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

Contents

Chapter 1

Metadata

1.1 Submitted Files

handin.time

```
03/30/2017 09:59:04 skasper: csce322h0mework03part01.hs  - OK
03/30/2017 09:59:08 skasper: csce322h0mework03part02.hs  - OK
03/30/2017 09:59:12 skasper: csce322h0mework03part03.hs  - OK
03/30/2017 09:59:17 skasper: csce322h0mework03part04.hs  - OK
03/31/2017 23:03:47 skasper: csce322h0mework03part01.hs  - OK
03/31/2017 23:08:35 skasper: csce322h0mework03part01.hs  - OK
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04/01/2017 14:52:46 skasper: csce322h0mework03part01.hs  - 1 day late
04/01/2017 14:54:47 skasper: csce322h0mework03part01.hs  - 1 day late
04/01/2017 15:02:55 skasper: csce322h0mework03part01.hs  - 1 day late
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04/01/2017 15:28:16 skasper: csce322h0mework03part01.hs  - 1 day late
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```
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04/01/2017 18:26:23 skasper: csce322h0mework03part01.hs  - 1 day late
04/01/2017 18:39:19 skasper: csce322h0mework03part01.hs  - 1 day late
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04/01/2017 19:22:48 skasper: csce322h0mework03part04.hs  - 1 day late
04/01/2017 19:25:38 skasper: csce322h0mework03part04.hs  - 1 day late
04/01/2017 19:29:23 skasper: csce322h0mework03part04.hs  - 1 day late
04/01/2017 19:31:35 skasper: csce322h0mework03part04.hs  - 1 day late
04/01/2017 19:34:50 skasper: csce322h0mework03part04.hs  - 1 day late
04/01/2017 19:42:07 skasper: csce322h0mework03part04.hs  - 1 day late
04/01/2017 19:48:47 skasper: csce322h0mework03part04.hs  - 1 day late
04/01/2017 19:42:07 skasper: csce322h0mework03part04.hs  - Deleted by User
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04/01/2017 22:55:53 skasper: csce322h0mework03part04.hs  - 1 day late
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04/02/2017 03:37:07 skasper: csce322h0mework03part04.hs  - 2 days late
04/02/2017 03:40:36 skasper: csce322h0mework03part04.hs  - 2 days late
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04/02/2017 14:35:22 skasper: csce322h0mework03part04.hs  - 2 days late
04/02/2017 14:38:13 skasper: csce322h0mework03part04.hs  - 2 days late
04/02/2017 14:44:53 skasper: csce322h0mework03part04.hs  - 2 days late
04/02/2017 15:50:37 skasper: csce322h0mework03part04.hs  - 2 days late
04/02/2017 15:51:50 skasper: csce322h0mework03part04.hs  - 2 days late
```

```
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04/02/2017 15:56:37 skasper: csce322h0mework03part04.hs  - 2 days late
04/02/2017 17:22:23 skasper: csce322h0mework03part04.hs  - 2 days late
04/02/2017 17:31:14 skasper: csce322h0mework03part04.hs  - 2 days late
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1.2 webgrader Runs

webgrader.time

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2017-04-01T14:27:22-0500 76.84.143.92  skasper 0003
2017-04-01T14:30:58-0500 76.84.143.92  skasper 0003
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2017-04-01T14:37:07-0500 76.84.143.92  skasper 0003
2017-04-01T14:41:02-0500 76.84.143.92  skasper 0003
2017-04-01T14:42:58-0500 76.84.143.92  skasper 0003
2017-04-01T14:45:35-0500 76.84.143.92  skasper 0003
2017-04-01T14:46:47-0500 76.84.143.92  skasper 0003
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2017-04-01T15:16:39-0500 76.84.143.92  skasper 0003
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2017-04-01T15:26:19-0500 76.84.143.92  skasper 0003
2017-04-01T15:28:20-0500 76.84.143.92  skasper 0003
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2017-04-01T17:41:08-0500 76.84.143.92  skasper 0003
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2017-04-01T19:36:07-0500 76.84.143.92  skasper 0003
2017-04-01T19:41:19-0500 76.84.143.92  skasper 0003
2017-04-01T19:42:35-0500 76.84.143.92  skasper 0003
2017-04-01T19:49:24-0500 76.84.143.92  skasper 0003
2017-04-01T20:01:52-0500 76.84.143.92  skasper 0003
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2017-04-02T15:54:35-0500 76.84.143.92  skasper 0003
2017-04-02T15:56:41-0500 76.84.143.92  skasper 0003
```

```
2017-04-02T17:22:27-0500 76.84.143.92  skasper 0003
2017-04-02T17:31:44-0500 76.84.143.92  skasper 0003
2017-04-02T17:35:21-0500 76.84.143.92  skasper 0003
2017-04-02T17:40:46-0500 76.84.143.92  skasper 0003
2017-04-02T17:42:07-0500 76.84.143.92  skasper 0003
2017-04-02T17:47:43-0500 76.84.143.92  skasper 0003
```

1.3 diffs

submission.diffs

Chapter 2

csce322h0mework03part01.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

```
(
[92,91,90,89,88,87,86,85,84,83,81,80,79,78,77,76,75,74,73,71,70,69,68,67,66,65,64,63,62,61,6

[
"41444234123243",
"23222144213241",
"43134223111122",
"43314244321211",
"14112232221223",
"23143441113124",
"43241212412222",
"24433343111143",
"14233332232434",
"24233132243112",
"13243243414443",
"11412134214414"
]
)
```

3.1.3 Submission Output

part02test01.output

```
"Result"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
""
```

3.1.4 Solution Output

part02test01.output

```
"Result"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
"11111111111111"
""
```

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

[
"2121113312",
"1133133134",
"4213443333",
"4214443332",
"2233334412",
"1414323222",
"4211441234",
"3114213213",
"2433343231",
"3343142432",
"3141134324"
]
)
```

3.2.3 Submission Output

part02test02.output

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

```
"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

```
(
[73,72,71,70,69,68,67,66,65,64,63,62,61,60,59,58,57,56,55,54,53,52,51,50,49,48,47,46,45,44,4

[
"24211314313",
"14341324143",
"43433331341",
"41134313414",
"41344113441",
"22414124114",
"21324213421",
"22232233241",
"21134431142",
"14344414442",
"44233213334",
"41134422132",
"44223343144"
]
)
```

3.3.3 Submission Output

part02test03.output

```
"Result"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
""
```

3.3.4 Solution Output

part02test03.output

```
"Result"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
""
```

3.3.5 stderr

part02test03.err

3.4 part02test04

3.4.1 Diff

part02test04.diff

3.4.2 Input File

part02test04.bff

```
(
[22,19,17,16,15,12,11,9,7,6,5,4,3,1],
[
"21221122",
"11212221",
"22112221",
"11121211",
"22112221",
"22111121",
"11211112",
```

```
"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

```
(
[42,41,40,39,38,37,36,35,34,33,32,31,30,29,28,27,26,25,24,23,22,21,19,18,16,15,14,13,12,11,1

[
"44242121314",
"43434232111",
"22442433113",
"42341143131",
"11124433342",
"43313131134",
"44434411122"
]
)
```

3.6.3 Submission Output

part02test06.output

```
"Result"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
""
```

3.6.4 Solution Output

part02test06.output

```
"Result"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
"11111111111"
""
```

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"
""
```

3.9.4 Solution Output

part02test09.output

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

```
"2121122"
"1111122"
"1111111"
"1111111"
"1111111"
""
```

3.9.5 stderr

part02test09.err

3.10 part02test10

3.10.1 Diff

part02test10.diff

3.10.2 Input File

part02test10.bff

```
(
[60,58,57,56,55,54,53,52,51,50,49,48,46,45,43,41,40,39,38,37,35,34,32,31,30,29,28,26,25,24,2

[
"3132112111111",
"3312312424342",
"1221344243411",
"1313344121322",
"1443411143432",
"3212431334241",
"1142421432423",
"1442211234134"
]
)
```

3.10.3 Submission Output

part02test10.output

```
"Result"
"3111111111111"
"3311111111142"
"1221144111411"
"1111144111111"
"1111111111111"
"1111111111111"
"1111111111111"
"1111111111111"
""
```

3.10.4 Solution Output

part02test10.output

```
"Result"
"3111111111111"
"3311111111142"
"1221144111411"
"1111144111111"
"1111111111111"
"1111111111111"
```

```
"1111111111111"
"1111111111111"
""
```

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

```
(
[63,62,61,60,59,58,57,56,55,54,53,52,51,50,49,48,47,46,45,44,43,42,41,40,39,38,37,36,35,34,3

[
"32243421314234",
"44211432332222",
"33222131233231",
"11144243341334",
"31324412342242",
"23424333333243",
"31111244433314",
"22242443313442",
"23333133124334"
]
)
```

5.3.3 Submission Output

part04test03.output

```
"Result"
"44444414422232"
"44444444442222"
"44444444444244"
"44444444444444"
"44444444444444"
"44444444444444"
"44444444444444"
"44444441124444"
"41111411144221"
""
```

5.3.4 Solution Output

part04test03.output

```
"Result"
"44444414422232"
"44444444442222"
```

```
"44444444444244"
"44444444444444"
"44444444444444"
"44444444444444"
"44444444444444"
"44444441124444"
"41111411144221"
""
```

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

```
(
[48,47,46,45,44,43,42,41,40,39,38,37,36,35,34,33,32,31,30,29,28,27,26,25,24,23,22,21,20,19,1

[
"121142",
"134141",
"134242",
"111333",
"434232",
"322411",
"432234",
"224241",
"314314",
"122134",
"323342",
"132423",
"114411"
]
)
```

5.5.3 Submission Output

part04test05.output

```
"Result"
"434444"
"434444"
"434444"
"444444"
"444444"
"444444"
"434444"
"444444"
"444444"
"444444"
"444444"
```

```
"444444"
"444444"
""
```

5.5.4 Solution Output

part04test05.output

```
"Result"
"434444"
"434444"
"434444"
"444444"
"444444"
"444444"
"434444"
"444444"
"444444"
"444444"
"444444"
"444444"
"444444"
""
```

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

```
(
[68,67,65,63,61,59,56,55,51,50,48,46,45,44,43,42,41,40,38,37,35,34,32,31,30,27,26,25,24,23,2

[
"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"
"222222221122222"
"122222222222222"
"122222222222222"
"122222222222222"
"222222222222222"
"222222222222222"
"222222222222222"
"222222222222222"
""
```

5.13.4 Solution Output

part04test13.output

```
"Result"
"222222222211222"
"222222222212222"
"222222221122222"
"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
       3
24                 | otherwise                                     = selectPlayers game t
       max
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)
```