Interview Questions: Substring Search

Warning: The hard deadline has passed. You can attempt it, but **you will not get credit for it**. You are welcome to try it as a learning exercise.

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Question 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.

Question 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).

Question 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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