Intuition

if we are able to find k pairs with maximum difference d and after that among all the d minimum will be answer.

Approach

1. Sort the given nums array in ascending order.
2. Initialize lo to 0 and hi to the maximum difference between the largest and smallest elements in the sorted array.
3. Perform a binary search loop while lo is less than hi.
4. Calculate the midpoint mid between lo and hi.
5. Count the number of pairs with a difference less than or equal to mid while ensuring that no index appears more than once among the pairs.
6. If the count is greater than or equal to p, update hi to mid.
7. Otherwise, update lo to mid + 1.
8. Return the value of lo as the minimum maximum difference that allows forming at least p valid pairs.

Complexity

- Time complexity:O(n$*$log(d)) where d is maximum difference.
- Space complexity:O(1)