

Assignment 0

1. If I were ever put in this situation, I would first tell them to choose a point of reference. This point of reference would have to stay the same throughout the whole conversation and cannot change. After they choose the point of reference, the alien would then face the point of reference. With the point of reference in a straight line ahead of the alien, the alien would draw out a small circle surrounding him (I'm assuming that the aliens do not have a compass that can measure degrees). With the circle surrounding him, I would tell the alien to cover $\frac{3}{4}$ of the circle with a material found on his planet, leaving the remaining $\frac{1}{4}$ of the circle empty. The empty quadrant would signify left. The other quarter in the top half of the circle that is covered with the material would signify right.
2. In order to find the number of gas stations in the US, I would have to first find out how many people a gas station serves on a typical day. Granted, most people fill up their gas tank every week to 2 weeks, I'd multiply the number of people at the gas station that day by 10.5 (midway between 7 and 14). I would then go and find out how many licensed drivers there are in the US. With these 2 numbers, I would then divide the number of licensed drivers by the number of people at the gas station every 10.5 days. This would hopefully give us the number of gas stations that are in the US. You can extrapolate this to the global scale too, trying to find the amount of global licensed drivers. With this information, you can then divide the number of global licensed drivers by 10.5 (gas station visit frequency) and come up with the number of gas stations in the world.
3. In order to differentiate the 3 baskets, I would weigh all 3 of them. Assuming that there are the same amount of apples and oranges in the 2 baskets containing only 1 type of fruit and an even 50% of apples and oranges in the other basket, the 3 baskets should weigh accordingly: The lighter fruit basket is the lightest fruit, the mixed fruit basket in the middle, and the heavier fruit basket at the top. As a result, I would pick from the heaviest fruit basket. Whatever fruit is pulled (ex: orange), I would assume the basket to be filled with (the pure orange fruit basket). Then the middle fruit basket would be the mixed fruit basket, and the final fruit basket would be the fruit basket filled with the fruit not pulled.
4. If an even number of quarters fit on the table, then he should go second. As a result, he would put down a quarter on an even number, leaving his brother unable to put another quarter down, thus meaning that Dylan will win the game. On the other hand, if an odd number of quarters fit on the table, Dylan should put a quarter down first. This will cause his brother to lose the game because Dylan will put down the last quarter since all of his plays occur in odd numbered turns. Ultimately, Dylan should ensure whether an odd number or even number of quarters will fit a length of the square table.
5. The pirates began with 341 gold coins. In order to get a feel for the process of solving the problem, I began with 16 gold coins. One for each of the 13 pirates, and 3 left over. I

then realized that for the pirate being removed to make any difference in the number of coins each pirate has, there would have to be more than 13 coins per pirate. As a result, I tried 172 gold coins (13 coins per pirate, 3 left over). This resulted in 4 coins being left over, so I tried 185 gold coins. With one pirate removed and the coins redistributed, I was left with 5 gold coins, as the problem stipulated. However, after the second pirate was kicked out and second redistribution, I was left with 20 coins which could not be distributed amongst the pirates evenly. Figuring out that this cycle occurs every 12 coins, I decided to start with 341 gold coins. This results in 5 gold coins left over in the first redistribution. In the second redistribution, there are 33 coins left over, which can be distributed amongst the 11 pirates evenly. This means the pirates began with 341 gold coins.

6. Most recently, I remember watching a video regarding the creation of the black hole image. Granted light cannot escape a black hole (and as a result bounce back towards earth) and oftentimes there are many stars orbiting the black hole, it is incredibly difficult to take a picture of a black hole. The researchers had to use large antennas to take in small bits of information that they could then extrapolate using an algorithm developed by researchers. Though I understood that there was some computer science involved to take in the data from the telescopes, I could not fathom that it was actually an algorithm that created the picture. Website with video link:
<https://www.veritasium.com/videos/2019/5/24/how-to-understand-the-image-of-a-black-hole>

7. Code that has no errors.

Just kidding! Good code is (ideally) code with no errors, but good code is most likely code that has a purpose/direction. Even though there might be an error in the code itself, as long as there is a direction/aim in the code. There is also an efficiency component, where the faster the code works, the more value exists in it. Ultimately, there are multiple aspects that can make the code good and lacking any one of these parts does not automatically make the code bad.

8. During my senior year, I took AP Computer Science A because I wanted to explore a new field that I hadn't had the chance to explore. Throughout the year, I began to fall in love with computer science and now am seriously considering majoring in it. Outside of AP Computer Science, I have no experience.