

LAB 3 — Arrays, Types and Operators

Problem A

A.1 Specification

Write a C program to input a line of characters and store the input characters in an array. Reverse the order of the input characters and display the reversed string on the standard output using `printf`.

A.2 Implementation

- The program is named `lab3a.c`. Use the given template `lab3a.c` and fill in your code.
- You are given an array of characters of size `MAX_SIZE` where `MAX_SIZE = 100`. The array is named `my_strg`.
- Use `getchar` and a loop to read a line of characters, and store the input characters into array `my_strg`. The loop terminates when a new line character `'\n'` is entered. The new line character `'\n'` is NOT part of the line (i.e., discard the new line character `'\n'`).
- Reverse the order of the input characters stored in array `my_strg`.
- Display on the standard output the reversed string using the `printf` statement as follows:

```
printf( "%s\n", my_strg );
```

A.3 Sample Inputs/Outputs

```
indigo 352 % lab3a
```

```
Hello, world!
```

```
!dlrow ,olleH
```

```
indigo 353 % lab3a
```

```
Welcome to CSE2031.
```

```
.1302ESC ot emocleW
```

```
indigo 354 % lab3a
```

```
A
```

```
A
```

```
indigo 355 % lab3a
```

```
123
```

321

Problem B

B.1 Specification

Write a C program to input an octal number in the form of a line of characters and store the input characters in an array. Convert the octal number to a decimal integer and display the decimal integer on the standard output using `printf`.

B.2 Implementation

- The program is named `lab3b.c`. Use the given template `lab3b.c` and fill in your code.
- You are given an array of characters of size `MAX_SIZE` where `MAX_SIZE = 100`. The array is named `my_strg`.
- Use `getchar` and a loop to read an octal number in the form of a line of characters, and store the input characters into array `my_strg`. The loop terminates when a new line character `'\n'` is entered. The new line character `'\n'` is NOT part of the line (i.e., discard the new line character `'\n'`).
- Convert the octal number stored in array `my_strg` to a decimal integer.
- Display on the standard output the decimal integer using the `printf` statement as follows:

```
printf( "%d\n", my_int );
```

- If the input string does not contain a valid octal number, display on the standard output the error message `"Error: not an octal number"`.

B.3 Sample Inputs/Outputs

```
indigo 356 % lab3b
```

```
12
```

```
10
```

```
indigo 357 % lab3b
```

```
340
```

```
224
```

```
indigo 358 % lab3b
```

-340

-224

indigo 359 % lab3b

5

5

indigo 359 % lab3b

29

Error: not an octal number

indigo 360 % lab3b

abc

Error: not an octal number

Problem C

Repeat Problem B, except that the input now is a line of characters containing a **hexadecimal** number. The hexadecimal digits 'A' to 'F' can be in upper case or lower case.

The program is named `lab3c.c`. **Use the given template `lab3c.c`** and fill in your code.

Sample Inputs/Outputs

indigo 361 % lab3c

8

8

indigo 362 % lab3c

10

16

indigo 363 % lab3c

-920

-2336

```
indigo 364 % lab3c  
  
DE  
  
222  
  
indigo 365 % lab3c  
  
1bc6  
  
7110  
  
indigo 364 % lab3c  
  
2R3  
  
Error: not a hexadecimal number
```

Common Notes

All submitted files should contain the following header:

```
/*  
*      EECS2031 - Lab 3  
*      Filename:  Name of file  
*      Author:    Last name, first name  
*      Email:     Your preferred email address  
*      EECS login ID: Your EECS login ID  
***/
```

In addition, all programs should follow the following guidelines:

- Include the `stdio.h` library in the header of your `.c` files.
- Use `printf` to print text and outputs according to the required formats.
- End each output result with a new line character `'\n'`.
- Do not use any C library functions except `getchar()`, `putchar()`, `scanf()` and `printf()`.
- Assume that the input strings are shorter than 100 characters and the resulting decimal numbers are small enough to be stored in an integer variable.