121"
]
)
```

5.13.3 Submission Output

part04test13.output

```
"Result"
"222222222211222"
```

```
"222222222212222"
"222222222112222"
"122222222222222"
"122222222222222"
"122222222222222"
"222222222222222"
"222222222222222"
"222222222222222"
"222222222222222"
"
```

5.13.4 Solution Output

part04test13.output

```
"Result "
"222222222211222"
"222222222212222"
"222222222112222"
"122222222222222"
"122222222222222"
"122222222222222"
"222222222222222"
"222222222222222"
"222222222222222"
"222222222222222"
"
```

5.13.5 stderr

part04test13.err

5.14 part04test14

5.14.1 Diff

part04test14.diff

5.14.2 Input File

part04test14.bff

```
(
[11,10,7,6,4,2],
[
"22122212",
"12211112",
"21111121",
"11122222",
"21221212",
"11111212",
"22121122"
]
)
```

5.14.3 Submission Output

part04test14.output

```
"Result "
"22222212"
"12211112"
```

```
"11111121"
"11122222"
"21221212"
"11111212"
"22121122"
""
```

5.14.4 Solution Output

part04test14.output

```
"Result"
"22222212"
"12211112"
"11111121"
"11122222"
"21221212"
"11111212"
"22121122"
""
```

5.14.5 stderr

part04test14.err

5.15 part04test15

5.15.1 Diff

part04test15.diff

5.15.2 Input File

part04test15.bff

```
(
[43,39,37,36,35,33,32,31,30,28,27,26,25,24,23,21,20,19,18,17,16,15,13,12,11,10,8,7,4,3,2,1],

[
"3331121311",
"3333123133",
"1313232113",
"1322222312",
"3121332233",
"2231313311",
"1331111221",
"2313122112",
"2223131221",
"2331212213",
"1322212113"
]
)
```

5.15.3 Submission Output

part04test15.output

```
"Result"
"2221122211"
"2222122222"
"1212222222"
"1222222222"
```

```
"2222222222"
"2222221122"
"2222222112"
"2212222222"
"2222221222"
"2221212212"
"1222212112"
""
```

5.15.4 Solution Output

part04test15.output

```
"Result"
"2221122211"
"2222122222"
"1212222222"
"1222222222"
"2222222222"
"2222221122"
"2222222112"
"2212222222"
"2222221222"
"2221212212"
"1222212112"
""
```

5.15.5 stderr

part04test15.err

5.16 part04test16

5.16.1 Diff

part04test16.diff

5.16.2 Input File

part04test16.bff

```
(
[51,50,49,48,46,44,43,42,39,32,28,27,25,24,23,22,19,18,17,16,14,12,11,10,9,8,5,3,2,1],
[
"12311413",
"32224311",
"21212222",
"11333424",
"23131321",
"12133324",
"34122213",
"43432412",
"44443442",
"31442431",
"23144133",
"32342243",
"42331242"
]
)
```

5.16.3 Submission Output

part04test16.output

```
"Result "  
"22422323"  
"22223322"  
"22222222"  
"22222423"  
"22222223"  
"32222223"  
"34222223"  
"42422422"  
"44442442"  
"31442431"  
"43244133"  
"12443333"  
"12441333"  
"
```

5.16.4 Solution Output

part04test16.output

```
"Result "  
"22422323"  
"22223322"  
"22222222"  
"22222423"  
"22222223"  
"32222223"  
"34222223"  
"42422422"  
"44442442"  
"31442431"  
"43244133"  
"12443333"  
"12441333"  
"
```

5.16.5 stderr

part04test16.err

5.17 part04test17

5.17.1 Diff

part04test17.diff

5.17.2 Input File

part04test17.bff

```
(  
[28,27,26,25,22,18,15,11,10,9,7],  
[  
"212122122",  
"121111112",  
"212211211",  
"111111121",  
"122212222",  
"211212121",  
"111122212",  

```



```
"121221222",
"211112112",
"221222111",
"212222221",
"112221211",
"221111122",
"212211222"
]
)
```

5.17.3 Submission Output

part04test17.output

```
"Result "
"212122122"
"121111112"
"211111211"
"111111121"
"122212222"
"211212121"
"111122222"
"121221222"
"211111112"
"221111111"
"211111111"
"111111111"
"111111122"
"112211222"
""
```

5.17.4 Solution Output

part04test17.output

```
"Result "
"212122122"
"121111112"
"211111211"
"111111121"
"122212222"
"211212121"
"111122222"
"121221222"
"211111112"
"221111111"
"211111111"
"111111111"
"111111122"
"112211222"
""
```

5.17.5 stderr

part04test17.err

5.18 part04test18

5.18.1 Diff

part04test18.diff

5.18.2 Input File

part04test18.bff

```
(
[23,21,19,17,15,14,13,12,10,9,8,7,6,5,4,2],
[
"21221212112111",
"12211212221111",
"12212221111111",
"11222222112212",
"12212222111222",
"21121112122211",
"11212122211112",
"22212222221222",
"11212112121111"
]
)
```

5.18.3 Submission Output

part04test18.output

```
"Result "
"22221212222222"
"22211212222222"
"22212222222222"
"22222222222222"
"22212222222222"
"21121112222222"
"11212122222222"
"22212222222222"
"22212112122222"
""
```

5.18.4 Solution Output

part04test18.output

```
"Result "
"22221212222222"
"22211212222222"
"22212222222222"
"22222222222222"
"22212222222222"
"21121112222222"
"11212122222222"
"22212222222222"
"22212112122222"
""
```

5.18.5 stderr

part04test18.err

5.19 part04test19

5.19.1 Diff

part04test19.diff

5.19.2 Input File

part04test19.bff

```
(
[60,58,57,55,51,48,47,46,45,43,42,40,38,36,33,29,28,23,21,19,11,10,2,1],
[
"34212132224",
"41444424141",
"21442112123",
"22111124241",
"33221142223",
"44332433313",
"33431121434",
"14341343323",
"44424321321"
]
)
```

5.19.3 Submission Output

part04test19.output

```
"Result "
"44212132224"
"21444424141"
"21444113122"
"22111124241"
"44221142223"
"44442233313"
"44441133414"
"42341143324"
"22221121321"
""
```

5.19.4 Solution Output

part04test19.output

```
"Result "
"44212132224"
"21444424141"
"21444113122"
"22111124241"
"44221142223"
"44442233313"
"44441133414"
"42341143324"
"22221121321"
""
```

5.19.5 stderr

part04test19.err

5.20 part04test20

5.20.1 Diff

part04test20.diff

5.20.2 Input File

part04test20.bff

```
(  
[75,73,71,69,68,66,64,63,62,61,60,57,56,55,54,52,51,50,49,47,42,39,38,35,34,33,32,31,29,28,2  
[  
"21413241",  
"24241134",  
"32231341",  
"14313132",  
"12121134",  
"23121121",  
"31413233",  
"42212314",  
"23341422",  
"14323344",  
"23244114",  
"32111112",  
"31232332",  
"23332341"  
]  
)
```

5.20.3 Submission Output

part04test20.output

```
"Result "  
"43412144"  
"43141134"  
"11131341"  
"14111433"  
"12114434"  
"22114444"  
"31313244"  
"41111344"  
"11111133"  
"11113344"  
"33111334"  
"33333332"  
"31433332"  
"23333341"  
""
```

5.20.4 Solution Output

part04test20.output

```
"Result "  
"43412144"  
"43141134"  
"11131341"  
"14111433"  
"12114434"  
"22114444"  
"31313244"  
"41111344"  
"11111133"  
"11113344"  
"33111334"  
"33333332"  
"31433332"  
"23333341"
```

""

5.20.5 stderr

part04test20.err

5.21 Source Code

csce322h0mework03part04.hs

```
1 import Prelude
2 import System.Environment ( getArgs )
3 import Data.List
4 import Data.Char
5 import Helpers
6
7 -- The main method that will be used for testing / comgand line access
8 main = do
9     args <- getArgs
10    filename <- readFile (head args)
11    (moves,game) <- readBattleFloodFile filename
12    print ("Result")
13    printGame (manyPlayersManyMoves game moves (selectPlayers game (generatePositions
game) 2))
14
15
16 selectPlayers :: [[Char]] -> [(Int, Int)] -> Int -> [Char]
17 -- selectPlayers game positionsToCheck max
18 selectPlayers game [] 4 = "1234"
19 selectPlayers game [] 3 = "123"
20 selectPlayers game [] 2 = "12"
21 selectPlayers game (h:t) max
22     | ((charToInt (get game h)) == 4) = "1234"
23     | ((charToInt (get game h)) == 3) && (max <= 3) = selectPlayers game t
24     | otherwise = selectPlayers game t
25
26 charToInt :: Char -> Int
27 charToInt character
28     | (character == '1') = 1
29     | (character == '2') = 2
30     | (character == '3') = 3
31     | otherwise = 4
32
33 -- YOUR CODE SHOULD COME AFTER THIS POINT
34 manyPlayersManyMoves :: [[Char]] -> [Int] -> [Char] -> [[Char]]
35 manyPlayersManyMoves game [] _ = game
36 manyPlayersManyMoves game (move:moves) player = manyPlayersManyMoves (changeCluster
game (findCluster game [] [(0,0)] move 1) (head (player))) moves (incrementPlayer
player)
37
38 incrementPlayer :: [Char] -> [Char]
39 incrementPlayer (h:t) = (t ++ [h])
40
41
42 findCluster :: [[Char]] -> [(Int, Int)] -> [(Int, Int)] -> Int -> Int -> [(Int, Int)]
43 -- game checkedPositions currentPosition move counter = positions representing cluster
number of move
44 findCluster game checkedPositions currentPosition move counter
```

```

45         | ((move*2) == counter) || ((move*2-1) == counter) = findNeighbors
game currentPosition checkedPositions
46         | ((move*2) < counter) || ((move*2-1) < counter) = []
47         | otherwise = findCluster game (removeDuplicates (
checkedPositions ++ (findNeighbors game currentPosition checkedPositions))) (
removeDuplicates passingCurrent) move (counter+1)
48         where newPosition = [n|n<-(generatePositions game),(not (elem n
checkedPositions))]
49         passingCurrent = [x|x<-newPosition, (x == (head newPosition))
]
50
51 changeCluster :: [[Char]] -> [(Int, Int)] -> Char -> [[Char]]
52 -- game clusterPositions player = game with changed cluster to player
53 changeCluster game [] _ = game
54 changeCluster game (h:clusters) player = (changeCluster (set game h player) clusters
player)
55
56 -- Code written together in class that is copied and pasted from the website...as I
understand we are allowed to use this
57 findNeighbors :: [[Char]] -> [(Int,Int)] -> [(Int,Int)] -> [(Int,Int)]
58 -- findNeighbors game positionsToCheck positionsChecked
59 findNeighbors _ [] _ = []
60 findNeighbors game (position:positions) checked = position:(findNeighbors game (
positions++usefulNeighbors) (position:checked))
61         where positionNeighbors = generateNeighbors position game
62         usefulNeighbors = [n|n<-positionNeighbors,(get game n)==(get game
position),(not (elem n positions)),(not (elem n checked))]
63
64 generatePositions :: [[a]] -> [(Int,Int)]
65 -- generate all positions for a given game
66 -- 8x7 game should generate (0,0), (0,1), ..., (0,6), (1,0), ..., (7,6)
67 generatePositions game = positions
68         where nRows = length game
69         nCols = length (head game)
70         positions = [(r,c)|r<-[0..(nRows-1)],c<-[0..(nCols-1)]]
71
72 generateNeighbors :: (Int,Int) -> [[a]] -> [(Int,Int)]
73 generateNeighbors (r,c) game = neighbors
74         where nRows = length game
75         nCols = length (head game)
76         above = [(row,col)|row<-[(r-1)],col<-[c],r>0]
77         below = [(row,col)|row<-[(r+1)],col<-[c],r<(nRows-1)]
78         left = [(row,col)|row<-[r],col<-[(c-1)],c>0]
79         right = [(row,col)|row<-[r],col<-[(c+1)],c<(nCols-1)]
80         neighbors = above ++ below ++ left ++ right
81
82
83 removeDuplicates :: Ord a => [a] -> [a]
84 -- remove duplicates from a list
85 -- abc
86 removeDuplicates [] = []
87 removeDuplicates [x] = [x]
88 removeDuplicates (h:t)
89     | h == n = removeDuplicates (h:ta)
90     | otherwise = h:(removeDuplicates t)
91     where n = head t
92           ta = tail t
93
94
95 set :: [[a]] -> (Int,Int) -> a -> [[a]]

```

```

96 -- set game position element = game with position replaced by element
97 set (row:rows) (0,c) el = (setCol row c el):rows
98 set (row:rows) (r,c) el = row:(set rows (r-1,c) el)
99
100 setCol :: [a] -> Int -> a -> [a]
101 setCol (_:cols) 0 el    = el:cols
102 setCol (col:cols) c el  = col:(setCol cols (c-1) el)
103
104
105 get :: [[a]] -> (Int,Int) -> a
106 -- get game position = element at that position in the game
107 get (row:_) (0,c)      = getCol row c
108 get (_:rows) (r,c)     = get rows ((r-1),c)
109
110 getCol :: [a] -> Int -> a
111 -- getCol row position = element at that position in the row
112 getCol (col:_) 0       = col
113 getCol (_:cols) c      = getCol cols (c-1)

```