CSE 102 Spring 2024 – Computer Programming Assignment 1

Due on March 11, 2024 at 23:59

You will write two programs to encrypt and decrypt input characters using a special cipher method. The original text to be encrypted will be a valid C code.

Part 1. [50pts] Encrypting C Code

Write a program that reads a sequence of characters from the user. These characters are expected to be the characters from a valid C code. Create your program encrypts the input C code according to the following rules:

- Ignore all the comments within /* */. Do not encrypt them. Instead put a marker saying that there was a comment with n characters (where n is the number of characters inside the comment). The marker should be "@" which is not in your alphabet.
- The rest of the characters are encrypted using Caesar's encryption method. You must use your student number as the key.

Part 2. [50pts] Decrypting to a C Code

Write a program that reads a sequence of encrypted characters from the user (correctly generated by the program written in Part 1). Use the following rules to decrypt:

- If the marker for a comment is encountered, the decryption should be in the form "There is 4 characters as comment.". For example, the original code is "/*ab cd*/" the generated encrypted character will be @ 4, where @ is the marker and 4 is the total length of words.
- The rest of the characters are decrypted using the reverse of the encryption method. You must use your student number as the key.

Hint: Calculation of the key for encryption and decryption operations is given below:

- Add all digits until it appears as a length of one digit. The result will be your key in Caesar's cipher method.
  Ex. Student ID: 225004001180
  2 + 2 + 5 + 4 + 1 + 1 + 8 = 23
  2 + 3 = 5

Hint: Your alphabet is given below. Do not consider whitespaces like space, tab, new line, and any other special character other than given ones. Only use small letters, do not consider uppercase letters.

```
char alphabet[61] = {'a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j', 'k',
'l', 'm', 'n', 'o', 'p', 'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y', 'z',
'(', '<', '=', '+', ')', '[', '*', '/', ']', '{', '>', '!', '-', '}', '?',
'\\', '&', '|', '%', '_', ';', '"', '#', '.', '\'', '0', '1', '2', '3', '4',
'5', '6', '7', '8', '9'};
```

Example: (Student ID: 225004001180, Key: 5)

Given Example Input:

```
#include <stdio.h>

int main() { /*This is the main function.*/
    int number_one = 3;
    int number_two = 4;
    int add = number_one + number_two;
    return 0;
}
```

Output Format:

```
Enter a valid C code:
#include <stdio.h>

int main() { /*This is the main function.*/
    int number_one = 3;
    int number_two = 4;
    int add = number_one + number_two;
    return 0;
}

Encrypted C code:
2nshqzij *xyint3m\

nsy rfns[{ ? @ 77
    nsy szrgjw'tsj / 80
    nsy szrgjw'y<t / a0
    nsy fii / szrgjw'tsj ] szrgjw'y<t0
    wjyzws 50
%

Decrypted C code:
#include <stdio.h>

int main() { /* There is 22 characters as comment.*/
    int number_one = 3;
    int number_two = 4;
    int add = number_one + number_two;
    return 0;
}
```

IMPORTANT NOTES:

- Submit your homework as a zip file named as your student id (StudentID.zip) and this file should include:
  - studentid_part1.c file which includes part 1 and studentid_part2 file which includes part 2
  - YourStudentID.pdf file which includes a YouTube link, screenshots of your generated outputs and given C code as an input. In this video you need to show your work and explain it. It must be 4 minute maximum. If it exceeds, you will lose points. Please open your camera as well.
- Programs with compilation errors will get 0.
- No partial grading for questions.
- **Do not** use any library other than stdio.h.
- **Do not** use arrays or other topics that you do not learn in the lecture.
- Ensure that the output format matches the provided specifications exactly; do not make any alterations. Additionally, ensure that all **indentation** operations and **spaces** in code are correctly implemented.
- Compile your work using the provided commands. Simply replace the "studentid" section with your own student ID. **Modifying** other sections may result in point deductions**.**
  - For **Part I** use “gcc --ansi studentid_part1.c -o homework1_1”.
  - For **Part II** use “gcc --ansi studentid_part2.c -o homework1_2”.
- After compiling in the terminal, execute the same commands provided below:
  - For **Part I** use “./homework1_1 < input.txt > encrypted.txt”
  - For **Part II** use “./homework1_2 < encrypted.txt > decrypted.txt”
- Your work will be evaluated using gcc version 11.4.0.
- For any questions and problems, you can always contact with me **via e-mail** (incikaramahmutoglu@gtu.edu.tr) or you can find me in Human-Computer Interaction Lab in scheduled office hours in February 27 and March 5, 2024 between 13:30 – 14:30.