Elon Musk & Planets

Time limit: **3 sec**

As we all know from high school physics book $E=mc^2$ which has something to do with mass becoming energy. But now the mega mind Elon Musk is trying to redefine the equation to match with his own name, like $E=mk^2$. God knows how that relates to his name Elon Musk. Whatever, according to his observation while traveling via one of his SpaceX rockets, he theorized that a planet's mass can be distributed as energy to other planets without any effect on the solar system. This, of course, has to be done in a sophisticated way so that the distributed energy can completely act like the lost mass (so effectively the mass of a planet never changes) in the solar system. By distributing the mass as energy, he wants to find the highest possible energy planet so that he can colonize that planet.

Elon Musk lists the mass of the planets in an appropriate sequence. Rules are given below,

1. Take the sequence of the mass of the planets
2. Every planet has a unique mass
3. Initially, the energy of each planet is equal to its mass
4. To distribute the mass of any planet's energy, Let's say it is planet **P** and has mass **M**
    a. Take only the planets that have come before the planet **P** in the sequence and also have less mass than **M**
    b. Sort them in ascending according to the mass
    c. Keep only the first **S** number of planets where 1 + 2 + … + **S** <= **M**
    d. Then the first planet's energy is multiplied by its own mass single time, the second one is multiplied by its own mass two times and so on. For example if the sorted planet's mass values are $m_{[1...s]}$ and energy are $e_{[1...s]}$ then $e_{[1]}=e_{[1]}*m_{[1]}^1$, $e_{[2]}=e_{[2]}*m_{[2]}^2$, $e_{[3]}=e_{[3]}*m_{[3]}^3$ and so on.
5. Even though the mass is distributed, as it has no effect on the solar system. You can assume that the mass never changes for any planet only it's energy is changed.
6. After distributing all the planet's mass find the maximum energy out of all the planets.

Input:
In the first line an integer **T** (1 <= **T** <= 5) is given.
Following **T** test cases each has a single integer **N** (1 <= **N** <= 10^5) in a line and on the next line **N** space-separated integer numbers **M** (1 <= $\mathbf{M_i}$ <= 10^9) representing the mass of each of the $\mathbf{i^{th}}$ planet.

Output:
As you can see the energy of the planets can be represented by M^X format where M is the planet mass and X is some integer number. So, for each test case output maximum energy according to the above rules in the format M^X. See the sample output for format.

Sample Input:
2
5
4 6 1 3 9
3
3 2 5

Sample Output:
4^5
3^3

Explanation:
For the first test case, the planet with 4 mass value has no previous planet so nothing changes. For the planet with mass 6, the energy changes for the planet with mass 4, $e(4) = 4 * 4^1$ which is 4^2.
Then for the planets with mass 1 and 3 have no previous planets having less mass than them. And for the planet with mass 9, all the previous planets have less mass than 9. So after sorting, we get planets as 1 3 4 6. So energy changes as $e(1) = 1*1$, $e(3) = 3 * 3^2$, $e(4) = 4^2*4^3$. Notice that the energy for the planet with mass 6 does not change as the summation of the position values (1 + 2 + 3 + 4) will exceed the mass value 9.
So finally the energy values are $e(1) = 1^2$, $e(3) = 3^3$, $e(4) = 4^5$, $e(6) = 6^1$, $e(9) = 9^1$ where 4^5 is the maximum.