



Spring 2022
CS609: System Programming
Solution File
Assignment No. 01

Total Marks: 15

Due Date:

Instructions:

Please read the following instructions carefully before submitting assignment. It should be clear that your assignment will not get any credit if:

- The submitted assignment does not open or file is corrupt.
- You have not followed all steps described in both questions
- Assignment is **copied** (partial or full) from any source (websites, forums, students, etc.)

Strict action will be taken in this regard.

NOTE:

You must upload only a SINGLE Word document (.doc or .docx). There is NO need to attach screenshot. If you provide screenshots, it will not carry any additional marks.

Objectives:

The objective of this assignment is to provide hands-on experience of System Programming concepts including:

- Opening and handling text files
- Understanding Caesar Cipher Decryption algorithm
- Basic understanding of Windows file creation and manipulation APIs

Question 1:

(10)

Write a function in C/C++ to implement a Caesar Cipher Decryption algorithm. This function will convert an input file containing some cipher-text (of alphabets only) into output file of plain text.

Detailed Instructions:

- The function will take the following three arguments:
 - a) Two file paths (input and output)
 - b) One Shift variable of **DWORD** type
- Take 5 as the value of Shift variable.
- Input file should be converted to plain text file, byte-by-byte
- The function must ignore any error reporting messages

Solution:

```
#define BUF_SIZE 256
BOOL d_Ceasar_cfr(LPCTSTR fln, LPCTSTR fOut, DWORD shift=5)
{
    HANDLE hIn, hOut;
    DWORD nIn, nOut, iCopy;
    CHAR aBuffer[BUF_SIZE], ccBuffer[BUF_SIZE];
    BOOL writeOk=TRUE;
    hIn=CreateFile(fln, GENERIC_READ, 0, NULL, OPEN_EXISTING, FILE_ATTRIBUTE_NORMAL, NULL);
    hOut=CreateFile(fOut, GENERIC_WRITE, 0, NULL, CREATE_ALWAYS, FILE_ATTRIBUTE_NORMAL, NULL);
    while(ReadFile(hIn, aBuffer, BUF_SIZE, &nIn, NULL) && nIn>0 && writeOk)
    {
        for(iCopy=0; iCopy < nIn; iCopy++)
            ccBuffer[iCopy]=(aBuffer[iCopy] - shift) % 26;
        writeOk=WriteFile(hOut, ccBuffer, nIn, &nOut, NULL);
    }
    CloseHandle(hIn);
    CloseHandle(hOut);
}
```

Question 2:

(5 marks)

Write function signature of **CreateFile()** API, in which the file **myFile1.txt** is required to be opened for reading purpose. Include all the necessary parameters with API along with the following options:

- The file may or may not exist on the disk. If it doesn't exist, create it
- File is not required to be shared for concurrent read.

Solution:

```
HANDLE hIn = CreateFile(myFile1, GENERIC_READ, 0, NULL, OPEN_ALWAYS,  
FILE_ATTRIBUTE_NORMAL, NULL);
```

NOTE:

- Question 1 requires complete function code.
- Question 2 requires Only function SIGNATURE. There is NO need to write complete program in question 2. If you provide complete program, it will not carry any additional marks.
- Final output screenshots are NOT required in both the questions. If you provide screenshots, it will not carry any additional marks.
- Your solution should be a single Microsoft Word file (doc or docx) containing answers of both questions. File in any other format will be awarded zero marks.

---BEST OF LUCK---