CP1H3 Script, Output, and Pseudocode

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Algorithm 1 Molecular Calculator

```
procedure MOLECULAR CALCULATOR
    Create necessary variables
    while User wants to input more do
        Ask for name of acid
        Ask for number of oxygen atoms
        Ask for number of carbon atoms
        Ask for number of nitrogen atoms
        Ask for number of sulfur atoms
        Ask for number of hydrogen atoms
        Perform calculations
        Print molecular weight
        Print average atomic weight
```

Listing 1: CP1H3 Script

```
/*
 * ============================================================================
 *
 *       Filename:  CP1H3_MBROD.cpp
 *       Assignment: C++ Lab #1 Homework 3
 *       Title: Molecular Weight Calculator
 *
 *    Description:  Takes atomic information to calculate weight
 *
 *        Version:  1.0
 *        Created:  11/05/2022
 *       Revision:  none
 *       Compiler:  GCC
 *
```

```
 *          Author:  M. Brodskiy
 *
 * ================================================================
 */
#include <iostream>  // Include header file to input/output
#include <iomanip>  // Include header file to manipulate input
#include <string>   // Include header file for string variable

using namespace std; // Declare standard namespace use

// Declare Variables
string ans("Yes");
string name("");
double oxygenWeight = 15.9994;
double carbonWeight = 12.011;
double nitrogenWeight = 14.00674;
double sulfurWeight = 32.066;
double hydrogenWeight = 1.00794;
double totalWeight;
int oCount, cCount, nCount, sCount, hCount, allCount;

// Main Program
int main() {

do { // Keep looping until user says no

    cout << "Enter the name of the acid: ";
    // Request name of acid
    cin >> name; // Store name in variable

    // Ask for all atom quantities
    cout << "Enter # of atoms of Oxygen: ";
    cin >> oCount;
    // Add to total weight
    totalWeight = oCount * oxygenWeight;

    cout << "Enter # of atoms of Carbon: ";
    cin >> cCount;
    totalWeight = totalWeight + cCount * carbonWeight;

    cout << "Enter # of atoms of Nitrogen: ";
    cin >> nCount;
    totalWeight = totalWeight + nCount * nitrogenWeight;

    cout << "Enter # of atoms of Sulfur: ";
```

```
60      cin >> sCount;
61      totalWeight = totalWeight + sCount * sulfurWeight;
62
63      cout << "Enter # of atoms of Hydrogen: ";
64      cin >> hCount;
65      totalWeight = totalWeight + hCount * hydrogenWeight;
66
67      // Count all atoms
68      allCount = oCount + cCount + nCount + sCount + hCount;
69
70      cout << fixed << setprecision(3);
71      cout << "The total molecular weight of " << name << " is: "
<< totalWeight << " u" << endl;
72      cout << "The average atomic weight of " << name << " is: "
<< (totalWeight / allCount) << " u" << endl;
73
74      // Ask user if they would like to calculate again
75      cout << "Would you like to calculate another acid?" << endl;
76
77      cout << "Enter 'Yes' or 'No': ";
78      cin >> ans; // Store user input
79
80  } while(ans!="No");
81
82  }
```

Listing 2: CP1H3 Output

```
1  Enter the name of the acid: Cysteine
2  Enter # of atoms of Oxygen: 2
3  Enter # of atoms of Carbon: 3
4  Enter # of atoms of Nitrogen: 1
5  Enter # of atoms of Sulfur: 1
6  Enter # of atoms of Hydrogen: 7
7  The total molecular weight of Cysteine is: 121.160 u
8  The average atomic weight of Cysteine is: 8.654 u
9  Would you like to calculate another acid?
10 Enter 'Yes' or 'No': Yes
11 Enter the name of the acid: Glycine
12 Enter # of atoms of Oxygen: 2
13 Enter # of atoms of Carbon: 2
14 Enter # of atoms of Nitrogen: 1
15 Enter # of atoms of Sulfur: 0
16 Enter # of atoms of Hydrogen: 5
17 The total molecular weight of Glycine is: 75.067 u
```

```
The average atomic weight of Glycine is: 7.507 u
Would you like to calculate another acid?
Enter 'Yes' or 'No': Yes
Enter the name of the acid: Methionine
Enter # of atoms of Oxygen: 2
Enter # of atoms of Carbon: 5
Enter # of atoms of Nitrogen: 1
Enter # of atoms of Sulfur: 1
Enter # of atoms of Hydrogen: 11
The total molecular weight of Methionine is: 149.214 u
The average atomic weight of Methionine is: 7.461 u
Would you like to calculate another acid?
Enter 'Yes' or 'No': No
```