

# Quant SC

Tuesday, March 16th

# Brain Teaser

A chess tournament has  $2^n$  players with skills  $1 > 2 > \dots > 2^n$ . It is a knockout tournament. After each round, only the winner proceeds to the next round. Except for the final, opponents in each round are drawn at random. Let's also assume that when two players meet in a game, the player with better skills always wins. What's the probability that players 1 and 2 will meet in the final?

# Brain Teaser Answer

Two ways to solve this problem:

1. Conditional probability -> not very efficient...
2. Counting approach -> more efficient & simpler
  - a.  $2^n$  players are separated into two  $2^{n-1}$ -player subgroups and in each group, one player reaches the final
  - b. So **player 2** cannot be in the same subgroup as **player 1**
    - i. Any of the remaining players are equally likely to be one of the  $(2^{n-1} - 1)$  players in the same subgroup as **player 1** or one of the  $2^{n-1}$  players in the subgroup different from **player 1**
    - ii. Probability that **player 2** is in a different subgroup from **player 1** =  $2^{n-1} / (2^n - 1)$  -> *they will meet in the final*

# Weekly Quant Share

The background features abstract, flowing shapes in shades of orange and red. On the left, there are overlapping orange waves. On the right, there are overlapping red waves that transition into a lighter pinkish-red at the top right corner. The overall effect is a modern, dynamic gradient.

# Deliverables

- 1.) Working bare-bones implementation of your strategy on GitHub. Please reach out to us if you need help!

Note: **No meeting next Tuesday** (Wellness Day)

**Let's start coding!**

The background features abstract, flowing shapes in shades of orange and red. On the left, there are several overlapping, semi-transparent orange shapes that curve upwards and to the right. On the right side, there are similar shapes in shades of red and pink, also curving upwards and to the left. These shapes create a sense of movement and depth, framing the central text.