

Data Structure
Additional Problems
Cycle 1

1. Given a dictionary and $M \times N$ board where any cell has one character. Write a program to find all possible words that can be formed by a sequence of adjacent characters. You can move to any of the 8 adjacent characters, but word should not have multiple instance of same cell.
2. A Maze is given as $N \times N$ binary matrix of blocks where source block is the upper left most block i.e., `maze[0][0]` and destination block is lower rightmost block i.e., `maze[N-1][N-1]`. A rat starts from source and has to reach the destination. The rat can move only in two directions: forward and down. In the maze matrix, 0 means the block is a dead end and 1 means the block can be used in the path from source to destination. Note that this is a simple version of the typical Maze problem.

Modify the program such that rat can move in 4 directions and a more complex version can be with a limited number of moves.

3. Given an array, print the Next Greater Element (NGE) for every element. The Next greater Element for an element x is the first greater element on the right side of x in the array. Elements for which no greater element exist, consider the next greater element as -1. (Complexity should be less than $O(n^2)$)
4. Given a list of prices of a stock for N days. Write a program to find the stock span for each day. **Stock span** can be defined as the number of consecutive days before the current day where the price of the stock was equal to or less than the current price.
5. You have three stacks of cylinders where each cylinder has the same diameter, but they may vary in height. You can change the height of a stack by removing and discarding its topmost cylinder any number of times. Write a program to find the maximum possible height of the stacks such that all of the stacks are exactly the same height. This means you must remove zero or more cylinders from the top of zero or more of the three stacks until they are all the same height, then return the height.