

The image features two white eggs positioned horizontally, touching at their narrow ends. The background is a solid, vibrant red. The text 'THEORY CLUB' is centered in the upper half, with the 'O' in 'THEORY' being a red circle. Below it, the word 'egg' is written in a lowercase, white, sans-serif font.

THEORY CLUB

egg

Egg Equality

The easter bunny wants to distribute candy equally throughout a neighborhood, made of n houses arranged in a circle. Now the task would be easy if pesky parents weren't involved. The parents each give the kids unequal amounts of candy to start. But being the Robinhood-Easter-Energizer bunny it is, the bunny wants to make sure everybody has the same amount of candy. So he proposes the following process: First give all the houses with an out amount of candy and extra piece. Next, take half the candy from each house and give it to the clockwise neighbor. He repeats this process until nothing changes. Show this process will eventually terminate and that when it does everyone will have an equal amount of candy.



Spring Time Wars

Since the weather has finally begun to warm up, you and another country have decided it's a suitable time for a war. You're competing to conquer castles and collect the most victory points. Each of the 10 castles has its own strategic value for a would-be conqueror. Specifically, the castles are worth 1, 2, 3, ..., 9 and 10 victory points. You and your enemy each have 100 soldiers to distribute between any of the 10 castles. Whoever sends more soldiers to a given castle conquers that castle and wins its victory points. (If you each send the same number of troops, you split the points.) Whoever ends up with the most points wins.

But now, you have a spy! You know how many soldiers your archenemy will send to each castle. The bad news, though, is that you no longer have 100 soldiers — your army suffered some losses during the cruel, unforgiving winter.

How many soldiers do you need to have in order to win, no matter the distribution of your opponent's soldiers? Put another way: What k is the minimum number such that, for any distribution of 100 soldiers in the 10 castles by your opponent, you can distribute k soldiers and win the battle?

A Typical Prison In Spring

Now that spring is finally here, the weather is great. As such, all the prisoners want to go outside, but of course the warden cannot let them since they are all death row convicts. However, he decides to cut them a deal. Everyday he'll choose one of the 100 prisoners and lets them enter a barren, secluded closet, with only a light switch. They can flip the light switch if they want, or alternatively they can venture a guess that every prisoner has visited the room. If they are right, then all the prisoners will be free to escape. If however, he is wrong then all the prisoners will be killed brutally. They are given a single meeting at the beginning (before the game starts) to choose a strategy. How can they escape? How long do we expect such a strategy to take?



Robinhood-Easter-Energizer-Springtime-Nascar-Driver Bunny At It Again

He's back and now with a new car. The

Robinhood-Easter-Energizer-Springtime-Nascar-Driver Bunny wants to visit four cities arranged in a square with side length a mile long. But there are no roads connecting the cities. So, the Robinhood-Easter-Energizer-Springtime-Nascar-Driver Bunny plans make his own roads. But he doesn't want to waste an inch of road. How much road does he need to connect the cities?

