Firstly, for a given array a of length n, there is an $\mathcal{O}(n)$ to find $\sum_{i=1}^{n}\sum_{j=i}^{n} A(i,j)$ using monotonic stacks. For each element, we find the closest element to its left and right that are larger, which determines the range in which it is the minimum.

Unfortunately, $2 \cdot 10^9$ is too large for this to fit within the one-minute constraint (especially because stacks in Julia have a high constant factor). We can instead take advantage of the pseudo-random generator. A quick brute force shows that the sequence has a period of 629527 which attains a minimum value of 3.

This implies that any subarray of length at least 629527 has an answer of 3. We can compute the answer for each cycle between the 3-s, as well as the prefix and suffix.