Assignment 3 Due Date: 25th May, 2021

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1. Write a program that accepts two integers n,k and finds $n^{1/k}$. The algorithm behind your program should run in time polynomial in $\log n$. Math libraries are not allowed.

   Input format: The first line of the input consists of a number $t \geq 1$ of test cases. Each subsequent line consists of pairs n,k separated by a space. An example is given below.

   Sample Input:
   3
   64 3
   15 2
   10 5
   Sample Output:
   4
   3
   1

   Constraints: $1 \leq n \leq 10^{16}$, $1 \leq k \leq n$.

2. Given an array $A[1,2,\ldots,n]$ of distinct elements, an inversion is a pair (i,j) of indices such that $i < j$ and $A[i] > A[j]$. Eg: The sequence 3, 8, 0, -4,1 has 7 inversions, namely the pairs (1,3), (1,4), (1,5), (2,3), (2,4), (2,5), (3,4).

   Write a program to count the number of inversions of a given array. The algorithm behind your input should run in $O(n \log n)$ time.

   Input format: The first line of the input consists of a single integer: n, the number of elements in the array. The second line of the input consists of the elements of the array, separated by a space.

   Sample Input:
   5
   3 8 0 -4 -1
   Sample Output:
   7

   Constraints: $n \leq 10^5$.