Explanation

Task 1

In this task, I read from the input file and seperate size and array. Two functions are used here. One is merge and another is mergesort. Mergesort takes an array and sorts it using divide and conquer method. In this method array is recursivly splitted into two sub arrays. Later merge funetion is used to merge the sub arrays into the main sorted array using two pointers.

Task 2

In this code, I seperated the size and array. Later called the merge funetion recursivly to split it and compare the value. Then, maximum value is returned when it is found.

Task 3:

For this code, total alien and the given list was seperated. Later, Mergesort funetion was called to split the list and compare the values. If the values were greater then 1 was returned otherwise 0 was returned.

Task 4:

For this code, we take the size and the array from input file. Then we find the maximum element with the condition possible for both sub arrays. Also, we checked if any maximum element is possible from the total element from both arrays This is done by adding the maximum element of the left array and maximum squared value of the right array and finally returning the maximum value among those three.

Task 5:

For this code, size and array were seperated first. The function quick short takes an array, last and first index as parameters. It recursively calls the partition function and sorts the sub array. Then partition function chooses a pivot and recognizes the elements in the array such that all elements less than or equal to the pivot are on the left side and all elements greater than the pivot are on the right side and it returns the index of the pivot. Then the sorted array is written on the output.

Task 6:

At first we read the size and the array from input file. Then the number of total queries. After that, I used two function quick select and partition function. Later, sorted the array to find to kth smallest element in the array.