UCF Practice Problem: Minimalist Violinist (Version 1)

Filename: violin1

Violinists must put their fingers down strategically when they play. Each note may require a different finger to be down. We typically refer to the fingers by numbers 1, 2, 3 and 4. Any subset of these four fingers may be down at any given moment of time, but the one that gets played is the maximum of the fingers that are down. For example, if the violinist had the fingers 1, 2 and 4 down, then the note played at that time would correspond to the 4. (A violinist can also be playing on any one of four strings and sometimes play a combination of those strings, but for this problem, we'll just deal with a violinist playing on a single string.) If no fingers are down, then the note played is 0.

A violinist is given a sequence of notes to play, which we can simply designated for the purposes of this problem as a sequence of numbers, each of which is 0, 1, 2, 3 or 4. Here is an example:

0, 0, 4, 4, 1, 3, 1, 2, 1, 4, 0, 0, and 0

One way in which the violinst could play this sequence would be to put no fingers down for the first 2 notes, then place all four fingers down in preparation for the third note, lift up fingers 2, 3 and 4 for the fifth note, put ***just*** the third finger down for the sixth note, lift that third finger for the seventh note, put the second finger down for the eighth note, lift the second finger for the ninth note, put the fourth finger down, followed by removing both the first and fourth finger for the last three notes. This particular method of playing the notes results in 4 + 3 + 1 + 1 + 1 + 1 + 1 + 2 = 14 total finger movements. Note: This isn't the minimum possible, however.

The Problem

Given a sequence of notes (0, 1, 2, 3 or 4) that a violinist must play, determine the minimum number of finger movements necessary to play the sequence. Assume the violinist starts with no fingers down and can end with any subset of her fingers down.

The Input

The first line of the input contains a single positive integer, *n (n ≤ 30),* representing the number of violin sequences described in the input. The cases follow, one per line. The first value on each of these lines is a positive integer, *k (k ≤ 100000)*, representing the length of the sequence. This is followed by *k* space-separated integers, representing the sequence of notes to be played. Each of these values will be 0, 1, 2, 3 or 4.

The Output

For each sequence to be played, output the minimum total number of finger movements necessary to play the sequence on a line by itself.

Sample Input	Sample Output
2 13 0 0 4 4 1 3 1 2 1 4 0 0 0 3 1 4 1	10 3