

Assignment 8: Treasure Box

8.1 Character Classes

C provides several functions determining the kind of a character. For example, `isalpha(c)` returns 1 if `c` is an alphabet. To use `isalpha`, `<ctype.h>` should be included. The header file also declares `isdigit`, `isxdigit`, `isalnum`, `islower`, `isupper`, `isascii`, `isblank`, `isctrl`, `isgraph`, `isprint`, `ispunct`, and `isspace`. The following code shows an example of how to use them:

```
1 #include <stdio.h>
2 #include <ctype.h>
3
4 int main() {
5     char p[] = "I like C programming!";
6     int n = 0, u = 0;
7     while (c = *s++) {
8         if (isalpha(c)) {
9             n++;
10            if (isupper(c))
11                u++;
12        }
13    }
14    printf("%s' has %d alphabets including %d capital letters\n", p, n, u);
15    return 0;
16 }
```

Note that a pointer variable `s` is used to scan the whole string. Also, note that the assignment to `c` in the condition `while` is intentional to reuse the dereferenced character.

8.2 Programming Assignment 8: finding.c

You just arrived on a treasure island and want to find the treasure box buried on the island. Fortunately, you have a secret string code for it. The string code directs the way to the treasure box in a tricky way: a vowel (one of `a`, `e`, `i`, `o`, and `u`) in the string directs a unit distance to the x -coordinate and a consonant does one to the y -coordinate. n cards ($n > 0$). Encountering a space, you have to retract a step, i.e. go to the previous position. The treasure is represented by a capital letter in the string. Assuming that you are in the origin initially, you want to find the coordinates of the treasure box deciphering the string code.

Having the following code, for example:

```
it is not easy to finD it
```

the treasure is denoted by 'D,' and you have to follow the character codes before it. Deciphering 'it,' the location is (1, 1) resulted by a step to x -direction due to 'i' and by one to y -direction due to 't.' But you have to retract to (1, 0) since a space is encountered after 'it.' Continuing the deciphering procedure, you can eventually find the location of the treasure box, which is (6, 5).

The input consists of a single line containing the secret string code. The maximum length of the code is 97 excluding the newline and the null characters. The code contains alphabets and spaces only. There is only one capital letter in the code, denoting the treasure box. Your program should print the x and y coordinates to standard output separated by space.

Additional requirements for bonus points

- Define and use the function `isvowel(c)` returning 1 if `c` is a vowel and 0, otherwise.

- Define and use the function `isconsonant(c)` returning 1 if `c` is a consonant and 0, otherwise.
- Use a single `switch` statement in your code for selection structures; no `if` statements are allowed.

Input	Output
it is not easy to finD it	6 5
do you like C language	2 4