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ECE 2305

Introduction to Computer Programming

Programming Project 09

Cryptography

Write a C++ program that will accept a text message from a disc file and produce a coded

or decoded message.

The code shall use a letter substitution cipher. The letters are identified by their

numerical position of the letter (𝑎 → 0, 𝑏 → 1, … 𝑧 → 25). The 𝑐𝑜𝑑𝑒 𝑛𝑢𝑚𝑏𝑒𝑟 shall be

calculated as follows

𝑐𝑜𝑑𝑒 𝑛𝑢𝑚𝑏𝑒𝑟 = 𝑜𝑓𝑓𝑠𝑒𝑡 + 𝑠𝑝𝑎𝑐𝑖𝑛𝑔 × (𝑙𝑒𝑡𝑡𝑒𝑟 𝑛𝑢𝑚𝑏𝑒𝑟)

Where 𝑜𝑓𝑓𝑠𝑒𝑡 is an offset value and 𝑠𝑝𝑎𝑐𝑖𝑛𝑔 gives the spacing between letters. The

𝑐𝑜𝑑𝑒 𝑛𝑢𝑚𝑏𝑒𝑟 is to “wrap around” so the values will range from 0 to 25. The offset

value 𝑜𝑓𝑓𝑠𝑒𝑡 is an integer ranging from 1 to 25. The spacing value 𝑠𝑝𝑎𝑐𝑖𝑛𝑔 is a positive

odd integer not greater than 11. These values are to be based on the number of characters

in the message, including spaces, punctuation and other characters. Use the following

formulas for these values:

int offset = length % 25 + 1; //returns a value from 1 to 25

int spacing = (length % 6) \* 2 + 1;

//returns a positive odd value <= 11

where 𝑙𝑒𝑛𝑔𝑡ℎ is the number of characters in the message.

Implement the code cipher by creating a lookup-table array. This same look-up table is

to be used in decoding messages. Revise the input text to contain all lower-case letters.

Apply the code to lower case letters only. Write the program to allow the user to choose

to encode regular messages and to decode coded messages. Write the encoded and

decoded messages to .txt disc files.

Document the program with the following:

A. A written description of the program that describes the purpose of the program and

the structure of the program.

The purpose of this program is to encode or decode certain .txt files. It opens files, reads

them, then uses a do while loop to ask the user whether to encode or decode the message.

It then goes through a series of for loops to complete the assigned task.

B. A flowchart to graphically illustrate the structure of the program.

A diagram of a program

Description automatically generated

A screenshot of a computer program

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