2008. Minimum Cost to Change the Final Value of Expression

Difficulty : Hard

https://leetcode.com/problems/minimum-cost-to-change-the-final-value-of-expression

You are given a **valid** boolean expression as a string `expression` consisting of the characters `'1'`,`'0'`,`'&'` (bitwise **AND** operator),`'|'` (bitwise **OR** operator),`'('`, and `')'`.

- For example, `"()1|1"` and `"(1)&()"` are **not valid** while `"1"`, `"(((1))|(0))"`, and `"1|(0&(1))"` are **valid** expressions.

Return *the **minimum cost** to change the final value of the expression*.

- For example, if `expression = "1|1|(0&0)&1"`, its **value** is `1|1|(0&0)&1 = 1|1|0&1 = 1|0&1 = 1&1 = 1`. We want to apply operations so that the **new** expression evaluates to `0`.

The **cost** of changing the final value of an expression is the **number of operations** performed on the expression. The types of **operations** are described as follows:

- Turn a `'1'` into a `'0'`.
- Turn a `'0'` into a `'1'`.
- Turn a `'&'` into a `'|'`.
- Turn a `'|'` into a `'&'`.

Note: `'&'` does **not** take precedence over `'|'` in the **order of calculation**. Evaluate parentheses **first**, then in **left-to-right** order.

Example 1:

```
Input: expression = "1&(0|1)"
Output: 1
Explanation: We can turn "1&(0|1)" into "1&(0&1)" by changing the '|' to a '&' using 1 operation.
The new expression evaluates to 0.
```

Example 2:

```
Input: expression = "(0&0)&(0&0&0)"
Output: 3
Explanation: We can turn "(0&0)&(0&0&0)" into "(0|1)|(0&0&0)" using 3 operations.
The new expression evaluates to 1.
```

Example 3:

```
Input: expression = "(0|(1|0&1))"
Output: 1
Explanation: We can turn "(0|(1|0&1))" into "(0|(0|0&1))" using 1 operation.
The new expression evaluates to 0.
```

Constraints:

- `1 <= expression.length <=` 10^5
- `expression` only contains `'1'`,`'0'`,`'&'`,`'|'`,`'('`, and `')'`
- All parentheses are properly matched.
- There will be no empty parentheses (i.e: `"()"` is not a substring of `expression`).