

# Interview Questions: Substring Search (ungraded)

Practice Quiz • 30 min

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TO PASS 1% or higher

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## Interview Questions: Substring Search (ungraded)

TOTAL POINTS 3

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.

1 / 1 point

A linear time algorithm to determine whether a string is cyclic rotation of another string.

✓ **Correct**

*Hint:* Use Knuth-Morris-Pratt.

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  $s$ .

1 / 1 point

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

maximum length of Tandem Repeat.

✓ **Correct**

*Hint:* use Knuth-Morris-Pratt.

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

1 / 1 point

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

Find the longest substring that is a palindrome in expected linearithmic time.

✓ **Correct**

*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.