T-201-GSKI, GAGNASKIPAN
VOR 2014

TRIE

DÆMATÍMAVERKEFNI 7

Assignment grading. A full mark is given for solutions implemented as specified and accepted by Mooshak. Note that points may be deducted for a solution failing to meet the implementation requirements specified below, whether it is accepted by Mooshak or not. Solutions that are not accepted by Mooshak will be graded by hand and will get a maximum grade of 7.

Hand-in

You do **not** need to hand in your code to MySchool. You only need to submit your code to Mooshak. You are free however to submit your solution to MySchool if you wish.

The Spanish acquisition

The widely popular Spanish search engine El Goog has decided to expand and is now looking into starting a phone company. They decide not to start from scratch, and take over a small phone company, El Phono Loco, that is on the verge of bankruptcy.

The directors of El Phono Loco had become quite greedy and started selling new phone numbers without consulting with the technical department. This affected you personally. Your Spanish friend, which you called often, had the phone number "91-14-92-32". However, the directors at El Phono Loco sold the number "911" to the Spanish branch of the Framsóknarflokkur, El Partido Progresista.

As a result, you could never reach your friend, since as soon as you had dialled the first three numbers of your friend's number, you were connected to El Partido Progresista.

The directors of El Goog, determined not to make the same mistake, ask you to write a program that determines whether a list of phone numbers is *consistent*. A list of phone numbers is consistent if no number in the list is a prefix of another.

Input and output description. The first line of the input contains a single integer n, which denotes the number of phone numbers in the input. Then follow n phone numbers, each on its own line.

Input example 1

```
3
911
97625999
91125426
```

Output example 1

Date: 22. febrúar 2014.

```
NO
```

Input example 2

```
5
113
12340
123440
12345
98346
```

Output example 2

```
YES
```

Implementation details. You are provided with an implementation of the `TrieNode` struct, given in *TrieNode.h* and *TrieNode.cpp*. Note that each node can have at most 10 children since the only characters we need to consider are digits.

You are also provided with an interface for the class `PrefixStringSet`, given in *PrefixStringSet.h*, which is an implementation of the ADT set for strings, with minor additions.

Your task is to implement the class `PrefixStringSet` in *PrefixStringSet.cpp* and write a main-program that uses the implementation to solve the problem stated above. Note that you do not need to give a full implementation of the class `PrefixStringSet` in order to receive full marks. It is sufficient to implement only the functions `insert` and `remove_all`.

In this implementation of set, the insertion function returns a boolean value. After inserting a string s into a set S, the insertion function returns true if either of the two conditions holds

- s is a prefix of a string that was present in S before the insertion, or
- a prefix of s was present in S before the insertion.

This property of the insertion function can come in handy when solving the problem stated above.

Submitting. To submit this problem to Mooshak you must create a zip file containing *TrieNode.h*, *TrieNode.cpp*, *PrefixStringSet.h*, *PrefixStringSet.cpp* and *main.cpp*.

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