Delta College

CST 283
Programming Assignment 4

Fall 2020
Instructor: T. Klingler

Objective

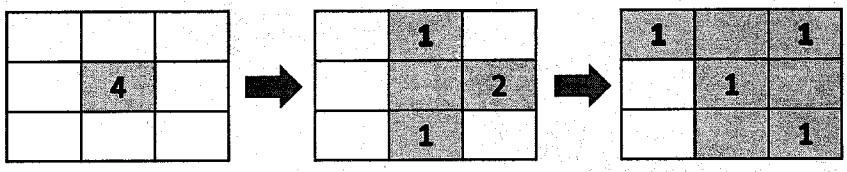
This program provides an opportunity to practice use of two-dimensional arrays.

Overview & Instructions

Anticipating the inevitable zombie apocalypse, the government has challenged you with the task of creating a model that will describe how quick a group of zombies move from a starting point to cover a given area.

The walking area can be seen as an n-by-n two-dimensional array. A number of zombies will start at the center. Each zombie individually can only make one step at a time to the left, right, up, or down (with an equal chance for any direction). Be sure to take into account the boundary cells to disallow zombines from leaving the area. You will need to "mark" the array cells visited by the zombies. Once marked, these stay marked even considering a zombie may return to the zone.

An example scenario could be what you see below. Four zombies start in the middle. Each one can move in any direction. Note the locations of the zombies after 1 step and further with two steps. The gray cells are marked as visited. Since the movement of the zombies is random and there is an equal chance they could move in any direction (excluding out-of-bounds moves), this is only one of many scenarios.



Your simulation input should include two variables: the number of zombies and the dimensions of the grid. These could be via program constants or as user input. The simple output of the simulation is to be the number of steps required to mark the entire grid area.

Your program should help to formulate and test a hypothesis about the number of steps taken before all cells are touched. Run the program several times in order to report back to the government bosses with a summary of steps as a function of grid size and zombie count.

Finally, include a feature that would allow someone (i.e. your instructor) to see your simulation to validate correctness. This does not imply the use of a graphical user interface, but instead could be a feature that could be enabled to send text messages to the console to show the step-by-step behavior of your zombies in motion.

Deliverables

Deliver the following to the online course management system **Assignment** dropbox:

- **Upload** your **source code** (.java) file(s)
- Summary table of several program executions with steps as a function of grid size and zombie count

Notice

This is an individual assignment. You must complete this assignment on your own. You may not discuss your work in detail with anyone except the instructor. You may not acquire from any source (e.g., another student or an internet site), a partial or complete solution to a problem or project that has been assigned. You may not show another student your solution to an assignment. You may not have another person (current student, former student, tutor, friend, anyone) "walk you through" how to solve the assignment.