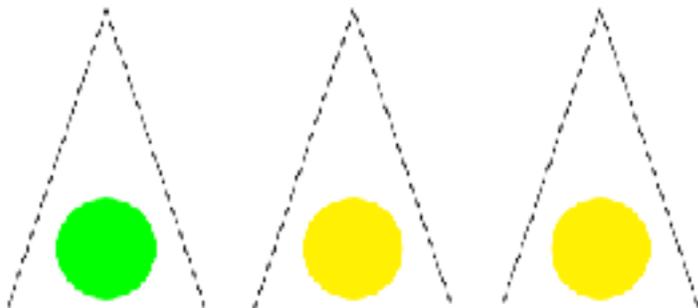


## 1 Intro to Wizard Training

A part of wizardry training is developing logic skills. In the following exercises, two students will be presented with three wizards hats, one with a green label and two with yellow labels.



The students will be asked to close their eyes. One hat will be hidden, the others will be put on the students heads. The students will open their eyes, and then be asked, "Who knows what color hat he/she has on? If so, which color is it?" The students can figure out the color hat he/she is wearing only by observing the hat of the other student. A student is not allowed to look at his/her own hat. This kind of cheating will be punished by turning the cheat into a toad!

Delise and Chris are given two hats. Delise gets the green labeled hat, and Chris gets a yellow-labeled one.

1. Bree asks them what color hat they have on. What are Delise and Chris going to say? Explain.

*Chris is going to say that he has the yellow hat because there is only one green hat and he sees that Delise has it. Delise will say that she has either a green or yellow hat.*

2. After hearing Chris's answer, can Delise now figure out which color hat she has on? Explain why or why not.

*Delise is then going to say that she has the green hat because Chris is confident that he has the yellow hat and the only reason why is because he sees Delise's green hat.*

This time, Delise and Chris are both given the yellow labeled hats.

1. Bree asks them what color hat they have on. What are Delise and Chris going to say? Explain.

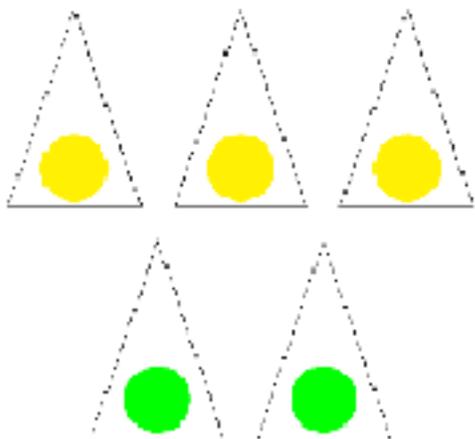
*Both Delise and Chris are going to say that they can have either the green or yellow hat.*

2. Now that they heard each others answers, can either of them figure out the color of their hat? How?

*Once they hear each others answers, they will know that they both have yellow hats because neither of them are sure of their hat color and this is possible only when both have yellow.*

## 2 Wizard Training Progresses

As the training progresses, three students will be chosen and presented with five hats, three with yellow dots and two with green. Once again, the students will be asked to close their eyes. Two hats will be hidden, three will be put on the students heads. The students will be asked to open their eyes and to figure out the color of their hat labels by observing those of the other students.



Renee, Laurie, and Darren are given the hats. Renee gets a yellow-labeled hat, Laurie and Darren get the hats with green labels.

1. What will each person say when they are asked for the color of their hats? Explain.

*Renee will know that she has a yellow hat because there are only two green hats and she sees them on Laurie and Darren. Laurie and Darren will say that they can either have green or yellow.*

2. After hearing each persons answer, can others figure out which color hat they have on? How?

*Laurie and Darren will know that they both have green hats because Renee says that she has a yellow hat and this is the only way that Renee could know for sure.*

### 3 Wizard Training Final Challenges

There are 10 wizards and 10 hats. Each wizard is assigned a random hat, either red or blue, but the number of each color hat is not known to the wizards. The wizards will be lined up single file where each can see the hats in front of them but not behind. Starting with the wizard in the back of the line and moving forward, they must each, in turn, say only one word which must be "red" or "blue". If the word matches their hat color they pass the test, if not, they are detained. A friend warns them of this test one hour beforehand and tells them that they can formulate a plan where by following the stated rules, 9 of the 10 prisoners will definitely pass, and 1 has a 50 percent chance of passing. What is the plan to achieve the goal?

This way, each subsequent person will be encoded to know which color hat is theirs (the color stated by the previous person in line), and have a method for transmitting that information successfully to the person who comes after.

The first person in line has to take a leap of faith and guess whether their hat is red or blue. *Solution 1: The last person in line would say one of the following four phrases: My hat is red. (If their hat is red, and the next is red.) My hat is not red. (If their hat is blue, and the next is red.) My hat is blue. (If their hat is blue, and the next is blue.) My hat is not blue. (If their hat is red, and the next is blue.)*

*This way, each subsequent person will be encoded to know which color hat is theirs (the color stated by the previous person in line), and have a method for transmitting that information successfully to the person who comes after.*

*The first person in line has to take a leap of faith and guess whether their hat is red or blue.//*

*All the individuals in front of him will be able to deduce their own hat by counting the number of blue hats in front of himself. Solution 2: The 10th guy at the end of the line just needs to be instructed to say blue if there is an odd number of blue hats in front of him, and red if there is an even number of blue hats.*

*All the individuals in front of him will be able to deduce their own hat by counting the number of blue hats in front of himself.*