LAB REPORT 实验报告

Lab Title	Bit-masking				Lab No.	13
Stud. Name		Major	CST		Class	
Student ID			Date			

Lab description/objectives:

Investigate the difference between the binary representation of alphabets' uppercase and their lowercase, for instance, 'a' is 01100001, 'A' is 01000001, 'z' is 01111010, 'Z' is 01011010. Write functions, upperToLower(), lowerToUpper(), that convert between lowercase and uppercase by **using bitwise operations.**

Based on the above functions, Write a C program to toggle all characters in a string, for example,

Input: tu@kmiNi123

Output: TU@KMInI123

Source code:

#include <stdio.h>

#include <stdlib.h>

#include <string.h>

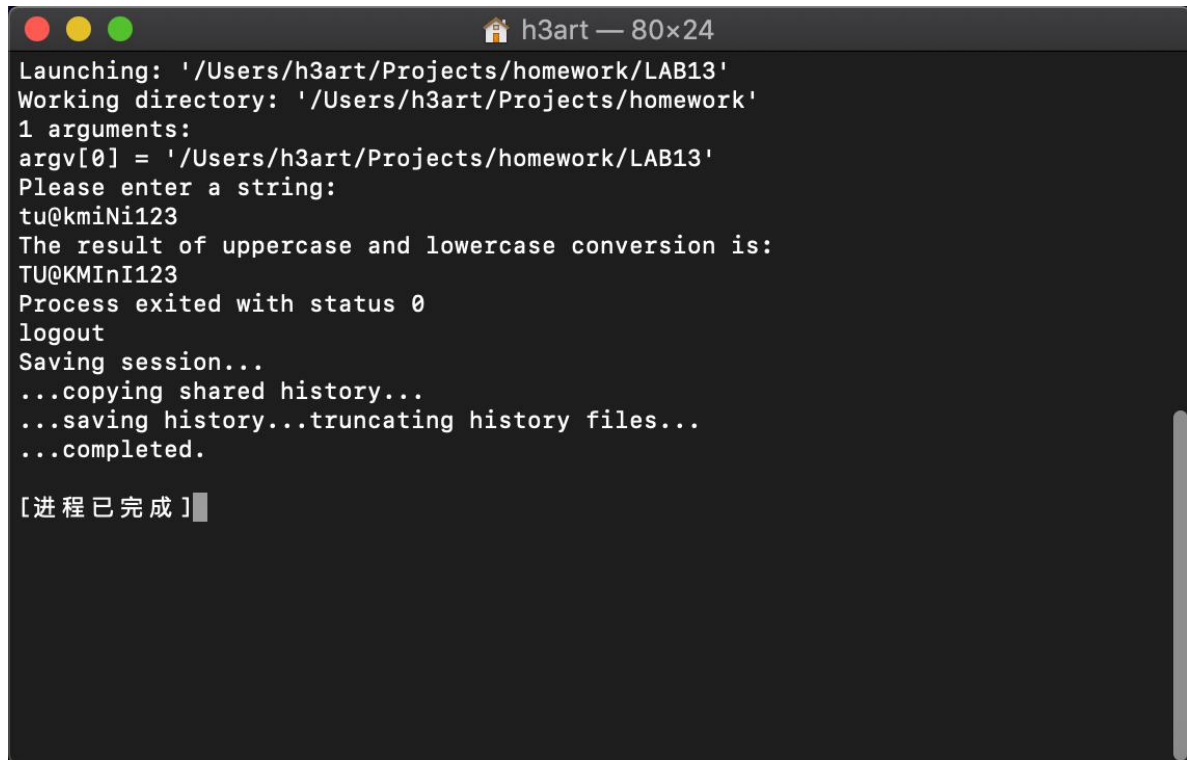*#define MAXLEN 2021102716*

char str[MAXLEN];

void upperToLower(char* letter)

{

   *letter = (*letter) | ' ';

   return;

}

void lowerToUpper(char* letter)

{

   *letter = (*letter) & '_';
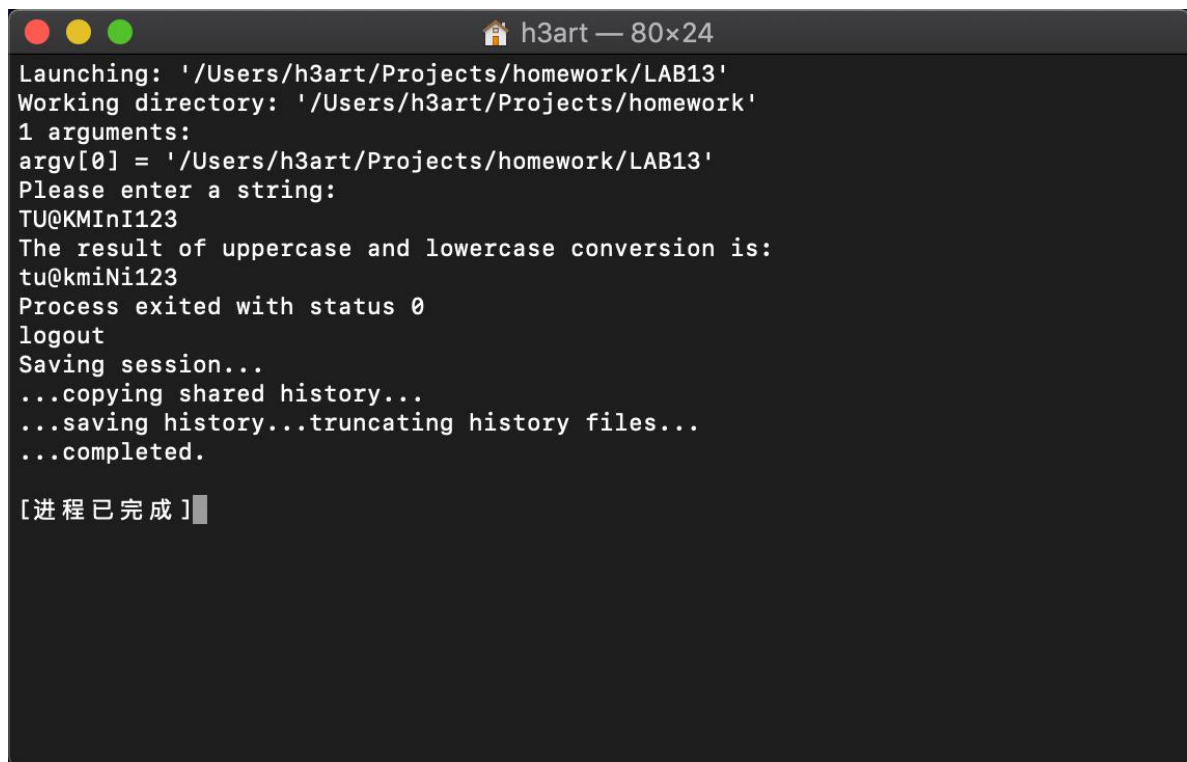
```
        return;
}


int main(void)
{

    printf("Please enter a string:\n");
    scanf("%s", str);
    for (int i = 0; str[i] != '\0'; i++) {
        if (str[i] >= 'a' && str[i] <= 'z') {
            lowerToUpper(&str[i]);
        }
        else if (str[i] >= 'A' && str[i] <= 'Z') {
            upperToLower(&str[i]);
        }
    }
    printf("The result of uppercase and lowercase conversion is:\n");
    printf("%s\n", str);
    return 0;
}
```

Program outputs:

```
h3art — 80×24
Launching: '/Users/h3art/Projects/homework/LAB13'
Working directory: '/Users/h3art/Projects/homework'
1 arguments:
argv[0] = '/Users/h3art/Projects/homework/LAB13'
Please enter a string:
tu@kmiNi123
The result of uppercase and lowercase conversion is:
TU@KMInI123
Process exited with status 0
logout
Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

[进程已完成]
```

```
h3art — 80×24
Launching: '/Users/h3art/Projects/homework/LAB13'
Working directory: '/Users/h3art/Projects/homework'
1 arguments:
argv[0] = '/Users/h3art/Projects/homework/LAB13'
Please enter a string:
TU@KMInI123
The result of uppercase and lowercase conversion is:
tu@kmiNi123
Process exited with status 0
logout
Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

[进程已完成]
```

Discussion:

1. **Most difficult parts**

2. **Bugs and/or Errors**