

$2n$ identical cubical blocks are kept in a straight line on a horizontal smooth surface. The separation between any two consecutive blocks is same. The odd numbered blocks $1, 3, 5, \dots, (2n-1)$ are given velocity v to the right whereas blocks $2, 4, 6, \dots, 2n$ are given velocity v to the left. All collisions between blocks are perfectly elastic. Calculate the total number of collisions that will take place.



Initially there will be n collisions. Exchange of velocity takes place between two colliding blocks. The two extreme blocks will move out and never encounter any other collision. Remaining $(2n-2)$ blocks will further have $(n-1)$ collisions and so on. This way total no of collisions = $n + (n-1) + (n-2) + (n-3) + \dots + 3 + 2 + 1 = \frac{n(n+1)}{2}$