Algorithms Design

Project 1 - Divide and Conquer

4012 - Semester

Who's telling the truth?

Overview

Once upon a time, in a faraway kingdom, there lived a beautiful princess named Isabella. She was the fairest maiden in all the land, with long golden hair and sparkling blue eyes. But despite her beauty and wealth, Princess Isabella was not happy. She longed for true love and dreamed of marrying a brave knight who would sweep her off her feet.

One day, the princess announced that she would marry the first knight who could prove his honesty and loyalty. All the knights in the land came to the castle to try their luck, but the princess was not convinced by any of them. As days went by, the princess grew more and more desperate to find her true love.

One day, a young man arrived at the castle gates. He was not dressed like a knight or a rogue, but he had an air of confidence about him that caught the princess's attention. He devised a test that will reveal whether someone is truly honest or not.

The princess was intrigued and agreed to hear him out. The young man explained his plan. He would ask each knight and rogue to make two statements: one true and one false. If they could correctly identify which statement was true, they would be deemed honest enough to marry the princess.

The plan seemed foolproof, so the princess agreed to give it a try. One by one, each knight and rogue stepped forward to take part in the test. Some were able to identify their true statement easily while others struggled.

So First you should know that **the knights can tell the differences between a liar and a honest instantly**. So if you find out some honest ones you can ask for their help. He is going to pair up the knights and have them evaluate each other. For example, if Sir Edward the knight and Sir Tomas the knight are honest knights, then they will both say the other is honest. But if Sir Edward the knight is an honest knight and Sir Guido the rogue is a liar knight, then Sir Edward will call Sir Guido out as a liar, but Sir Guido may say either that Sir Edward is a liar or that he is honest.

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

Knight A	Knight 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 the man find the best way of investigating knights.

Suppose that there are **n** knights in castle, and that **there are strickly more that n/2 honest knights**.

Goal

1. **Use divide and conquer approach and Give an algorithm** that uses knights comparisons and identifies all the honest knights.

Attention!

1. All of the projects 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 **-100** points.
2. You are free to choose any programming language you desire in this problem.
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. It's necessary to present your implementation. There is no score for just uploading the documentation.