

Minimum Cost of Ropes

Given an array, **arr[]** of rope lengths, connect all ropes into a single rope with the **minimum total cost**. The **cost** to connect two ropes is the **sum of their lengths**.

Examples:

Input: arr[] = [4, 3, 2, 6]

Output: 29

Explanation: First connect 2 and 3 to get [4, 5, 6] with a cost of 5, then connect 4 and 5 to get [9, 6] with a cost of 9, and finally connect 9 and 6 to get one rope with a cost of 15, giving a total minimum cost of 29. Any other order, such as connecting 4 and 6 first, results in a higher total cost of 38.

Input: arr[] = [4, 2, 7, 6, 9]

Output: 62

Explanation: First, connect ropes 4 and 2, which makes the array [6, 7, 6, 9]. Cost of this operation $4 + 2 = 6$. Next, add ropes 6 and 6, which results in [12, 7, 9]. Cost of this operation $6 + 6 = 12$. Then, add 7 and 9, which makes the array [12, 16]. Cost of this operation $7 + 9 = 16$. And finally, add these two which gives [28]. Hence, the total cost is $6 + 12 + 16 + 28 = 62$.

Input: arr[] = [10]

Output: 0

Explanation: Since there is only one rope, no connections are needed, so the cost is 0.

Constraints:

$1 \leq \text{arr.size()} \leq 10^5$

$1 \leq \text{arr}[i] \leq 10^4$