INOI, Iranian National Olympiad in Informatics
Online Contest, April 2008
Fourth Exam

Necklace

Time limit for each test: 2 seconds
Memory limit: 16 megabytes

A sequence of *Binary Strings* are written in a row, one after another. Parisa wants to pick a subsequence[1] of these strings and stick them together in the coming order, to make one long binary string. After that, she'll stick both ends of this long string to make a "**Binary Necklace**". Note that, she's not allowed to modify, shift, replace, rotate or substitute bits inside string nor flip or change the order of the strings.

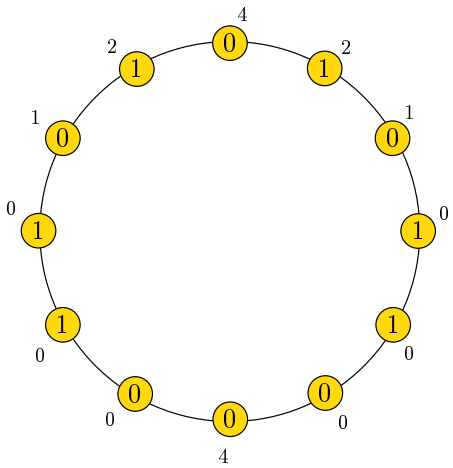
As Parisa is obsessed with symmetry, she defines the "*beauty*" of a bit of the necklace to be the length of the longest binary string which occurs on both sides of that bit, in opposite directions.
For example, the beauty of bit $\underline{0}$ in $\ldots 1011\underline{0}1100\ldots$ is 3, as the first three digits (110) on its left is equal to the reverse of the first three digits on its right (011) and $011\underline{0}110$ is symmetric. If we iterate through the bits on both sides in opposite directions, the first three bits are identical, but the fourth bit isn't. 1100 on its right isn't equal to the reverse of 1011 on its left, so the beauty isn't 4.

On the other hand, Parisa believes the human mind can fail in recognition of long symmetric patterns and thus she assumes the beauty of a bit to be at most 4! (In case the longest binary string on both sides of a bit is more that 4, its beauty is assumed to be 4.)

Therefore, the beauty of every bit of a necklace of n bits is at least 0 and at most 4. Sometimes the strings from different sides of a bit can reach each other and thus have some bits in common. In other words, one bit may have a beauty of larger than $\lfloor \frac{n-1}{2} \rfloor$ in such a necklace.

For example, in this figure a necklace of size 12 is depicted and the beauty of each of its bits are shown beside them. Notice that the beauty of the bit on the top of the figure is ∞, but due to Parisa's belief about the human mind, it's assumed to be 4. Similarly in a necklace of size 30 with bits altenrating between 0 and 1 (i.e. $010101010\ldots$) the beauty of each bit is 4.

Finally, Parisa defines "beauty" of a necklace to be the summation of the beauties of all of its bits. For example, Beauty of the necklace in the figure is 14.



Problem

Write a program that

- Reads n binary strings from the *Standard Input*,
- Finds the most beautiful necklace Parisa can make from a subsequence of given sequence of strings,
- Writes the beauty value of that necklace in the *Standard Output*.

[1] A subsequence S of sequence P is the ordered items resulted from omitting some elements and saving the order of the others. Note that Parisa wants to pick a subsequence of the **binary string** sequence and not a subsequence of their digits. That is, she'll chose some of the binary stings without altering the order or their digits.

Input Sepcification

The first line of input n appears (which is the number of binary strings).
In the second line of input, n space-separated binary strings are given.

Output Specification

In the single line of output, write the beauty of most beautiful necklace, Parisa can make.

Restrictions

- $1 \leq n \leq 100$.
- $1 \leq$ The length of each binary string in the input ≤ 8.

Example

Standard Input	Standard Output
5 01 10 01100 0110 01101	14
1 1	4