In this article, let’s learn how to print each word in a sentence with their corresponding average of ASCII values. The aim is to calculate the average ASCII value of each word in the given sentence, then print it alongside the word.

**Let’s understand the problem with few examples:**

The initial steps to calculating the average value of each word in a sentence is to find the ASCII value of each character in a word and then find their average to get the average ASCII value of that word.

**Example 1:**

Let’s take the input string as “Taj Mahal”. It consists of two words “Taj” and “Mahal”. The word “Taj” has three characters whose ASCII values are 84, 97 and 106. So, the average value of “My” is (84+97+106)/3=95. Similarly, average value of “Mahal” is (77+97+104+97+108)/5=96.

So, the output of this example should be:

Taj - 95

Mahal - 96

**Example 2:**

Let’s take another example to understand it clearer where the input string is “hello world”. It consists of two words “hello” and “world”. The word “Hello” has five characters whose ASCII values are 104,101, 108, 108, and 111. So, the average value of “hello” is (104+101+108+108+111)/5=106. Similarly, the average value of “world” is (119+111+114+108+100)/5=110.

So, the output of this example should be:

Hello - 106

World - 110

## **Approach 1: Without using string vector**

I think now the problem statement is clearer to you, let's see how to solve it using naive algorithm and code implementation for the same.

### **Algorithm**

**Step 1:** Create a calculateAverage function, which accepts a string input given by the user.

**Step 2:** Initialize an empty string word and an Integer variable sum with 0.

**Step 3:** Using a for loop to go through each word of the sentence one by one and calculate the sum of ASCII value of each word.

**Step 4:** Calculate the average ASCII value of the word by dividing the sum with the length of the word.

**Step 5:** Print the word along with its average ASCII value.

### **Explanation**

In this approach, we are using a simple method to solve the problem using string and break the string into words whenever we encounter space “ “ we print the last word and its average of ASCII values. It uses a for loop to find the sum of each character in a word and then calculate its average by dividing the sum with the word length.

### **Program**

|  |
| --- |
| #include <iostream>  #include <string>  using namespace std;  void calculateAverage(string sentence)  {  string word = "";  int sum = 0;  int len = sentence.length();  for (int i = 0; i < len; ++i) {  if (sentence[i] == ' ') {  int average = sum / word.length();  cout << word << " - "  << average << endl;  word.clear();  sum = 0;  }  else {  sum += sentence[i];  word += sentence[i];  }  }  int average = sum / word.length();  cout << word << " - " << average;  }  int main()  {  string sentence;  cout << "Enter a sentence: ";  getline(cin, sentence);  calculateAverage(sentence);  return 0;  } |

**Output:**

|  |
| --- |
| Enter a sentence: Hello World  Hello - 100  World - 104 |

Now we have successfully implemented the c++ program using naive approach. Let’s look at the second approach which is using vector string.

## **Approach 2: Using string vector**

### **Algorithm**

**Step 1:** In this algorithm, we take input as a string using the getline function.

**Step 2:** Create a stringstream object ss and pass the input string to it.

**Step 3:** Define a string vector “words”. = and a string “word”.

**Step 4:** Use a while loop to enter each word of the input string in the vector words.

**Step 5:** Then with the help of a for loop go through each word of the vector, calculate its average ASCII value and print the word with its corresponding average ASCII values.

### **Explanation**

The approach uses the string, vector, and stringstream header file with some common input/output libraries. In this approach, the input string is divided into words and saved into a vector string. Then for each word in the vector, we calculate the average ASCII value with the help of a for loop. Finally, We print the word with its average ASCII value.

### **Program**

|  |
| --- |
| #include <iostream>  #include <string>  #include <vector>  #include <sstream>  using namespace std;  int main() {  string sentence;  cout << "Enter a sentence: ";  getline(cin, sentence);  stringstream ss(sentence);  vector<string> words;  string word;  while (ss >> word) {  words.push\_back(word);  }  for (int i = 0; i < words.size(); i++) {  int avgAscii = 0;  for (int j = 0; j < words[i].length(); j++) {  avgAscii += (int)words[i][j];  }  avgAscii /= words[i].length();  cout << words[i] << " - " << avgAscii << endl;  }  return 0;  } |

**Output:**

|  |
| --- |
| Enter a sentence: Hello World  Hello - 100  World - 104 |

## **Conclusion**

In this article, we learn two different approaches to print each word in a sentence with their corresponding average of ASCII values. We understand how to split a sentence into words. We learn and solve the problem with explanations and with the help of a program we can easily print the word with its corresponding ASCII value.