Interview Questions: Substring Search

3/3 points earned (100%)

Excellent!

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1 / 1 points

1.

Cyclic rotation of a string. A string s is a cyclic rotation of a string t if s and t have the same length and s consists of a suffix of t followed by a prefix of t. For example, "winterbreak" is a cyclic rotation of "breakwinter" (and vice versa). Design a linear-time algorithm to determine whether one string is a cyclic rotation of another.

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Thank you for your response.

Hint: Use Knuth–Morris–Pratt.

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1 / 1 points

2.

Tandem repeat. A tandem repeat of a base string b within a string s is a substring of s consisting of at least one consecutive copy of the base string b. Given b and s, design an algorithm to find a tandem repeat of b within s of maximum length. Your algorithm should run in time proportional to $m + n$, where m is length of b and n is the length s.

For example, if s is "abcabcababcaba" and b is "abcab", then "abcababcab" is the tandem substring of maximum length (2 copies).

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Thank you for your response.

Hint: use Knuth–Morris–Pratt.

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1 / 1 points

3.

Longest palindromic substring. Given a string s, find the longest substring that is a palindrome in expected linearithmic time.

Signing bonus: Do it in linear time in the worst case.

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Thank you for your response.

Hint: use given a parameter L, find all palindromic substrings of length exactly L in linear time using a Karp-Rabin strategy.

Hint (signing bonus): To do it in linear time in the worst case, use *Manacher's algorithm* or suffix trees.