1. Word separator

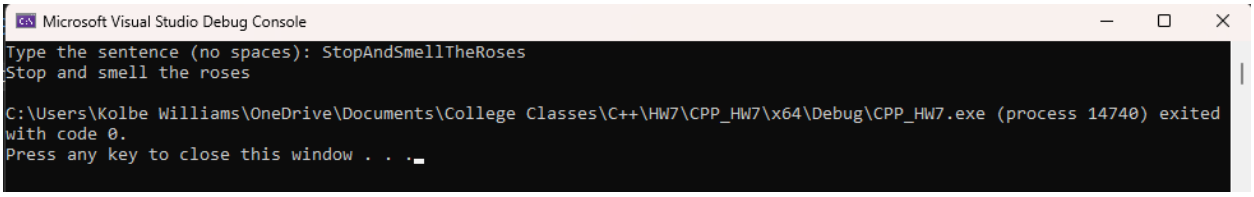
Write a program that accepts as input a sentence in which all of the words are run together, but the first character of each word is uppercase. Convert the sentence to a string in which the words are separated by spaces and only the first word starts with an uppercase letter. For example, the string “StopAndSmellTheRoses.” would be converted to “Stop and smell the roses.”

Source Code:

```
//DO NOT MODIFY THIS SECTION
#define _CRT_SECURE_NO_WARNINGS
#include <iostream>
#include <cstring>
using namespace std;

//prototypes (USE ONLY IF YOU WILL USE FUNCTIONS)

int main()
{
    string input, separated;
    cout << "Type the sentence (no spaces): ";
    cin >> input;
    //ADD YOUR CODE FROM HERE
    //1. Find the size of the input and put it in a constant variable
    const int SIZE = input.size();

    //2. Use a for loop to traverse the input
    for (int i = 0; i < SIZE; i++)
    {
        //2.1 Check if the character is an uppercase letter
        if (isupper(input[i]))
        {
            //2.1.1 On the first letter, simply add the character to the new string
            if (i == 0)
            {
                separated += input[i];
            }
            //2.1.2 On the rest of the uppercase letters, add a space and then the
character to the
            //new string in lowercase
            else
            {
                separated += ' ';
                separated += tolower(input[i]);
            }
        }
        //2.2 If the character isn't an uppercase letter, add the character to the
new string
        else
            separated += input[i];
    }


    //3. Print the new, separated string
    cout << separated << endl;
```

```
    return 0;
}
```

Output:



2. Weather statistics

Write a program that uses a structure to store the following weather data for a particular month:

- Total Rainfall
- High Temperature
- Low Temperature
- Average Temperature

The program should have an array of 12 structures to hold weather data for an entire year. When the program runs, it should ask the user to enter data for each month. (The average temperature should be calculated.)

Once the data are entered for all the months, the program should calculate and display the average monthly rainfall, the total rainfall for the year, the highest and lowest temperatures for the year (and the months they occurred in) (use index), and the average of all the monthly average temperatures.

Input Validation: Only accept temperatures in the range -100 to +140 degrees Fahrenheit.

Source Code:

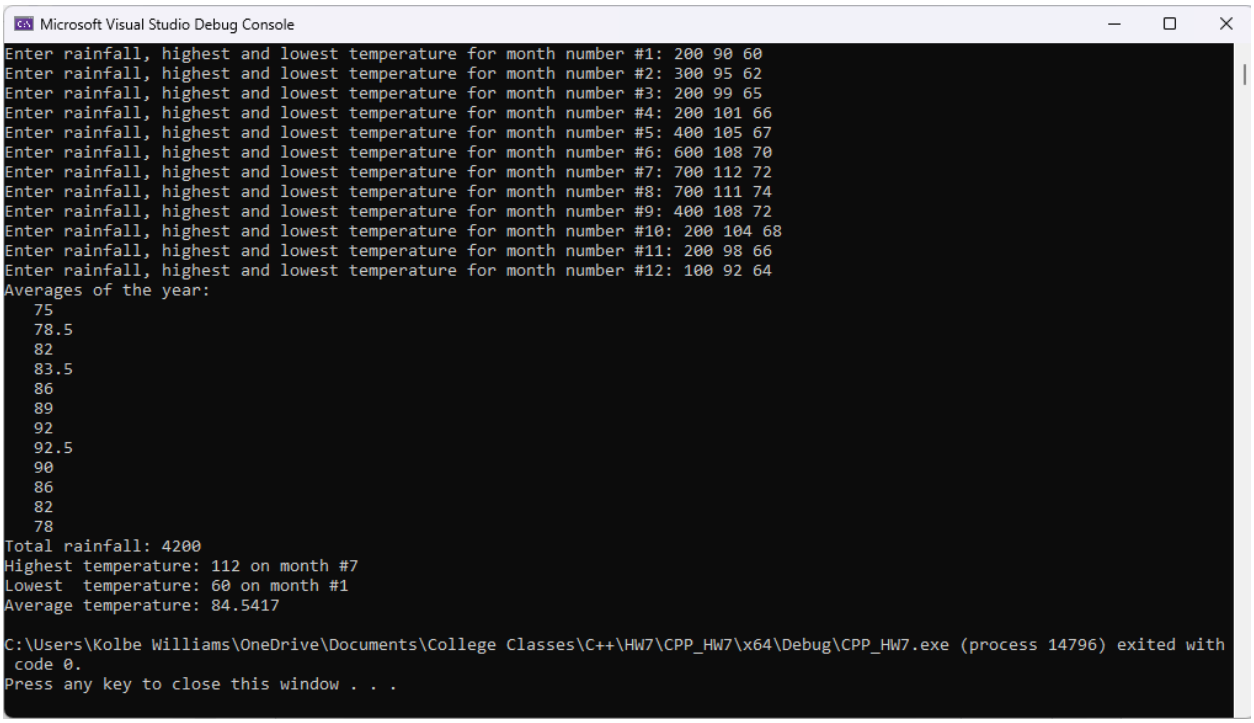
```
//DO NOT MODIFY THIS SECTION
#include <iostream>
#include <fstream>
using namespace std;

struct Weather
{
    int rainfall;
    int hTemp;
    int lTemp;
    float avg;
```

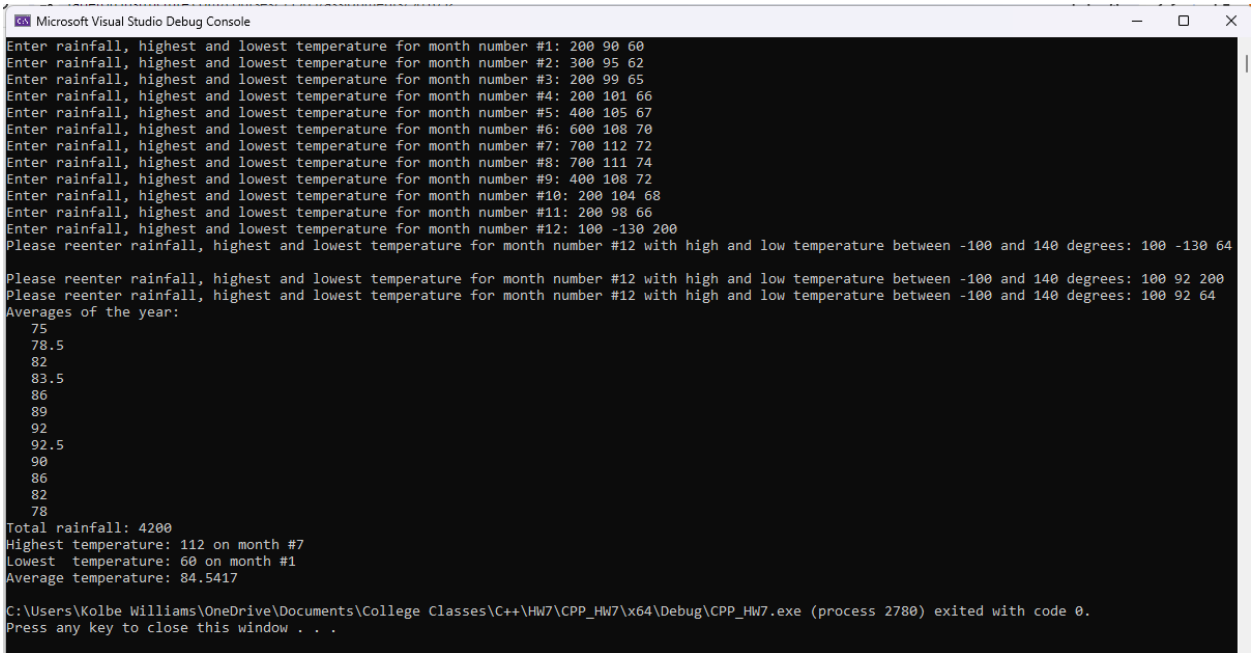
```
};

//prototypes (USE ONLY IF YOU WILL USE FUNCTIONS)
int highTemp(Weather[], int, int&);
int lowTemp(Weather[], int, int&);
float averageTemp(Weather[], int, float);

int main()
{
    //USE THIS DATA ONLY FOR TESTS.
    //THE DATA MUST BE INTRODUCED BY THE USER OR FROM FILE
    /*Weather year[12] = {200,  90, 60, 0.0,
                            300,  95, 62, 0.0,
                            200,  99, 65, 0.0,
                            200, 101, 66, 0.0,
                            400, 105, 67, 0.0,
                            600, 108, 70, 0.0,
                            700, 112, 72, 0.0,
                            700, 111, 74, 0.0,
                            400, 108, 72, 0.0,
                            200, 104, 68, 0.0,
                            200,  98, 66, 0.0,
                            100,  92, 64, 0.0 };*/
    //ifstream ifile;
    int highest, lowest, totalRain = 0, fullAverage;
    float sumAvg = 0;
    //ADD YOUR CODE FROM HERE
    //1. Initialize highest, lowest, and fullAverage variables for later use, and
declare the array
    highest = lowest = 0;
    fullAverage = 12;
    Weather year[12];

    //2. Use a for loop to traverse the array and ask the user for input about each
month
    for (int i = 0; i < 12; i++)
    {
        cout << "Enter rainfall, highest and lowest temperature for month number #"
<< i + 1 << ": ";
        //2.1 Use a do-while loop for input validation with the high and low
temperatures
        do {
            cin >> year[i].rainfall;
            cin >> year[i].hTemp;
            cin >> year[i].lTemp;
            if (year[i].hTemp < -100 || year[i].hTemp > 140 || year[i].lTemp < -100
|| year[i].lTemp > 140)
                cout << "Please reenter rainfall, highest and lowest temperature for
month number #" << i + 1 << " with high and low temperature between -100 and 140
degrees: ";
        } while (year[i].hTemp < -100 || year[i].hTemp > 140 || year[i].lTemp < -100
|| year[i].lTemp > 140);
        //2.2 Use the user input to calculate the average temperature for each month
        year[i].avg = (static_cast<float>(year[i].hTemp) + year[i].lTemp) / 2;
    }

    //3. Display the temperature averages for each month using another for loop
    cout << "Averages of the year: " << endl;
```

```
    for (int i = 0; i < 12; i++)
    {
        cout << "   " << year[i].avg << endl;
        //3.1 Calculate the total rainfall within the same for loop
        totalRain += year[i].rainfall;
    }

    //4. Display the results by calling the highTemp, lowTemp, and averageTemp
functions
    cout << "Total rainfall: " << totalRain << endl;
    cout << "Highest temperature: " << highTemp(year, 12, highest) << " on month #"
<< highest << endl;
    cout << "Lowest  temperature: " << lowTemp(year, 12, lowest) << " on month #" <<
lowest << endl;
    cout << "Average temperature: " << averageTemp(year, fullAverage, sumAvg) <<
endl;

    return 0;
}

//5. Write the hightemp function
int highTemp(Weather year[], int size, int &hMonth)
{
    //5.1 Set the hMonth variable that was passed by reference to the first month
    int i = 0;
    hMonth = 1;
    int high = year[i].hTemp;
    //5.2 Traverse the array and find the highest temperature from the year
    for (i = 1; i < size; i++)
    {
        if (year[i].hTemp > high)
        {
            //5.3 Set the highest temperatue and month variables when found
            high = year[i].hTemp;
            hMonth = i + 1;
        }
    }
    return high;
}

//6. Write the lowTemp function
int lowTemp(Weather year[], int size, int &lMonth)
{
    //6.1 set the lMonth variable that was passed by reference to the first month
    int i = 0;
    lMonth = 1;
    int low = year[i].lTemp;
    //6.2 Traverse the array to find the lowest temperature from the year
    for (i = 1; i < size; i++)
    {
        if (year[i].lTemp < low)
        {
            //6.3 Set the lowest temperature and month variables when found
            low = year[i].lTemp;
            lMonth = i + 1;
        }
    }
    return low;
```

```
}

//7. Write the average Temp function
float averageTemp(Weather year[], int fullAverage, float sumAvg)
{
    //7.1 Traverse the array and add all of the average temperature for each month
together
    for (int i = 0; i < fullAverage; i++)
        sumAvg += year[i].avg;
    //7.2 Returen the sum of the average temperature for the year divided by 12
    return sumAvg / fullAverage;
}
```

Output:




Microsoft Visual Studio Debug Console
Enter rainfall, highest and lowest temperature for month number #1: 200 90 60
Enter rainfall, highest and lowest temperature for month number #2: 300 95 62
Enter rainfall, highest and lowest temperature for month number #3: 200 99 65
Enter rainfall, highest and lowest temperature for month number #4: 200 101 66
Enter rainfall, highest and lowest temperature for month number #5: 400 105 67
Enter rainfall, highest and lowest temperature for month number #6: 600 108 70
Enter rainfall, highest and lowest temperature for month number #7: 700 112 72
Enter rainfall, highest and lowest temperature for month number #8: 700 111 74
Enter rainfall, highest and lowest temperature for month number #9: 400 108 72
Enter rainfall, highest and lowest temperature for month number #10: 200 104 68
Enter rainfall, highest and lowest temperature for month number #11: 200 98 66
Enter rainfall, highest and lowest temperature for month number #12: 100 -130 200
Please reenter rainfall, highest and lowest temperature for month number #12 with high and low temperature between -100 and 140 degrees: 100 -130 64
Please reenter rainfall, highest and lowest temperature for month number #12 with high and low temperature between -100 and 140 degrees: 100 92 200
Please reenter rainfall, highest and lowest temperature for month number #12 with high and low temperature between -100 and 140 degrees: 100 92 64
Averages of the year:
75
78.5
82
83.5
86
89
92
92.5
90
86
82
78
Total rainfall: 4200
Highest temperature: 112 on month #7
Lowest temperature: 60 on month #1
Average temperature: 84.5417
C:\Users\Kolbe Williams\OneDrive\Documents\College Classes\C++\HW7\CPP_HW7\x64\Debug\CPP_HW7.exe (process 2780) exited with code 0.
Press any key to close this window . . .