Brainteasers for Fun and Profit

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1. Why are tsunamis more destructive than earthquakes at farther distances from the epicenter?

2. You are walking from the NE corner of 14th St and 8th Ave to the SW corner of 16th St and 6th Ave. Which direction should you walk first? (Does it even make a difference?)

3. Two people are together, with one bicycle, and they are traveling to the same destination. How should they travel, so that as soon as possible, both of them have arrived at the destination?

4. During rush hour, how many highway lanes carry the same number of people per minute as one subway track?

5. Even if there were incredible advances in materials science to construct very strong and sturdy buildings, an office building with a square base 1000 feet on each side would have an upper limit in height. Why?

6. Six people go into a closet with 5 blue hats and 5 red hats. Each puts on a hat but doesn't know what color it is. After they come out:

   Person #1 says: I don't know what color my hat is.

   Person #2 then says: I also don't know what color my hat is.

   Person #1 then asks: Do any of you know what color your hat is now?

   All 5 other people simultaneously answer: No

   If each one has perfect logic and reasoning skills, based on all the information, how many people are now sure what color their hat is?

7. In a game of American football, you've just caught the ball, and there's only one defender between you and the end zone. How do you run?

8. There is a deck of 52 cards, of which 13 happen to be face-up and the other 39 are face-down. You don't know which of them are face-up, and you are blindfolded. It is possible for you to make 2 piles of cards such that every card appears in exactly one of the piles, every card is either face-up or face-down, and the number of face-up cards in both piles is exactly the same.

9. There are 100 people in a room. Everyone will be given a hat which has a single integer from $\{1, \ldots, 100\}$ written on it. The same integer may be used more than once. Everyone will be able to see everyone else, but won't be able to see their own hat. Then, everyone will need

to guess their own number, all simultaneously. If anyone guesses their own number correctly, the whole group wins. Otherwise, the whole group loses. The group can discuss a strategy before the hats are distributed, but once the hats are distributed, no communication of any kind is allowed. What should they do?

10. Birds are lucky because they can always travel in the straight line between two points. Humans, on the other hand, have to rely on roads. So, whenever we go between two points, we have to travel farther than a bird.

    Road networks are designed for efficiency, so you don't have to travel that many times farther than a bird. The network of roads across the United States exhibit a fractal pattern: you typically progress from local streets to main roads to highways.

    Calculate the maximum ratio (rounded to the nearest tenth, and expressed as a decimal) of the distance a car would travel using roads, over the distance a bird would fly. For this maximum, consider the distance between two major cities in the USA (which have populations of at least 500,000) and whose straight line path is not separated by a large lake or ocean.

11. What are some fundamental reasons why computers are becoming powerful enough to challenge / surpass humans?