

Christmas Strings

Let's denote Ron's and his neighbouring classmate's string as s and t respectively. To find a minimum string s satisfying $s > t$, we need to find a maximum index i such that $s[i] > t[i]$ while $s[j] = t[j]$ for all $j < i$ and for all $j > i$, we should put the remaining letters in s in the lexicographic order of alphabets i.e. "a, b, c,, z".

Here we need prefix idea that for a particular index i in string t , it is possible to have $j < i$ such that $s[j] = t[j]$ and some letter in s greater than $t[i]$. For this purpose, $cnt[26]$ array will keep track of the letters in the string s where 'a' mapped to 0, 'b' to 1, and so on z to 25.

Therefore, we can enumerate indices from right to left and for each position i , we check whether we can put a letter with value greater than $t[i]$ at index i while all the letters with indices $j < i$ are exactly the same as $t[j]$. This can be done with complexity $O(26)$ by using $cnt[i][26]$. After we find a feasible position, we output the same letters as t before this index and output the found letter greater $t[i]$ at index i while output the "unused" letters in the order of "a,b,c,...,z" using cnt array.

```

#include<bits/stdc++.h>
using namespace std;

bool check(int len, string a, string b) {
    vector<int>cnt(26,0);
    for(int i=0; i<a.length(); i++)
        cnt[a[i]-'a']++;
    for(int i=0; i<len; i++) {
        if(cnt[b[i]-'a'] < 1) return false;
        cnt[b[i]-'a']--;
    }
    if(a.length() == len) return false;
    bool flag = false;
    for(int i = 0; i<26; i++)
        if(cnt[i] != 0 && i+'a' > b[len]) {
            flag = true;
            break;
        }
    return flag;
}

void print(int len, string a, string b) {
    vector<int>cnt(26,0);
    for(int i = 0; i<a.length(); i++)
        cnt[a[i]-'a'] ++;
    for(int i = 0; i<len; i++) {
        cout<<b[i];
        cnt[b[i]-'a']--;
    }
    for(int i=0; i<26; i++)
        if(cnt[i] != 0 && i+'a' > b[len]) {
            cout<<char(i+'a');
            cnt[i]--;
            break;
        }

    for(int i = 0; i<26; i++)
        while(cnt[i]) {
            cnt[i]--;
            cout<<char(i+'a');
        }

    cout<<endl;
}

```

```
void solve(string a, string b) {
    bool flag = true;
    for(int i=min(a.length(),b.length()); i>=0; i--)
        if(check(i,a,b)) {
            flag = false;
            print(i,a,b);
            break;
        }
    if(flag) puts("-1");
}

int main() {
    string a, b, c;
    cin>>a>>b;
    c = a;
    sort(c.begin(), c.end());
    reverse(c.begin(), c.end());
    if(c <= b) {
        cout<<-1<<endl;
        return 0;
    }
    solve(a,b);
    return 0;
}
```