Practice 3 (2015/9/29)

Friendly and Smart Interactive Query – (II)

1. Another Instruction *getchar*() to Read a Character from stdin

A. Nightmare

```c
#include <stdio.h>

int  main() {
    int val;

L1: printf("Please input a number that is larger than 10 and less than 100: ");
    printf("the return value of scanf is %d\n",scanf("%d",&val));
    if (val < 10 || val > 100) goto L1;
    printf("Your input number is %d, this is a valid value.\n", val);

    return 0;
}
```

☞ The above program will repeat the message display and you have no chance to input data if you input some non-numerical character → characters in keyboard buffer are not removed by scanf().

B. Scavenger for keyboard buffer, *getchar*()

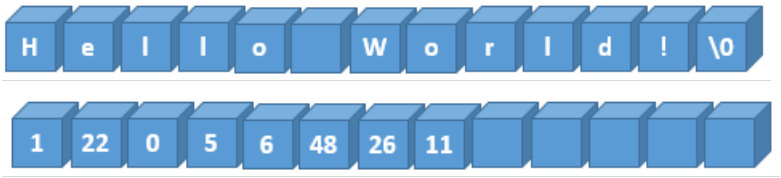
☞ You should already find *scanf*() does not receive invalid input characters and leave these invalid characters in keyboard buffer. As you try to use *scanf*() to start a new query, it easily gets into an infinite loop and you have no chance to input a character any more. Use *getchar*() to consume invalid characters of previous input. After that you can start a new query again.

Hint: You can use *getchar*() to remove every character in keyboard buffer until *getchar*() returns a newline character.

2. String

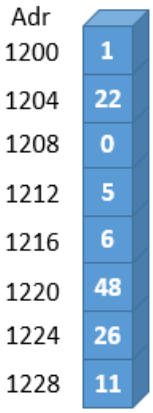
A. Array Definition

☞ A group of consecutive data of the same type, for instance, integer array and character array (string).



B. Array Location

☞ In memory, an array is stored in consecutive locations.



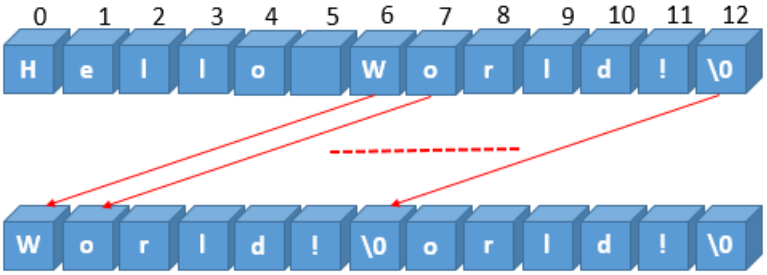
C. String

☞ A string is a sequence of characters ending with null character '\0'.

☞ We use null character to detect where a string ends.

D. String Cutting

Ex. char str[50];

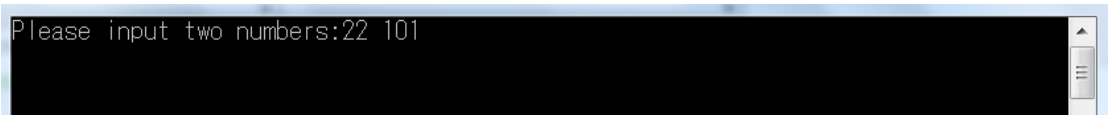


str[0] = str[6]; str [1] = str[7]; …; str[6] = str[12];

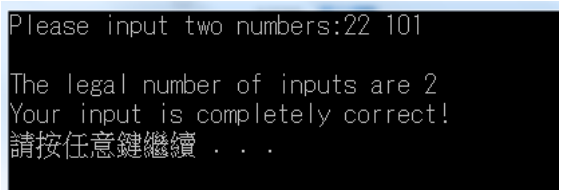
3. Problem

Last time we already realized how to read data in different type with *scanf*(), but failed to read two integers with *scanf*() if users input non-numerical characters or string intentionally. Write a program to read two integers with a well-designed interactive query that prompts useful message to lead users to the right way of offering correct data.

a. Begin a query for two integers.

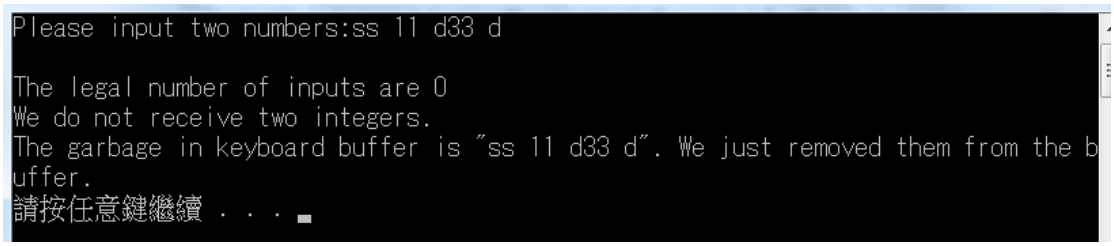


b. Prompt two messages for a correct input.

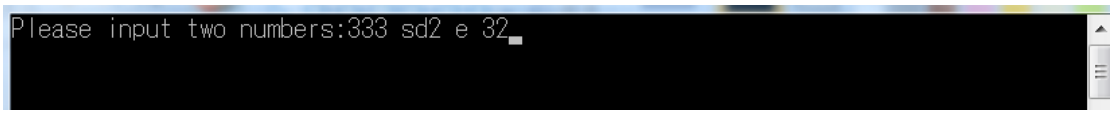


c. After users press a key, the program returns to initiate a new query.

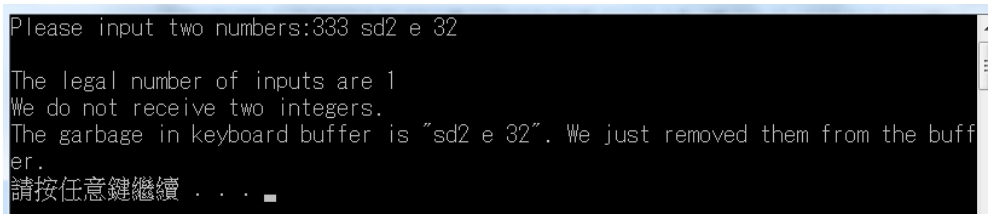
d. The input program cannot recognize any integer and prompts three messages for users.



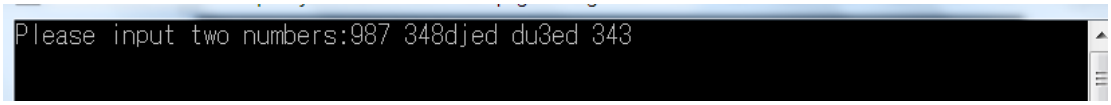
e. The program returns to initiate a new query after users press any key.



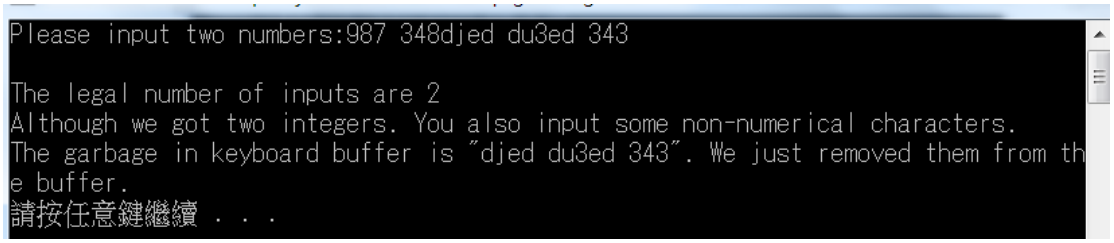
f. The program recognizes one integer and prompts three messages.



g. The program initiates a new query after users press any key.



h. The program recognizes two integers but there are remaining garbage messages.



Hint: **You can use *system*("cls") to clear screen in a C program.**

Main features:

(a) Use *scanf*() and *getchar*() only without any flush statement to realize a friendly and smart interactive query program to accept two integers from users.

(b) Add one features to clear the screen before starting a new iteration of query.

(c) Use *getchar*() only rather than *scanf*() + *getchar*() to receive an integer from users. Notice: Do not put the newline character of input characters into your

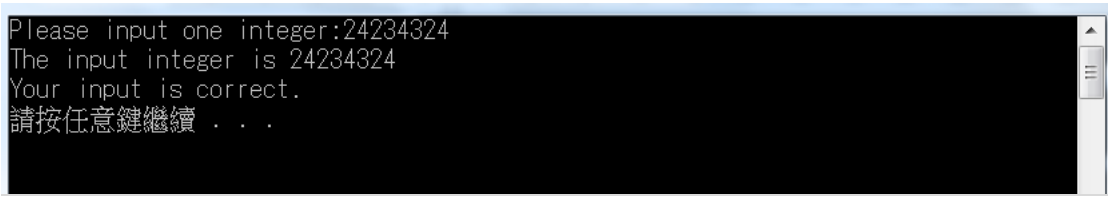
garbage message, or your prompt message will look messed.

☞ **At least complete features (a) and (b) before the end of practice time.**

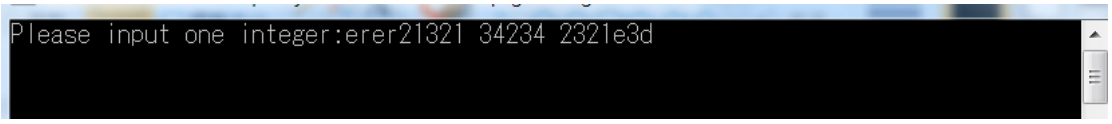
☞ **The deadline to upload the program of feature (c) is the midnight of 10/5.**

a. The program starts a query for one integer.

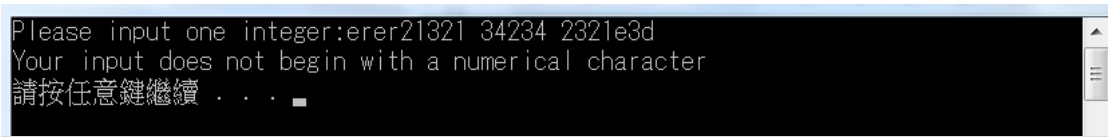
b. The program recognize one integer and there is no garbage characters.



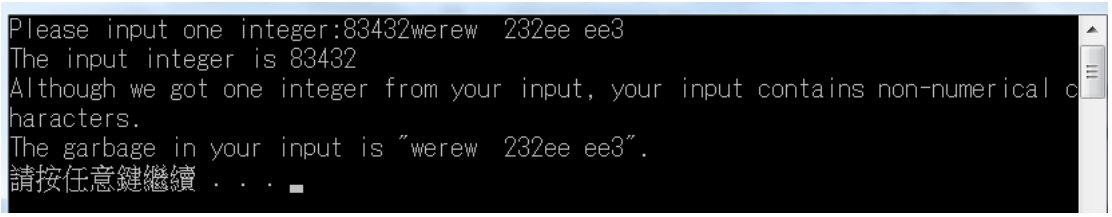
c. The program initiates a new query after users press any key.



d. The program cannot recognize any integer and prompt a message for this situation.



e. The program initiates a new query after users press any key. And it recognizes one integers but there are remaining garbage characters. Show three messages for this situation.



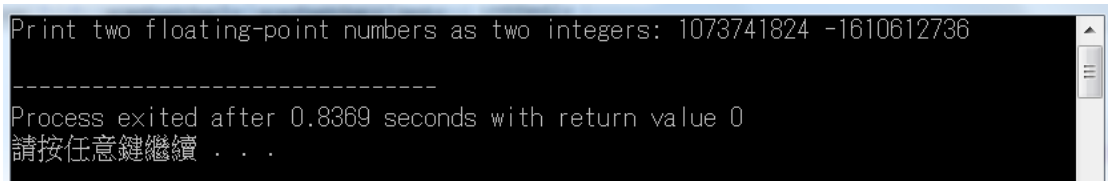
4. Bonus

The following simple program displays a weird outcome. Two floating-point numbers are displayed totally in a wrong way. Try to explain why the outcome looks like this.

```c
#include<stdio.h>

int main(void)
{
    printf("Print two floating-point numbers as two integers: %d %d \n", 8403810.434f, 10.3f);

    return 0;
}
```



☞ **The deadline of Bonus is still the midnight. Remember to mail me your test program along with your analysis and conclusions.**

☞ **You have to finish features (a), (b) and (c) first and submit your program to E3. After that, you are qualified to take this challenge.**

Hint: Study IEEE Std 754 first.

5. **Further Reading**

2's complement addition and subtraction, fflush(stdin), scanf("%*[^abc]")