Problem D. Pipes selection

Time limit: 4s

Color of balloons: gray

Mario works at a factory. There are n pipes in a row. Let us label the pipes $1, 2, 3, \ldots, n$ from left to right. The factory will deliver a_i units of water per second through pipe i for i from 1 to n. His job is to open some consecutive pipes to make them output exactly j units of water per second, but he doesn't know how to do it. Help Mario to find which segment of pipes to open.

You are given $a_1, a_2, a_3, \ldots, a_n$. Let $s = \sum_{i=1}^{n} a_i$. Your task is to find (l_j, r_j) for all j from 1 to s such that $j = a_{l_j} + a_{l_j+1} + \ldots + a_{r_j}$. Because of his boss' command, if there are k possible (l, r) for j, then (l_j, r_j) is the $\lfloor \frac{k+1}{2} \rfloor$-th smallest one of all possible (l, r). If there are no possible (l, r) for j, then $(l_j, r_j) = (0, 0)$.

We say (x, y) is smaller than (z, w) if $x < z$ or ($x = z$ and $y < w$).

For example, $n = 4$ and (a_1, a_2, a_3, a_4)=(2, 1, 1, 2), then we can find ((l_1, r_1), (l_2, r_2), (l_3, r_3), (l_4, r_4), (l_5, r_5), (l_6, r_6))=((2, 2), (2, 3), (1, 2), (1, 3), (0, 0), (1, 4)).

- There are 2 possible (l, r) for 1 which are $(2, 2), (3, 3)$ and (l_1, r_1) is the 1-th smallest, so $(l_1, r_1) = (2, 2)$.
- There are 3 possible (l, r) for 2 which are $(1, 1), (2, 3), (4, 4)$ and (l_2, r_2) is the 2-th smallest, so $(l_2, r_2) = (2, 3)$.
- There are 2 possible (l, r) for 3 which are $(1, 2), (3, 4)$ and (l_3, r_3) is the 1-th smallest, so $(l_3, r_3) = (1, 2)$.
- There are 2 possible (l, r) for 4 which are $(1, 3), (2, 4)$ and (l_4, r_4) is the 1-th smallest, so $(l_4, r_4) = (1, 3)$.
- There are no possible (l, r) for 5, so $(l_5, r_5) = (0, 0)$.
- There is 1 possible (l, r) for 6 which is $(1, 4)$ and (l_6, r_6) is the 1-th smallest, so $(l_6, r_6) = (1, 4)$.

Input

The first line contains an integer t indicating the total number of test cases. The following lines describe a test case.

The first line of each case contains one integer n, the number of pipes. The second line contains n integers, representing $a_1, a_2, a_3, \ldots, a_n$.

- $1 \leq t \leq 20$
- $0 \leq \min(a_i)$
- $1 \leq \max(n, s) \leq 30000$
- There are at most 5 test cases with $\max(n, s) > 10000$.

Output

For each test case, output on a single line two integers $\sum_{j=1}^{s}((233)^j \times l_j)$ modulo $10^9 + 7$ and $\sum_{j=1}^{s}((233)^j \times r_j)$ modulo $10^9 + 7$.

Sample

standard input	standard output
3 4 2 1 1 2 4 0 1 0 0 6 2 3 2 3 2 1	685473415 769026629 233 932 811854151 883301517