

Question 1

Your senior Kshitij did a course in geography two years ago. In order to easily memorize their names, he prepared a sorted list of all the Indian states. You borrowed the list from him for a similar course this year. As you would know, India now has a new state (Telangana). Your task is to write code to insert Telangana in Kshitij's list. Make sure that your code is general enough so that we can invoke it even if USA declares a new state. Extra credit if your code supports renaming/merging states.

Question 2

For this question, you are to generalize the notion of transposition for matrices to lists of strings. Recall that the transpose of a matrix is a new matrix where the rows become columns and vice-versa. Similarly, one might attempt to transpose of a list of strings. Transposition is the following map:

K	R	I	T	A	R	T	H
N	E	E	R	A	J		
D	H	A	I	R	Y	A	
V	I	K	A	S			
M	A	Y	A	N	K		



K	N	D	V	M
R	E	H	I	A
I	E	A	K	Y
T	R	I	A	A
A	A	R	S	N
R	J	Y	K	
T	A			
H				

Here, the original list is [KRITARTH, NEERAJ, DHAIRYA, VIKAS, MAYANK] and the transposed list is [KNDVM, REHIA, IEAKY, TRIAA, AARSN, RJKY, TA, H]. Write code to accomplish this. When would the transposing the transpose give you the original list?

Question 3

Everyone in your group calls Aryan Garg as the Angry Raga. Observe that the two strings have exactly the same letters (ignore case). As one of the methods in your code to generate cool nicknames like this, you want to check if two strings have this property. Specifically, the method should take a name and a nickname and output whether the two have the same letters. Turn in an implementation of the method. What is the time complexity of your implementation?

Question 4

Read about scrabble. The core task in this popular game is to generate valid words from tiles on your rack. A word is valid if it is in a dictionary (a list of strings). Each tile has a score on it. The score of a word is the sum of scores of all the tiles in that word. Write a program to calculate the highest scoring word that can be formed with the n tiles on your rack. Take the standard scrabble score for each letter. Extra credit: Have support for blank tiles.