5 Distance between Two Words

5.1 Using math Functions

C provides various mathematical functions including sqrt, floor, ceil, exp, and log. Some functions are provided in different names depending on types, say sqrt for double, sqrtf for float, and sqrtl for long double. You may refer to the manual for details.

The following shows a sample program measuring the distance of a string from the origin in a two-dimensional Cartesian plane assuming that a string corresponds to a point (a, b) where a is the number of alphabets in the string and b, that of other characters including special symbols.

```c
#include <stdio.h>
#include <string.h>
#include <math.h>

int main()
{
    char   str[41] = "Hello world!";
    size_t len = strlen(str);
    int    x = 0, y = 0;

    for (int i = 0; i < len; ++i) {
        char c = str[i];
        if ('a' < c && c < 'z' || 'A' < c && c < 'Z')
            x++;
        else
            y++;
    }
    double sqsum = x * x + y * y;
    printf("d(\"%s\") = %f\n", str, sqrt(sqsum));

    return 0;
}
```

Beware that the program should include <math.h> to use math functions be compiled with the option -lm, indicating the math library should be linked with.

5.2 Programming Lab 5: wdist.c

Reading two words from the input lines, calculate the distance between the words assuming the words correspond to points in two dimensional Cartesian plane. The words consists of alphabets only. Assume that a word corresponds to a point (x, y) where x is the number of vowels and y, the number of consonants. Given two words "HELLO" and "WORLD", the former corresponds $(2, 3)$ and the latter, $(1, 4)$. And the distance of them is $\sqrt{2}$ (1.414 in approximation). Your program should define and use the function calculating the distance between two points in a two-dimensional plane.

The input consists of two lines in standard input. Each line contains a alphabetic words. The maximum length of the words is 40. Your program should print to standard output. Print the distance rounding to three decimal places after the decimal point.

Additional requirements for bonus points

- Use for loops instead of other looping structures, but do not use the library function strlen.

- Check the quality of your code to confirm that there are no style issues.

Input	Output
`HELLO` `WORLD`	`1.414`
`C` `Programming`	`7.616`