GE1111

Lab # 3

Tutorial for Learning C++

Amino Acid Molecular Weights

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**Pseudocode**

include appropriate headers

make an ordered list of the atomic masses of each element

make an empty list to hold the number of each atom

prompt the user to ask how many of each atom there are

put their responses into the list in the same order as the atomic masses

multiply the atomic masses by the corresponding number of atoms, and sum the products

print the sum

pause and exit the program

**Source Code**

#include <iostream>

using namespace std;

//atomic masses

const double atomic\_masses [5] = {15.9994, 12.011, 14.00674, 32.066, 1.007};

const int array\_size = 5;

//Declare an array of the numbers of atoms in the specified amino acid

double atom\_number [array\_size];

//Declare a double of the calculated molecular mass of the specified amino acid

double final\_molec\_mass;

int main(void)

{

//Prompt user for the number and type of atoms in the amino acid

cout << "How many Oxygen atoms are in the amino acid? \n\n";

cin >> atom\_number[0];

cout << "How many Carbon atoms are in the amino acid? \n\n";

cin >> atom\_number[1];

cout << "How many Nitrogen atoms are in the amino acid? \n\n";

cin >> atom\_number[2];

cout << "How many Sulfur atoms are in the amino acid? \n\n";

cin >> atom\_number[3];

cout << "How many Hydrogen atoms are in the amino acid? \n\n";

cin >> atom\_number[4];

//Variable to be iterated : n, Condition to continue iterating: n < size of our atom\_number array, Rate of iteration: n++ or n + 1

for (int n=0; n<array\_size; n++)

{

final\_molec\_mass += (atom\_number[n] \* atomic\_masses[n]);

}

cout << "The mass of the amino acid is: " << final\_molec\_mass << "\n\n";

//Exit the program

system("pause");

return 0;

}

**Errors**

Since we decided to write the code using features of C++ that we were not yet formally taught, we encountered some errors that were difficult to diagnose. In particular, working with arrays and proved difficult, as neither of us were used to using them with C++. We knew what they should do from prior experience in other languages, so once we solved the syntactical errors things proceded smoothly. Originally we had attempted to use functions in the program, but we encountered scope errors which we could not solve. In the for loop for calculating the total mass, we had been getting 0 as the mass for any combination of atoms, which turned out to be the result of having the order of the arguments wrong in the for loop; once this was corrected everything worked as expected.