Universität Greifswald
Institute für Mathematik and Informatik
Marc Hellmuth

3. Übung "Bioinformatik", SS 16

Aufgabe 1: (5 Credits)
For a given string T and the pattern P, the worst-case time complexity of the brute-force pattern matching algorithm is in $O(|P|(|T| - |P| + 1))$.
Give an example of a string T and a pattern P such that the brute-force pattern matching algorithm indeed performs $|P|(|T| - |P| + 1)$ comparisons of characters to find *one* occurence of P in T.
This illustrates that the bound is actually tight.

Aufgabe 2: (7.5 Credits)
Use the existence of a linear-time exact matching algorithm to solve the following problem in linear time. Given two strings α und β, determine if α is a cyclic (or circular) shift of β.

Aufgabe 3: (7.5 Credits)
Show that the Edit-Distance of two strings u and v is the same as the Edit-Distance of the inverted strings u^{-1} and v^{-1}, i.e.,

$$\text{Edit-Distance}(u, v) = \text{Edit-Distance}(v^{-1}, u^{-1}),$$

where $w^{-1} = w_k w_{k-1} \dots w_2 w_1$ whenever $w = w_1 w_2 \dots w_{k-1} w_k$.

Deadline: Monday - May 9, 2015 - 2.00pm