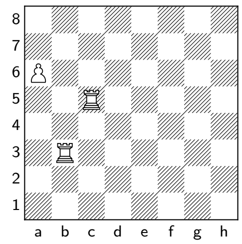
How many distinct $n \times n$ chessboard are there with two white rooks and a pawn all occupying different rows and columns? Justify your answer.



Solution: If the white rooks were distinct the number of possible configurations can be counted using the product rule: There are n choices for the first rook's rows and columns, $n-1$ remaining for the second one, and $n-2$ remaining for the pawn's, giving a total of $n \cdot n \cdot (n-1) \cdot (n-1) \cdot (n-2) \cdot (n-2) = (n \cdot (n-1) \cdot (n-2))^2$.

Each actual configuration with indistinguishable white rooks arises from two configurations with distinct (labeled) white rooks. By the division rule, the desired number of configurations is $(n \cdot (n-1) \cdot (n-2))^2/2$.