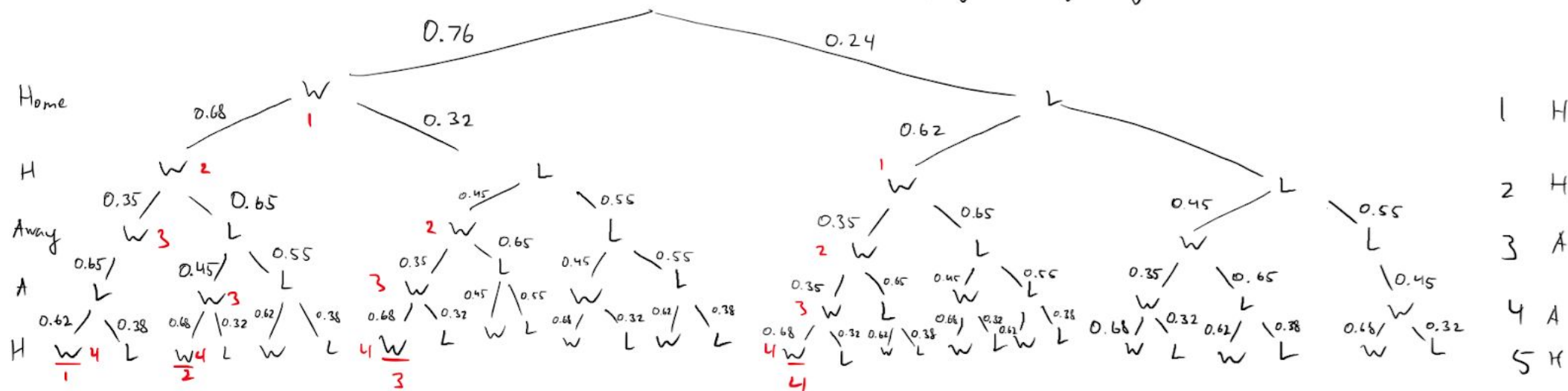


Dhruvil Patel

We construct a tree diagram depicting all possible outcomes of playing exactly 5 games:



Now we consider the cases where the Jays win the series (win 4 games) in **exactly** 5 games:

$$P(W|L|W|W|W) = 0.76 \times 0.68 \times 0.35 \times 0.65 \times 0.62 = 0.073 \quad \textcircled{1}$$

$$P(W|W|L|W|W) = 0.76 \times 0.68 \times 0.65 \times 0.45 \times 0.68 = 0.103 \quad \textcircled{2}$$

$$P(W|W|W|L|W) = 0.76 \times 0.32 \times 0.45 \times 0.35 \times 0.68 = 0.026 \quad \textcircled{3}$$

$$P(W|W|W|W|L) = 0.24 \times 0.62 \times 0.35 \times 0.35 \times 0.68 = 0.012 \quad \textcircled{4}$$

The probability that the Jays win is the union:

$$\begin{aligned} P(W|5\text{ games}) &= P(W|L|W|W|W \cup W|W|L|W|W \cup W|W|W|L|W \\ &\quad \cup W|W|W|W|L) \\ &= 0.073 + 0.103 + 0.026 + 0.012 \\ &= 0.214 \\ &= 21.4\% \end{aligned}$$

\therefore The Jays have a 21.4% probability of winning the series in exactly 5 games.

Now should you bet on them winning? 🤔 hmmm...

This is conditional probability, so the probability of winning is expressed, for example, as $P(W|W|L|W|W)$, where this denotes the Jays winning their last game given they won the previous, which is given they lost the previous, etc.