11 Reversing Strings

11.1 Making a String Type

Based on the memory allocation facility, a new string type String can be defined. The following code shows a sketch of how to do it:

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

typedef struct {
    char *s;
    int len;
} String;

#define MKSTR(s) {s, strlen(s)}

int main()
{
    String s1 = MKSTR("Hello C");
    String s2 = MKSTR("Hola C++");

    printf("s1(%d) = '%s'\n", s1.len, s1.s);
    printf("s2(%d) = '%s'\n", s2.len, s2.s);

    return 0;
}
```

Though the above code relies on the macro function `MKSTR`, it can be used for string literal only. To make it more general, a function `mkstr` is required to make the structure and copy the contents of the string.

11.2 Programming Lab 11: revstr.c

Even if C provides various string functions including `strlen` and `strcpy`, the function reversing a string is not supported by C standard library. The meaning of the operation reversing a string implies making a new string reading the characters in reverse. For the string `"step"` for example, reversing it should be `"pets"` as the result.

Write a program reading the strings in several lines and printing the reversed strings. Your program should use the type String in the sample code. An input line consists of alphabets, numbers, and punctuation characters: `?`, `!`, `.`, `,`, `;`, `:`, `'`, `"`, `-`, and `_`. Your program should read a line using the library function `fgets`.

Your program is to read from standard input. Input consists of n lines ($0 < n < 100$). The maximum length of the line is 256 including the newline characters. Note that you should handle the newline characters attached in default reading by `fgets`. The newline characters may be different depending on the system.[1] Your program should print the reversed strings in standard output. The output consists of n lines, too. Each line of the output lines contains the reversed string of the corresponding input line.

Additional requirements for bonus points

- Define and use the function `revstr(s)` accepting a `String` argument `s` and returning the (new) reversed string of it.
- Define and use the macro function `SWAPCHAR` swap two characters accepting two `char` pointers.

[1] A newline is represented CR/LF in Windows. In Unix, it is represented by LF only.

Input	**Output**
step	pets
You know C programming!	uoY wonk C !gnimmargorp