CMSC858W Homework 1
Handed out: Feb 16, 2010
Due: Feb 23, 2010

1. For each of the n prefixes of P, we want to know whether prefix P[1..i] is a periodic string. That is, for each i we want to know the largest $k > 1$ (if there is one) s.t. P[1..i] can be written as a^k for some string a. Of course, we also want to know the period. Show how to determine this for all n prefixes in linear time in the length of P.

2.. Given two strings of equal length A and B, describe a linear time algorithm that can determine if one of the strings is a circular rotation of the other string.

3. Describe an algorithm that uses a suffix tree to compute the sp_i values used by the KMP algorithm.

4. Given two input strings S_1 and S_2 and a parameter k, a k-cover C is a set of substrings of S_1, each of length k or greater, such that S_2 can be expressed as the concatenation of the substrings of S_1 in some order. Note that the substrings can overlap in S_1 but not in S_2. Give a linear-time algorithm to find a k-cover from two strings, or to determine that no such cover exists.