

Name Matching Problem (100 Marks)

The serious problem we are facing is the account opening fraud. In this growing type of fraud, criminals open accounts at financial institutions only to one day max out credit lines and cash advances before disappearing.

To avoid this, the institutions employ the screening process at the entry level. An exhaustive list of illegitimate and fraudulent account holders is maintained centrally which is considered as defaulting customers. The institution then will like to check every new account holder's detail with the defaulting list and will ensure that the new account holder name is not matching with defaulting list.

Hence, the problem is to perform name matching. The problem is to match name 1 and name 2 using variety of logic.

Please check the following test cases for more understanding.

Example 1
Modi Naitik
Mr. Naitik Modi
Match

It will be expected to remove all the special words like Mr., Mrs. Ms., Shri., etc. from both name 1 and name 2. Similarly, the special characters can also be removed.

In example 1, it is simply the permutation of the words. Hence, Naitik Modi is matching with Modi Naitik.

Example 2
sumayya abou
SUMAYYABANU
Match

It is visible from example 2, that the matching should not be case sensitive. Also, these two names are matched with fuzzy matching logic where the threshold for matching is expected to be 80% and above.

Example 3
Shyama Prasad Khumawat
Shyama Khumawat
Match

The above example specifies even if the subset matches from one string to the other, it is a match.

Example 4

SANKAR CHARAN DAS
s c das
Match

In this, the two strings are matched as their initials are matching. It is expected to match initials in any order. Hence Sankar Charan Das should also match with “c s das” or “das c s”.

Example 5
Mrs Meera Sakhare
Mira Sakhare
Match

This is example for phonetic matching. Two names sounding same but spelled differently should also match.

Example 6
Sureshkumar Periyal
Suresh Kumar Periyal
Match

In this example, two names are same, but they are bonded in different way.

Along with positive matching, there will be some test cases which are ‘No Match’. If two names are not getting matched with all the possible logic applied, then they are ‘No Match’. Please check the following examples for more clarity.

Example 7
Shri. Veer Prasad Lodha
Virchandra Prasad
No Match

Example 8
Radhika Sharma
Mrs. Sharma Kaveri
No Match

Input Format

The first line of input consists of Name 1.

The second line of input consist of Name 2.

Constraints

1<= Name 1, Name 2 <=50

Output Format

Print Match if the names are a match otherwise print No Match.

Sample TestCase 1

Input
Modi Naitik
Mr. Naitik Modi

Output
Match

Time Limit(X):

1.00 sec(s) for each input.

Memory Limit:

512 MB

Source Limit:

100 KB

Allowed Languages:

C, C++, C++11, C++14, C#, Java, Java 8, Kotlin, PHP, PHP 7, Python, Python 3, Perl, Ruby, Node Js, Scala, Clojure, Haskell, Lua, Erlang, Swift, VBnet, Js, Objc, Pascal, Go, F#, D, Groovy, Tcl, Ocaml, Smalltalk, Cobol, Racket, Bash, GNU Octave, Rust, Common LISP, R, Julia, Fortran, Ada, Prolog, Icon, Elixir, CoffeeScript, Brainfuck, Pypy, Lolcode, Nim, Picolisp, Pike, pypy3

Soln:

```
/* Read input from STDIN. Print your output to STDOUT*/
```

```
import java.io.*;
import java.util.*;
public class CandidateCode {
    static ArrayList<String> removeSpecialWords(String name){
        String[] arr = name.split(" ");
        ArrayList<String> res = new ArrayList<String>();
        int i=0;
        for(String s: arr){
            if(s.equalsIgnoreCase("Mr.") || s.equalsIgnoreCase("Ms.") || s.equalsIgnoreCase("Mrs.") ||
s.equalsIgnoreCase("Shri."))
                continue;
            else{
                res.add(s.toLowerCase());
                i++;
            }
        }
        return res;
    }

    static Set<String> isEqual(ArrayList<String> n1, ArrayList<String> n2){
        Set<String> nameSet = new HashSet<String>();
        nameSet.addAll(n1);
        nameSet.addAll(n2);
        return nameSet;
    }

    static Set<String> oneWordDiffSpell(Set<String> nameSet){
        String sameName="";
        for(String s: nameSet){
            if(s.contains("ee")){
                sameName = s.replace("ee","i");
                if(nameSet.contains(sameName)){

```

```

        nameSet.remove(sameName);
        break;
    }
}
else if(s.contains("ph")){
    sameName = s.replace("ph", "f");
    if(nameSet.contains(sameName)){
        nameSet.remove(sameName);
        break;
    }
}
else if(s.contains("ie")){
    sameName = s.replace("ie", "y");
    if(nameSet.contains(sameName)){
        nameSet.remove(sameName);
        break;
    }
}
else if(s.contains("ie")){
    sameName = s.replace("ie", "ee");
    if(nameSet.contains(sameName)){
        nameSet.remove(sameName);
        break;
    }
}
else if(s.contains("ksh")){
    sameName = s.replace("ksh", "x");
    if(nameSet.contains(sameName)){
        nameSet.remove(sameName);
        break;
    }
}
}
return nameSet;
}

static Set<String> initialsPresent(Set<String> nameSet){
    int singleEle=0;
    while(true){
        for(String s : nameSet){
            if(s.length()>2){
                String str=""+s.charAt(0);
                if(nameSet.contains(str)){
                    nameSet.remove(str);
                    singleEle-=1;
                    break;
                }
            }
            else{
                singleEle+=1;
            }
        }
        if(singleEle!=0){
            singleEle=0;
        }
        else if(singleEle==0)break;
    }
    return nameSet;
}

static boolean endProgram(Set<String> nameSet, ArrayList<String> nameArr1, ArrayList<String> nameArr2){
    if(nameSet.size() == nameArr1.size() || nameSet.size() == nameArr2.size()){
        return true;
    }
    return false;
}

static boolean diffBonded(ArrayList<String> nameArr1, ArrayList<String> nameArr2){

```

```

String str1="";
String str2="";
for(String s: nameArr1){
    str1+=s;
}
for(String s: nameArr2){
    str2+=s;
}
if(str1.equals(str2))return true;
//else return diffLogic(str1,str2);
return false;
}

static boolean diffLogic(String str1,String str2){
    int len,i;
    int isPart=0,isNotPart1=0,isNotPart2=0;
    char c1,c2;
    if(str1.length()>=str2.length())len=str1.length();
    else len=str2.length();
    for(i=0;i<len;i++){
        if(i<str1.length())
            c1=str1.charAt(i);
        else{
            isNotPart2+=str2.length()-i+1;
            break;
        }

        if(i<str2.length())
            c2=str2.charAt(i);
        else{
            isNotPart1+=str1.length()-i+1;
            break;
        }

        if(c1==c2)isPart++;
        else{
            isNotPart1++;
            isNotPart2++;
        }
    }
    //i++;
    //isNotPart1=str1.length()-i;
    //isNotPart2=str2.length()-i;

    if(isPart>isNotPart1 || isPart>isNotPart2)
        return true;
    return false;
}

public static void main(String args[] ) throws Exception {
    String name1,name2;
    Scanner in = new Scanner(System.in);

    name1=in.nextLine();
    name2=in.nextLine();

    ArrayList nameArr1 = removeSpecialWords(name1);
    ArrayList nameArr2 = removeSpecialWords(name2);

    boolean endProgram=false;

    Set<String> nameSet = isEqual(nameArr1,nameArr2);

    if(endProgram(nameSet,nameArr1,nameArr2)){
        System.out.println("Match");
    }
    else {
        nameSet = initialsPresent(nameSet);
    }
}

```

```
if(endProgram(nameSet,nameArr1,nameArr2)){
    System.out.println("Match");
}
else{
    nameSet = oneWordDiffSpell(nameSet);
    if(endProgram(nameSet,nameArr1,nameArr2)){
        System.out.println("Match");
    }
    else{
        if(diffBonded(nameArr1,nameArr2)){
            System.out.println("Match");
        }
        else{
            if(diffLogic(name1.toLowerCase(),name2.toLowerCase())){
                System.out.println("Match");
            }
            else System.out.println("No Match");
        }
    }
}
}
}
}
```


Submit Code

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Time:

06 days and 04:00:07 / 7 days

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Example 3

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The above example specifies even if the subset matches from one string to the other, it is a match.

Example 4

SANKAR CHARAN DAS

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Java { 1.7.0_111 }

```

131
132
133         else{
134             islotPart2+=str2.length()-i+1;
135             break;
136         }
137         if(i<str2.length())
138             str2 = str2.substring(i+1, str2.length());
139     }
140     return islotPart2;
141 }
```

Draft saved at 12:14 AM

Console

Test Case	Status	Score	Time	Memory	Details
Test Case 40	Passed ✓	1.562	176	2.13	
Test Case 41	Failed ✗	4	176	0	
Test Case 42	Failed ✗	4	172	0	
Test Case 43	Failed ✗	0.696	176	0	
Test Case 44	Passed ✓	0.344	176	1.42	
Test Case 45	Passed ✓	0.336	176	0.71	
Test Case 46	Passed ✓	0.354	176	1.42	
Test Case 47	Failed ✗	0.365	176	0	
Test Case 48	Passed ✓	0.334	176	0.71	
Test Case 49	Passed ✓	0.33	176	0.71	

☐ Custom Input

Compile & Run

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Type here to search

27°C

ENG IN

12:15 AM

09-Aug-21

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Java { 1.7_0_111 } ▾
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```

Draft saved at 12:14 AM
131      else{
132          islotPart2+=str2.length()-i+1;
133          break;
134      }
135
136      if(i<str2.length())
137          str2=str2.charAt(i);
    
```

Console ✕

Test Case 60	Failed ❌	0.331	176	0	📄
Test Case 61	Passed ✅	0.335	176	0.71	📄
Test Case 62	Passed ✅	0.38	176	2.13	📄
Test Case 63	Passed ✅	0.362	172	2.13	📄
Test Case 64	Failed ❌	0.311	176	0	📄
Test Case 65	Passed ✅	0.347	176	2.13	📄
Test Case 66	Passed ✅	0.324	176	2.13	📄
Test Case 67	Passed ✅	0.324	176	2.13	📄
Test Case 68	Passed ✅	0.36	172	2.13	📄
Test Case 69	Passed ✅	0.944	176	2.13	📄
Test Case 70	Pended ⏸️	0.384	176	2.13	📄

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s c das

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