

String Compression in C++

```
#include <iostream>
#include <string>
using namespace std;

string compression1(string str) {
    if (str.empty()) return ""; // Handle edge case

    string s;
    s += str[0]; // Append the first character directly
    for (int i = 1; i < str.length(); i++) {
        char curr = str[i];
        char prev = str[i - 1];
        if (curr != prev) {
            s += curr; // Append only if current character is
            different from previous
        }
    }
    return s;
}

string compression2(string str) {
    if (str.empty()) return ""; // Handle edge case

    string s;
    s += str[0]; // Append the first character directly
    int count = 1;
    for (int i = 1; i < str.length(); i++) {
        char curr = str[i];
        char prev = str[i - 1];
        if (curr == prev) {
            count++; // Increment count for consecutive
            characters
        } else {
            if (count > 1) {
                s += to_string(count); // Append count if it's
                greater than 1
                count = 1; // Reset count
            }
            s += curr; // Append current character
        }
    }
    if (count > 1) {
        s += to_string(count); // Append the final count if
        needed
    }
    return s;
}

int main() {
    string str = "wwwaaadexxxxxx";
    cout << compression1(str) << endl;
    cout << compression2(str) << endl;
    return 0;
}
```

Step-by-Step Dry Run: compression2("wwwaaadexxxxxx")

| i | curr | prev | count | Output so far | Action |
|-----|------|------|-------|---------------|---------------------|
| 1 | w | w | 2 | w | same, count++ |
| 2 | w | w | 3 | w | same, count++ |
| 3 | w | w | 4 | w | same, count++ |
| 4 | a | w | 1 | w4a | append 4, then a |
| 5 | a | a | 2 | w4a | same, count++ |
| 6 | a | a | 3 | w4a | same, count++ |
| 7 | d | a | 1 | w4a3d | append 3, then d |
| 8 | e | d | 1 | w4a3de | different, append e |
| 9 | x | e | 1 | w4a3dex | append x |
| 10 | x | x | 2 | w4a3dex | same, count++ |
| 11 | x | x | 3 | w4a3dex | same, count++ |
| 12 | x | x | 4 | w4a3dex | same, count++ |
| 13 | x | x | 5 | w4a3dex | same, count++ |
| 14 | x | x | 6 | w4a3dex | same, count++ |
| end | | | | w4a3dex6 | append 6 |

📦 Final Output

wadex
w4a3dex6

wadex
w4a3dex6