beCP
2022
Task 1.3: Slogans (slogans)

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Time limit: 3 s Memory limit: 512 MB

Finding a good slogan and formatting it nicely is a hard task that involves a lot of trial-and-error. A slogan is made of symbols: letters, numbers and whitespaces. Professional designers operate symbol by symbol when they have to update the formatting for a slogan, and they charge according to the following rules:

- Removing **the last symbol** costs a fixed amount of money depending on the symbol: removing a whitespace is free, removing a lowercase letter costs 5, removing an uppercase letter costs 10, and removing a number costs the value of the number +1.
- Adding a symbol **at the end of the slogan** requires adjustements to the entire slogan: the cost is the new number of symbols. For example, adding a symbol to an empty slogan costs 1, then adding another symbol costs 2, etc... Please note that adding a whitespace costs the same as adding a letter or a number.

The beOI is asking you to help them with their list of slogan candidates. You start with an empty list, and the beOI will ask you to perform some of the following operations.

1. Add a new slogan to the list.
2. Copy an existing slogan, add new symbols to it, then add it to the list.
3. Compute how much it costs for a professional designer to update the formatting from one slogan to another.

Input

The first line contains an integer q: the number of operations to perform. Then each of the following lines contains a number *op*, the operation to perform.

If *op* is 1, the rest of the line contains a slogan to add to the list, enclosed by ".

If *op* is 2, the rest of the line contains i: the index of the existing string, and then the rest of the line contains symbols to add to a new copy of the i-th slogan option, to be inserted at the end of the list.

If *op* is 3, the rest of the line contains two integers a and b: the index of two strings in the list.

The indexes i, a and b start at 0: the first slogan has index 0, the second has index 1, and so on... The slogans are guaranteed to exist in the list.

Output

For every operation of type 3, print a line containing one number: the minimum possible cost of converting a slogan for the a-th symbol sequence to a slogan for the b-th symbol sequence.

General limits

- $1 \leq q \leq 10^6$, the number of operations to perform.
- the combined length of all the input strings (what is enclosed by `"`) is $L \leq 10^6$.

Important remark: Some of the answers might exceed the range of 32-bit integers, so make sure to use `long long`.

Additional constraints

Subtask	Points	Constraints
A	10	$q \leq 10^4$, there is no operation of type 2, all slogans start with a different symbol.
B	30	$q \leq 10^4$, $L \leq 10^4$
C	60	No additional constraint

Example 1

sample1.in

```
4
1 "All"
2 0 " theM pAiN"
2 0 " the medals"
3 1 2
```

sample1.out

```
117
```

After the first three operations, the slogans are `All`, `All theM pAiN` and `All the medals`. Then we need to compute how much going from `All theM pAiN` to `All the medals` costs.

The cheapest way is to first go from `All theM pAiN` to `All the`, removing the following symbols: `N`, `i`, `A`, `p`, (whitespace), `M` for a cost of $10+5+10+5+0+10=40$.

Then, going from `All the` to `All the medals` costs 8 for the whitespace, 9 for the `m`, and so on... for a cost of $8+9+10+11+12+13+14=77$.

The total cost is $40+77=117$.

This sample is only valid for subtasks B and C.

Example 2

sample2.in

```
4
1 "just do it"
1 "2022 Life"
3 0 1
3 1 0
```

sample2.out

```
85
90
```

To go from `just do it` to `2022 Life`, the total cost is 85.

To go from `2022 Life` to `just do it`, the total cost is 90. Note that removing a `2` costs 3 and removing a `0` costs 1 as explained above.

This sample is valid for all subtasks.