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1 import java.time.Year;
2
3 public class GameOfLife {
4
5     public static void main(String[] args) {
6         String fileName = args[0];
7         // Uncomment the test that you want to execute, and re-compile.
8         // (Run one test at a time).
9         // read(fileName);
10        // test1(fileName);
11        // test2(fileName);
12        // test3(fileName, 3);
13        play(fileName);
14    }
15
16    // Reads the data file and prints the initial board.
17    private static void test1(String fileName) {
18        int[][] board = read(fileName);
19        print(board);
20    }
21
22    // Reads the data file, and runs a test that checks
23    // the count and cellValue functions.
24    private static void test2(String fileName) {
25        int[][] board = read(fileName);
26        for (int i = 0; i < board.length; i++) {
27            for (int j = 0; j < board[i].length; j++) {
28                System.out.printf("%3s", cellValue(board, i, j));
29            }
30            System.out.printf("%n");
31        }
32    }
33
34    // Reads the data file, plays the game for Ngen generations,
35    // and prints the board at the beginning of each generation.
36    private static void test3(String fileName, int Ngen) {
37        int[][] board = read(fileName);
38        for (int gen = 0; gen < Ngen; gen++) {
39            System.out.println("Generation " + gen + ":");
40            print(board);
41            board = evolve(board);
42        }
43    }
44
45    // Reads the data file and plays the game, for ever.
46    private static void play(String fileName) {
47        int[][] board = read(fileName);
48        while (true) {
49            show(board);
50            board = evolve(board);
51        }
52    }
53
54    // Reads the data from the given fileName, uses the data to construct the
55    // initial board,
56    // and returns the initial board. Live and dead cells are represented by 1 and
57    // 0, respectively.
58    private static int[][] read(String fileName) {
59        StdIn.setInput(fileName);
60        if (StdIn.isEmpty()) {

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61         System.out.println("The input file is empty. Please enter other file");
62         System.exit(0);
63     }
64     int rows = Integer.parseInt(StdIn.readLine());
65     int cols = Integer.parseInt(StdIn.readLine());
66     int[][] board = new int[rows][cols];
67     for (int i = 0; i < rows; i++) {
68         String row = StdIn.readLine();
69         for (int j = 0; j < row.length(); j++) {
70             if (i == 0 || i + 1 == rows) {
71                 board[i][j] = 0;
72             } else if (j == 0 || j + 1 == cols) {
73                 board[i][j] = 0;
74             } else if (row.charAt(j) == 'x') {
75                 board[i][j] = 1;
76             } else {
77                 board[i][j] = 0;
78             }
79         }
80     }
81     return board;
82 }
83
84 // Creates a new board from the given board, using the rules of the game.
85 // Returns the new board.
86 private static int[][] evolve(int[][] board) {
87     int[][] nextStageBoard = new int[board.length][board[0].length];
88     for (int i = 0; i < board.length; i++) {
89         for (int j = 0; j < board[i].length; j++) {
90             nextStageBoard[i][j] = cellValue(board, i, j);
91         }
92     }
93     return nextStageBoard;
94 }
95
96 // Returns the value that cell (i,j) should have in the next generation.
97 private static int cellValue(int[][] board, int i, int j) {
98     if (board[i][j] == 1) {
99         if (count(board, i, j) < 2) {
100
101             return 0;
102         } else if (count(board, i, j) > 3) {
103             return 0;
104         } else if (count(board, i, j) == 2 || count(board, i, j) == 3) {
105             return 1;
106         }
107     } else if (count(board, i, j) == 3) {
108         return 1;
109     }
110     return 0;
111 }
112
113 // Counts and returns the number of living neighbors of the given cell.
114 private static int count(int[][] board, int i, int j) {
115     int counter = 0;
116     for (int row = -1; row <= 1; row++) {
117         for (int col = -1; col <= 1; col++) {
118             if (row != 0 || col != 0) {
119                 if ((i + row) < 0 || (i + row) >= board.length) {
120                     break;
121                 } else if ((j + col) < 0 || (j + col) >= board[i].length) {

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122         break;
123     } else if (board[i + row][j + col] == 1) {
124         counter++;
125     }
126 }
127 }
128 }
129 return counter;
130 }
131
132 // Prints the board. Alive and dead cells are printed as 1 and 0, respectively.
133 private static void print(int[][] arr) {
134     for (int i = 0; i < arr.length; i++) {
135         for (int j = 0; j < arr[i].length; j++) {
136             System.out.printf("%3s", arr[i][j]);
137         }
138         System.out.printf("%n");
139     }
140 }
141
142 // Displays the board. Living and dead cells are represented by black and white
143 // squares, respectively.
144 private static void show(int[][] board) {
145     StdDraw.setCanvasSize(900, 900);
146     int rows = board.length;
147     int cols = board[0].length;
148     StdDraw.setXscale(0, cols);
149     StdDraw.setYscale(0, rows);
150     StdDraw.show(100); // delay the next display 100 milliseconds
151     for (int i = 0; i < rows; i++) {
152         for (int j = 0; j < cols; j++) {
153             int grey = 255 * (1 - board[i][j]);
154             StdDraw.setPenColor(grey, grey, grey);
155             StdDraw.filledRectangle(j + 0.5, rows - i - 0.5, 0.5, 0.5);
156         }
157     }
158     StdDraw.show();
159 }
160 }

```