

Who's telling the truth?

April 18, 2021

Overview

Last night , Professor Snape found out that somebody is stealing from his potion storeroom, There is a rumor that the thieves are the house elves of Hogwarts (who have gone rogue because of the absence of the headmaster Professor Dumbledore.)

Today Professor Snape has sent Harry Potter to detention (for his behavior in the class) and assigned him the task of finding out the place of stolen potions. Some house elves like Harry Potter so they tell the truth to him but some don't like him very much so **they might tell the truth or lie in this case**. Consider that Harry is very popular in the wizard world and especially Hogwarts so they are more elves that are honest with him than the liars. Your job as a friend of Harry is to help him find the honest elves among all of them.

But you need a strategy.

First You should know that **the house elves can tell the difference between a liar and an honest elf instantly**. So if you find out some honest ones you can ask for their help.

So Harry wants to use their power of telling the difference between each one with confronting them with each other :

He is going to pair up the elves and have them evaluate each other. For example, if Tiffany the elf and Tomás the elf are honest elves, then they will both say that the other is honest. But if Tiffany the elf is an honest elf and Tyrannus the elf is a liar elf, then Tiffany will call Tyrannus out as a liar, but Tyrannus may say either that Tiffany is a liar or that she is honest. We will refer to one of these interactions as a "elf-to-elf comparison."

The outcomes of comparing elves A and B are as follows:

Elf A	Elf B	A says (about B)	B says (about A)
Honest	Honest	Honest	Honest
Honest	Liar	Liar	Either
Liar	Honest	Either	Liar
Liar	Liar	Either	Either

Help Harry find the best way of investigating elves with elf-to-elf comparisons

Suppose that there are n elves in Hogwarts, and that **there are strictly more than $n/2$ honest elves.**

Goals

1. **Use divide and conquer approach and Give an algorithm that uses** elf-to-elf comparisons and identifies all the honest elves.

Attention!

1. All of the projects (no matter which you choose) will be tested for similarities by a coded script, So if we find an obvious similarity between 2 or more projects **all** of them will get **0** points.
2. You are free to choose any programming language you desire **in this problem**.(check for others in their attention part).
3. You have to write a document file and **explain deeply** what you've done in your code and the algorithm you wrote , Explain the algorithm **before** you begin talking about the code.
4. For Questions about the problem contact via email :
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