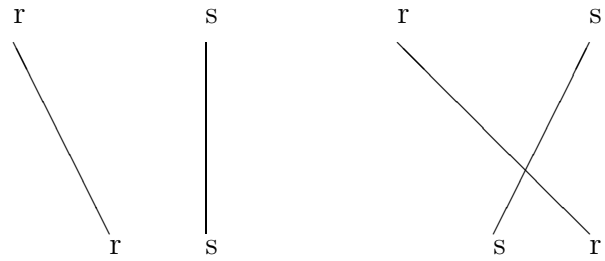QUESTION Explain why the pictorial way of counting inversions gives the correct answer.

r   s   r   s

r   s   s   r

ANSWER
Consider a pair (r, s) with $r < s$. The above pictures illustrate typical cases where r precedes s in the permutation (non-inversion) and where s precedes r (inversion). the corresponding lines in the picture do not cross in the former case but do in the latter.