GEBZE TECHNICAL UNIVERSITY

CSE 102 Computer Programming HW 04

Last Submission Date: March 17, 2015 – 11:00am

Feel free to ask any questions about this homework.

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	Q1	**Q2**	**Q3**
Points	30 points	20 points	50 points

Read General rules at the end of homework and make sure that you named files correctly.

Q1)

GTU Encoding Table	
Char	**Code**
E	0
I	10
Space	110
T	1110
C	11110
N	111110
A	1111110
G	11111110
B	111111110
Z	1111111110
H	11111111110
L	111111111110
U	1111111111110
V	11111111111110
R	111111111111110
S	1111111111111110
Y	11111111111111110

Assume that we are in a terrible science war. All universities sniff each other's network and try to understand what they are doing. In the cold science war you are expected to send messages not as plain text but as encrypted text.

Yes, you are the chosen one and all you have and need is GTU encoding table and your amazing coding skills! Table is given left… Note that it only includes a part of the alphabet. The remaining characters are not going to be encrypted.

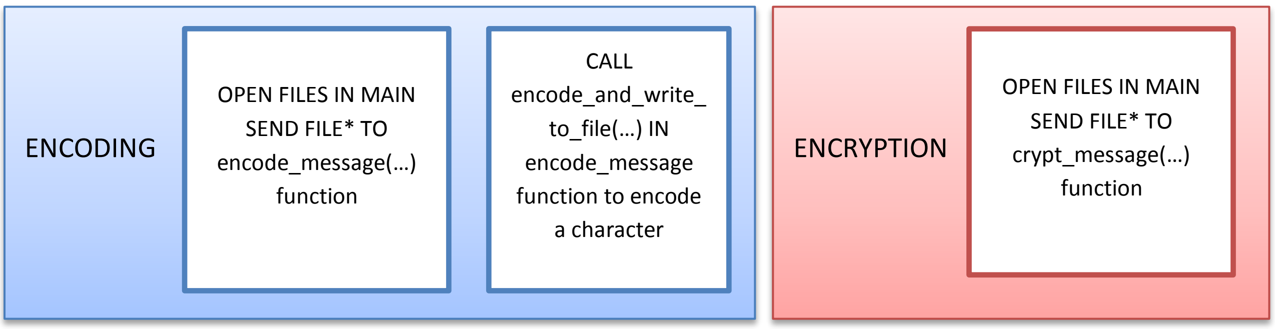
Objectives

1. Read the plain text message from **PlainMessagesToSent.txt** file
2. Write the encoded message to **EncodedMessages.txt** file
3. Crypt encoded messages by reading encoded messages file and changing each '1' with '*' and '0' with '_', also add '-' symbol according to following rule:
   Add a '-' symbol after each M characters. M starts with N and decreased by one after adding a '-' symbol until M is equal to zero. When M is equal to zero reinitialize it by N. N is given to be 5.
4. Write the ***encrypted message*** (encrypted by '*' '_' '-') to **EncryptedMessages.txt** file

Example

Plain Text Message	IT IS BAG
Encoded Message	10111011010111111111111111101101111111101111110111111110
Encrypted Message	*_***-_**_-*_*-**-*-*****-****-**_-**-_-*****-***_-***-**-*-_****-***_-

Big Picture


ENCODING
OPEN FILES IN MAIN SEND FILE* TO encode_message(…) function
CALL encode_and_write_to_file(…) IN encode_message function to encode a character
ENCRYPTION
OPEN FILES IN MAIN SEND FILE* TO crypt_message(…) function

GIVEN	**ASKED FOR**
Template_1.c	Part1.c
PlainMessagesToSent.txt	EncodedMessages.txt
	CryptedMessages.txt

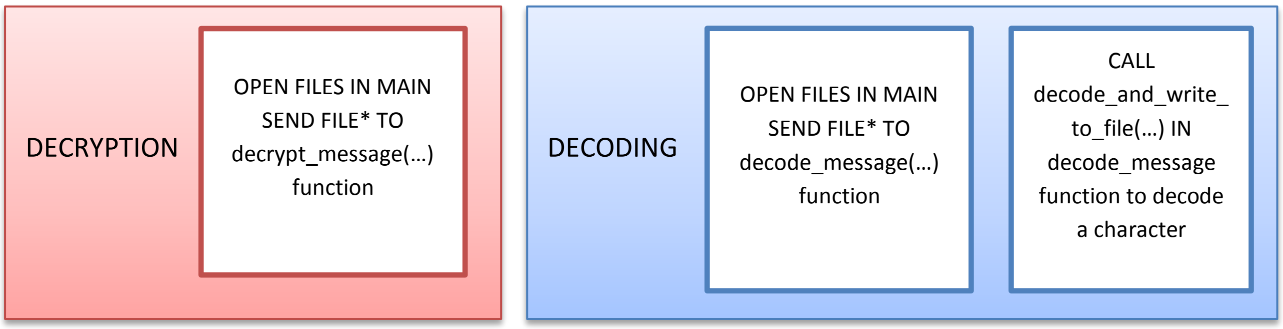
Note that you are expected to use Template_1.c file for Q1 which is attached to homework. You are going to find detailed info there also.

Q2) In this question, you are expected to read an encrypted message and convert it back to the plain text message.

Objectives

1. Read the encrypted message from **EncryptedInput.txt** which is attached to homework.
2. Eliminate '-' symbols and change '*' to '1' and '_' to '0' to obtain the encoded message. Write encoded message to **EncodedInput.txt** file.
3. Read the encoded input from **EncodedInput.txt** file.
4. Decode the encoded message and write the plain text message to **ReceivedMessage.txt** file.

Big Picture


DECRYPTION
OPEN FILES IN MAIN SEND FILE* TO decrypt_message(...) function
DECODING
OPEN FILES IN MAIN SEND FILE* TO decode_message(...) function
CALL decode_and_write_to_file(...) IN decode_message function to decode a character

GIVEN	**ASKED FOR**
Template_2.c	Part2.c
CryptedInput.txt	EncodedInput.txt
	ReceivedMessage.txt

Note that you are expected to use Template_2.c file for Q2 which is attached to homework. You are going to find detailed info there also.

Q3) Now it is time to decode X University's messaging system! Assume X University uses a heuristic to create encoding table. Their heuristic is just based on frequency of letters. Frequently used letters have shorter code length.

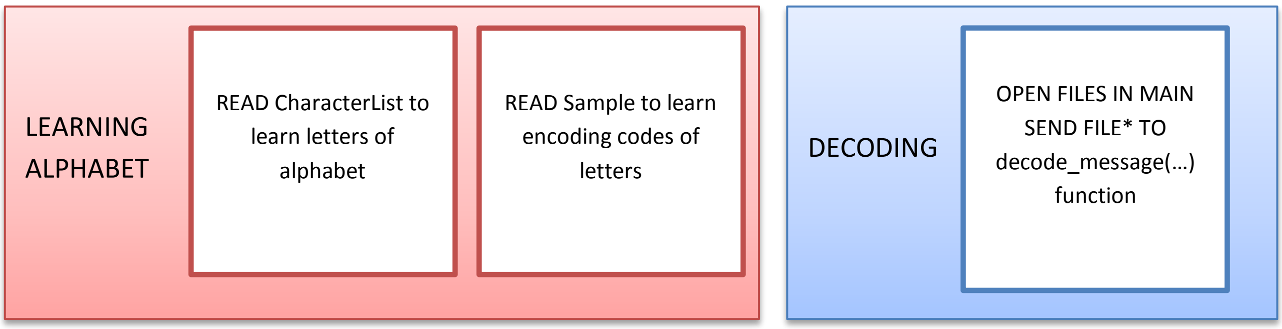
Example

Character List	A B C
Sample	AABABAABCBAAC
Frequency List of Sample	**Char** A B C **Counts** 7 5 2
Encoding Table of Sample	**Char** A B C **Code** 0 10 110
Encoded Message of X University	11010010011000110
Plain Text Message of X University	CBABACAAC

Objectives

1. You are given **CharacterList.txt** including three characters which are the letters of messaging system's alphabet. However, since the file is recovered from their trash it is broken (it contains some extra characters which are not a part of their alphabet). You should ignore all characters which are not letter like '!', '=','+' etc. Write a function to figure out three letters and return number of letters read.
2. Read the file **Sample.txt** and count letters to find their frequencies and sort the letters with respect to their frequencies. Implement swap functions given in template c file. You are going to use swap functions while sorting numbers and characters.
3. Since you figured out frequency of letters thanks to count letters function, you can handle decoding process. Decode the messages in **XUniversityEncoded.txt** file. Write the decoded (plain text) message to **XUniversityMessage.txt** file

Big Picture


LEARNING ALPHABET
READ CharacterList to learn letters of alphabet
READ Sample to learn encoding codes of letters
DECODING
OPEN FILES IN MAIN SEND FILE* TO decode_message(…) function

GIVEN	ASKED FOR
Template_3.c	Part3.c
CharacterList.txt	XUniversityMessage.txt
Sample.txt	
XUniversityEncoded.txt	

Note that you are expected to use Template_3.c file for Q3 which is attached to homework. You are going to find detailed info there also.

General:

1. Obey honor code principles.
2. Obey coding convention.
3. Read your homework carefully and follow the directives about the I/O format (data filenames, file formats, etc.) and submission format strictly. Violating any of these directives will be penalized.
4. Your submission should include the following file and NOTHING MORE (no data files, object files, etc):
   HW04_<student name>_<student surname>_<student number>_part1.c
   HW04_<student name>_<student surname>_<student number>_EncodedMessages.txt
   HW04_<student name>_<student surname>_<student number>_CryptedMessages.txt
   HW04_<student name>_<student surname>_<student number>_part2.c
   HW04_<student name>_<student surname>_<student number>_EncodedInput.txt
   HW04_<student name>_<student surname>_<student number>_ReceivedMessage.txt
   HW04_<student name>_<student surname>_<student number>_part3.c
   HW04_<student name>_<student surname>_<student number>_XUniversityMessage.txt
5. Do not use non-English characters in any part of your homework (in body, file name, etc.).
6. Deliver the printout of your work until the last submission date.