

計算機程式語言

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Chapter 7_project 4

Write a program that translates an alphabetic phone number into numeric form:

```
Enter phone number: CALLATT
```

```
2255288
```

(In case you don't have a telephone nearby, here are the letters on the keys: 2=ABC, 3=DEF, 4=GHI, 5=JKL, 6=MNO, 7=PRS, 8=TUV, 9=WXYZ.) If the original phone number contains nonalphabetic characters (digits or punctuation, for example), leave them unchanged:

```
Enter phone number: 1-800-COL-LECT
```

```
1-800-265-5328
```

You may assume that any letters entered by the user are upper case.

Solution

```
1  #include <stdio.h>
2
3  ✓ int main(void) {
4      char c;
5      printf("Enter phone number: ");
6  ✓  while ((c = getchar()) != '\n') {
7  ✓      switch (c) {
8  ✓
9
10
11  ✓
12
13
14  ✓
15
16
17  ✓
18
19
```

Solution

```
20
21
22
23
24
25
26
27
28
29
30
31
32     default:
33         putchar(c);
34         break;
35     }
36 }
37 printf("\n");
38 return 0;
39 }
```

Example

```
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter phone number: ABCDEFG
2223334
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter phone number: 0975-A10-1WG
0975-216-194
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter phone number: 0-Y-W-G-A-J-I-C
6-9-9-4-2-5-4-2
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ █
```

Chapter 7_project 10

Write a program that counts the number of vowels (*a*, *e*, *i*, *o*, and *u*) in a sentence:

```
Enter a sentence: And that's the way it is.
```

```
Your sentence contains 6 vowels.
```

Solution

```
1 // find amount of vowels
2
3 #include <ctype.h>
4 #include <stdio.h>
5
6 int main(void){
7
8     char ch;
9     int num_vowels = 0;
10
11     printf("Enter a sentence : ");
12
13     while( ) {
14         switch(toupper(ch)) {
15             [redacted]
16             [redacted]
17         }
18     }
19
20     printf("Your sentence contains %d vowels.\n", num_vowels);
21
22     return 0;
23 }
24
25
```

Example

```
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a sentence: Week
Your sentence contains 2 vowels.
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a sentence: Pattern Oriented Software Design
Your sentence contains 11 vowels.
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a sentence: Take care of command line parameters
Your sentence contains 13 vowels.
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$
```


Chapter 7_project 11

Write a program that takes a first name and last name entered by the user and displays the

last name, a comma, and the first initial, followed by a period:

```
Enter a first and last name :
```

```
Lloyd Fosdick
```

```
Fosdick, L.
```

The user's input may contain extra spaces before the first name, between the first and last names, and after the last name.

Solution

```
1 // find abbreviation of english name
2
3 #include <stdio.h>
4
5 int main(void){
6     char first_initial, ch;
7
8     printf("Enter a first and last name : ");
9
10    /* Read first initial */
11    scanf("%c", &first_initial);
12
13    /* Skip remainder of first name */
14    while( ){
15        /* empty loop body */
16    }
17
18    /* Read and print last name */
19    while((ch = getchar()) != '\n')
20        ;
21
22    /* Print first initial */
23    printf(", %c.\n", first_initial);
24
25    return 0;
26 }
27
```

Example

```
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a first and last name: Break Time
Time, B.
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a first and last name: Happy Birthday
Birthday, H.
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a first and last name: Life Zero
Zero, L.
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ █
```

Chapter 7_project 15

15. Write a program that computes the factorial of a positive integer:

Enter a positive integer : 6

Factorial of 6: 720

- (a) Use a short variable to store the value of the factorial. What is the largest value of n for which the program correctly prints the factorial of n ?
- (b) Repeat part (a), using an int variable instead.
- (c) Repeat part (a), using a long variable instead.
- (d) Repeat part (a), using a long long variable instead (if your compiler supports the long long type).
- (e) Repeat part (a), using a float variable instead.
- (f) Repeat part (a), using a double variable instead.
- (g) Repeat part (a), using a long double variable instead.

In cases (e)-(g), the program will display a close approximation of the factorial, not necessarily the exact value.

Solution

```
1 // reverse a integer
2
3 #include <stdio.h>
4
5 int main(void){
6
7     int i, n;
8
9     short s_fact = 1;
10    int i_fact = 1;
11    long l_fact = 1;
12    long long ll_fact = 1;
13    float f_fact = 1;
14    double d_fact = 1;
15    long double ld_fact = 1;
16
17    printf("Enter a positive integer : ");
18    scanf("%d", &n);
19
20    for( ; n > 0; n--){
21        s_fact *= n;
22        i_fact *= n;
23        l_fact *= n;
24        ll_fact *= n;
25        f_fact *= n;
26        d_fact *= n;
27        ld_fact *= n;
28    }
29
30    printf("Factorial of %d (short) : %d\n", n, s_fact);
31    printf("Factorial of %d (int) : %d\n", n, i_fact);
32    printf("Factorial of %d (long) : %d\n", n, l_fact);
33    printf("Factorial of %d (long long) : %d\n", n, ll_fact);
34    printf("Factorial of %d (float) : %f\n", n, f_fact);
35    printf("Factorial of %d (double) : %f\n", n, d_fact);
36    printf("Factorial of %d (long double) : %Lf\n", n, ld_fact);
37
38    return 0;
39 }
```

Example

```
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a positive integer : 6
Factorial of 6 (short)           : 720
Factorial of 6 (int)             : 720
Factorial of 6 (long)            : 720
Factorial of 6 (long long)       : 720
Factorial of 6 (float)           : 720.000000
Factorial of 6 (double)          : 720.000000
Factorial of 6 (long double)     : 720.000000
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a positive integer : 10
Factorial of 10 (short)          : 24320
Factorial of 10 (int)            : 3628800
Factorial of 10 (long)           : 3628800
Factorial of 10 (long long)      : 3628800
Factorial of 10 (float)          : 3628800.000000
Factorial of 10 (double)         : 3628800.000000
Factorial of 10 (long double)    : 3628800.000000
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$
```