

7.  $\chi^2$

$$\begin{array}{r} 1 \\ 4 \\ \hline 3 \end{array}$$

			P		V		
1	2		1	2	2	1	2
1	3		2	2	1	1	2
1	4		1	2	2	1	2
2	3		1	2	2	1	2
2	4		1	1	2	2	2
3	4		1	2	2	1	2
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							12

1 2 3 4  
↑  
how often is it going to be  
the smallest element in  $p$ ?

$$\binom{2n}{n-1}$$

$$Z = 6$$

	1	1	2	2
$P_1$	3	2	1	0
$P_2$	0	1	2	3
$q_1$	0	1	2	3
$q_2$	3	2	1	0

$$P(i, c) = \# \text{ of sortings where index } i \text{ was put in } p \text{ sequence at position } c$$

for every indices  $(i, j)$

How many times

$|v_i - v_j|$  contributes to the answer?

$$\sum_{C \in \mathcal{C}_{i,n}} \min \left( P(i, C), Q(j, C) \right)$$

$$\begin{array}{cc} & \begin{matrix} 1 & 2 \end{matrix} \\ \begin{matrix} q_1 \\ q_2 \end{matrix} & \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \end{array}$$