

Exercise Sheet 8

complete until Tuesday, December 15th

Exercise 1

Prove that the following holds. If x and y are two strings with edit distance d , then there exists a rotation x' of x and a rotation y' of y , such that x' and y' have a common prefix of length at least $\lceil L/d \rceil - 1$, where $L = \max\{|x|, |y|\}$ is the length of the longer of the two strings.

Give an example, where the length is *exactly* $\lceil L/d \rceil - 1$. What is the maximal length of the common prefix for given L and δ ? Prove that this is indeed the maximal length, and give an example where that maximal length is achieved.

Exercise 2

Given two words x and y , let ℓ be the number of k -grams which x and y have in common. Then give a formula for the k -gram Jaccard distance $J(x, y)$ (= the Jaccard coefficient of the sets of k -grams of x and y , respectively) in terms of ℓ , $|x|$, $|y|$, and k . Prove that the formula is correct and verify it by three different examples.

Exercise 3

Prove that for every optimal sequence of edit distance transformations (each one of: insert, delete, replace) to get from a string x to a string y , there is a sequence with the same number of transformations that is *monotone*, as defined in the lecture (in short: subsequent operations are at strictly increasing positions, except that an operation directly after a delete may also be at the same position; the position of an operation is simply the position of the character in the current string that is being inserted / deleted / replaced).

Exercise 4

Sit down and think about what you liked / did not like about the course, the lecturer, the exercises, the tutorials, etc. so far. Then write down the results of this thought process. Don't be shy with either praise or criticism, write down your honest experiences and feelings. Don't be rude though, also criticism can be formulated politely without compromising its contents. Also don't forget that we are human beings too, trying our best, etc. Don't upload your feedback to the Wiki, just hand it over to one of us on an anonymous piece of paper. On the PDF you upload

to the Wiki just confirm that you handed over your feedback. If you write by hand, please write legible.