Indian Institute of technology, Guwahati
Department of Computer Science and Engineering
Data Structure Lab: (CS210)
Offline Assignment: 10

Date: 30th October 2017. **Total Marks: 30**
Deadline: 10PM, 5th November 2017. (Hard Deadline)

Note: You have to have to do both the questions using hashing otherwise will be awarded zero.

1. **[Equal Substring]** You are given a **string S** (containing English small letters only) as input. We are considering 1-based indexing for S.
   Next, you are given **Q queries**. Each query has four space separated integers: i, j, k, l. You have to write a program to find whether substring S[i : j] is equal to substring S[k : l] or not. If both are equal, print "YES", otherwise print "NO". **[15]**

   Input Format:
   First line will contain a string S.
   Next line will have a single integer Q denoting number of queries.
   For next Q lines, each has four space separated integers: i, j, k, l.

   Output Format:
   For each query, in a new line, print "YES" if S[i : j] is equal to S[k : l], else print "NO".

   Input Constraint:
   1<= |S| <= 10^5
   1<= Q <= 10^5
   1<= i <= j <= |S|
   1<= k <= l <= |S|
   |i-j| = |k-l|
   S will have English small letters only.

   Test:

   Input:
   abcababcbb
   3
   1 2 4 5
   1 3 6 8
   1 2 2 3

   Output:
   YES
   YES
   NO

   Explanation:
   S[1 : 2]=ab, S[4 : 5]=ab, S[1 : 3]=abc, S[6 : 8]=abc, S[1 : 2]=ab, S[2 : 3]=bc

2. **[Book and Topic]** Your friend has a famous book. To save his time in reading this book, he converted the content of the book into a string S. Now S contains only English small letters and no whitespaces.
   You like this book and take string S from him to read. But there is topic T (in the form of a string) which you don't like at all. You are removing all the occurrences of T in S. Even after removing an occurrence of T in S, if any new occurrence of T is generated, you have to remove that also.
   You don't want to consume more time in removing T from S, so can you write an efficient program for this task? [15]

   Input Format:
   There will be t test cases. Each test case will have two lines:
   - First line will contain a string S denoting content of the book.
   - Second line will contain a string T denoting topic.

   Output Format:
   For each test case, in a new line, print the string after removing all T from S.

   Input Constraint:
   1 <= T <= 10
   1<= |S| <= 10^4
   1<= |T| <= 10^4
   S and T both will have English small letters only.

   Test:

   Input:
   1
   ababccdabce
   abc

   Output:
   de

   Explanation:
   From given string "ababccdabce", if you remove "abc" starting from index 2 and 7, you will get "abcde". Again if you remove "abc" starting at index 0, you will get "de". Now you cannot remove "abc" from "de".