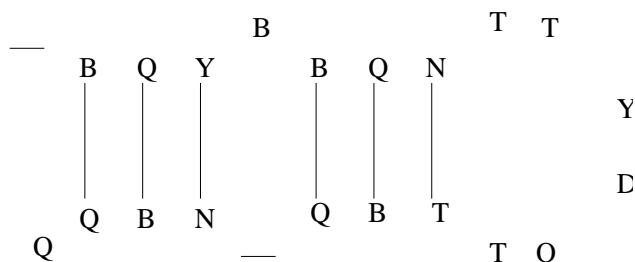


Problem 3 : Sibonian Protein Folding

Problem

The inhabitants of the planet Sibonia, the third planet of the star Eta Eridani, are Silicon-based bipeds. Having not yet evolved to the same extent as Humans, their biochemistry is relatively simple: their proteins consist of just 6 different "Simino Acids". These are Brioline (B), Degtrine (D), Nosinine (N), Quaxine (Q), Travertine (T) and Yttenzine (Y). Furthermore, the folding of their proteins is two-dimensional; it consists of simple Simino Acid pairing. For instance, given the sequence BQYBBQNTTYDQTTBQNBQQ, one possible folding might be:



Here the sequence starts at the top left and goes around clockwise. Paired acids are linked by vertical lines. There are certain pairings which are energetically favorable; these are:

Pairing	Energy reduction
B-Q	5.7
D-Y	4.8
N-T	4.4
B-T	2.1
D-Q	1.6
N-Y	1.0

Table 1: Pairing Relative energy reduction

No other pairings are possible. Naturally, any Simino Acid sequence tends to fold up into the lowest possible energy state. However, there are certain restrictions:

1. No cross-pairing is allowed; if the acid at position i pairs with that at position j , then all acids at positions greater than i must pair with acids at positions less than j ; of course, some of them may not pair at all.
2. There can be no sharp folds. This means that there must be gap of at least 6 Simino Acids between any two that are paired up.
3. Any given Simino Acid can pair with only a single other Simino Acid.

Your task is to write a program that determines the minimum energy folding for any given Simino Acid sequence. The total energy reduction for a given folding is simply the sum of the

reductions caused due to all the pairings in the folding. For instance, the folding in the example given above has a relative energy reduction of 28.2.

Input

The first line of the input will be a number, N , indicating the number of cases in the input. Each of the subsequent N lines will contain a string of Simino Acids (represented by their first letters), of length at most 200.

Output

For each case, output the total relative energy reduction of the optimal folding, in a new line. Print only one digit after the decimal point.

Sample Input

```
3
BDQTNYTQNTYQNTTDQ
QTYNDBDBDYTNQ
YYTQDBYTDBYTDBDBQTYDBT
```

Sample Output

```
12.7
8.8
21.0
```