Programming Assignment 1

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1 Deadline

2/20/2020

2 Petri dish

Dr. Smartperson has colonized a group of cells that arrange themselves into interesting shapes once they are exposed to a certain type of radiation. These cells have all been categorized and arranged in separate jars (indexed by alphabet letter) based on the shapes that they make. Later on, he plans to test each jar separately to make sure that the shapes that the cells form are all correct. Obviously, every cell that is in a particular jar should theoretically make the same shape as every other cell in that jar.

A graduate student wanders into the lab and manages to spill every single jar into a single petri dish. Dr. Smartperson is not amused.

He puts the petri dish under the microscrope and sees the various shapes. On a large sheet of graph paper, he marks the squares that he sees are occupied by a cell. He now needs to reassign letters to the various shapes and designate which letter is associated with which square of the graph paper.

A square is adjacent to another square if it is horizontal, vertical, or diagonal from it. You may assume that any cell-filled square that is adjacent to another cell-filled square is part of the same shape.

Your goal will be to identify the shapes, keeping in mind that 90 degree rotations and mirror images are to be considered the same shape, and label them with lowercase letters. (It is guaranteed that there will be at most 26 different shapes in the petri dish.) In the petri dish, all cell-occupied squares are noted with the character *. Your goal will be to replace *every* * character with a character from a to z (lowercase) indicating to which shape it belongs. The first shape should be labeled with a, the second with b, and so on.

For examples of simple and more complex petri dishes, see the examples.