

```

1  #include <iostream>
2  #include <fstream>
3  using namespace std;
4
5  #define MAXLINE 100
6
7  int getLenChars(char str[])
8  { // returns number of characters in a string
9      int i = 0;
10     int len = 0;
11
12     while (str[i] != '\0')
13     {
14         len++;
15         i++;
16     }
17     return len;
18 }
19
20 void toUpper(char input[])
21 {
22     int length = getLenChars(input);
23     for (int i = 0; i < length; i++)
24     {
25         if ((input[i] >= 'a') && (input[i] <= 'z'))
26             // if the character is lowercase
27             input[i] -= 32; // maker uppercase
28     }
29 }
30
31
32 bool isLetter(char c)
33 {
34     return((c >= 'A' && c <= 'Z') || (c >= 'a' && c <= 'z'));
35 }
36
37 void countChars(char inputLine[], int len, int counts[], int &totalLetters)
38 {
39     for (int i = 0; i < len; i++)
40     {
41         if (isLetter(inputLine[i]) )
42         {
43             totalLetters++;
44             counts[int(inputLine[i]) - 65]++;
45         }
46     }
47 }
48
49 void printCounts(int counts[])
50 {
51     for (int i = 0; i < 26; i++)
52     {
53         cout << char(i+65) << " : " << counts[i] << endl;
54     }
55 }
56
57 void findFrequencies(int counts[], int totalLetters, float frequencies[])
58 {
59     for (int i = 0; i < 26; i++)
60     {
61         if (counts[i] > 0)
62         {
63             frequencies[i] = (0.0+counts[i])/(0.0+totalLetters);
64         }
65     }
66 }
67
68
69 void printFrequencies(float frequencies[])

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70 {
71     for (int i = 0; i < 26; i++)
72     {
73         cout << char(i+65) << " : " << frequencies[i] << endl;
74     }
75 }
76
77 void printAllData(int counts[],float frequencies[],int totalLetters)
78 {
79     cout << "Total letter count: " << totalLetters << endl;
80     cout << endl;
81     for (int i = 0; i < 26; i++)
82     {
83         cout << char(i+65) << ": count: " << counts[i] << " frequencies: " <<
            frequencies[i] << endl;
84     }
85 }
86
87
88 int main()
89 {
90     ifstream file;
91     file.open("input.txt", ios_base::in);
92     int counts[26] = {0}; // counts[0] is count of A; [1] for Z
93     int totalLetters = 0;
94     float frequencies[26] = {0.0};
95     char inputLine[MAXLINE];
96     while (file.getline(inputLine, MAXLINE))
97     {
98         toUpper(inputLine);
99         int len = getLenChars(inputLine);
100         countChars(inputLine, len, counts, totalLetters);
101     }
102     findFrequencies(counts, totalLetters, frequencies);
103     printAllData(counts, frequencies, totalLetters);
104     file.close();
105
106     return 0;
107 }

```