Homework #8 – Simple Encryption of a Variable-Sized Message

DUE: November 5 by 11:59:59 PM **Assigned**: October 29

Background

Square code is a simple transposition cipher that utilizes a square (or rectangle) arrangement of your plain text to create a ciphertext. You will write a program that allows the user to type a message of any length, then encode it using an appropriately sized 2D array.

Assignment Requirements

- The name of your source code file shall be `hw08.cpp`
- Prompt the user to type in a message
- Strip all whitespace and punctuation marks from the message
  - Tabs, spaces, new lines, and carriage returns count as white space
  - Period, comma, apostrophe, exclamation mark, question mark, and hyphen count as common punctuation marks
- The message will then be inserted into a dynamic 2D array; left to right, top to bottom
  - The array will always be a square
  - You must determine the dimensions of the array based on the input message
  - If there is empty space left in a row, it must be filled with '#'
  - If there is an empty row (nothing but '#'), that is acceptable
- The message is encoded by reading the columns; top to bottom, left to right

Sample Run

NOTE: The original message and encoded message are a single line; there are breaks so that it can fit on the page.

```
Enter a message to encoded: I wanted you to see what real courage is,
instead of getting the idea that courage is a man with a gun in his
hand. It's when you know you're licked before you begin, but you begin
anyway and see it through no matter what. - Atticus Finch

I W A N T E D Y O U T O S E
E W H A T R E A L C O U R A
G E I S I N S T E A D O F G
E T T I N G T H E I D E A T
H A T C O U R A G E I S A M
A N W I T H A G U N I N H I
S H A N D I T S W H E N Y O
U K N O W Y O U R E L I C K
E D B E F O R E Y O U B E G
I N B U T Y O U B E G I N A
N Y W A Y A N D S E E I T T
```

```
H R O U G H N O M A T T E R
W H A T A T T I C U S F I N
C H # # # # # # # # # # # #

IEGEHASUEINHWC WWETANHKDNYRHH AHITTWANBBWOA NASICINOEUAUT
TTINOTDWFTYGA ERNGUHIYOYAHT DESTRATORONNT YATHAGSUEUDOI OLEEGUWRYBSMC
UCAIENHEOEEAU TODDIIELUGETS OUOESNNIBIITF SRFAAHYCENTEI EAGTMIOKGATRN
```

Hints

- The `std::string` class has many functions that can make this assignment a bit easier
  - `find_first_of()`, `find_last_of()`, and `erase()` are worth looking into
- A dynamic 2D array requires special care to set up and properly destroy
- No functions are required, but they should be used
- `std::vector` is acceptable

Reminders

- Be sure to include a comment block at the top of every file with the required information
  - Refer to the General Homework Requirements handout on Blackboard
- Provide meaningful comments
  - If you think a comment is redundant, it probably is
  - If you think a comment is helpful, it probably is
  - Remember that you are writing comments for other programmers, not people who know nothing (obligatory Jon Snow) about coding
  - Comments are more helpful when they explain why, not what or how
- There will be no extensions

Preparing and Submitting

- Your code must be able to compile and run on the EECS lab machines
  - You are responsible for testing your code
  - "But it runs fine on my machine!" will **not** earn you any points
- Submit **ONLY** your source code file
- Homework submission will be handled exclusively through Blackboard

Sample Run

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I W A N T E D Y O U T O S E
E W H A T R E A L C O U R A
G E I S I N S T E A D O F G
E T T I N G T H E I D E A T
H A T C O U R A G E I S A M
A N W I T H A G U N I N H I
S H A N D I T S W H E N Y O
U K N O W Y O U R E L I C K
E D B E F O R E Y O U B E G
I N B U T Y O U B E G I N A
N Y W A Y A N D S E E I T T
H R O U G H N O M A T T E R
W H A T A T T I C U S F I N
C H # # # # # # # # # # # #

IEGEHASUEINHWC WWETANHKDNYRHH AHITTWANBBWOA NASICINOEUAUT
TTINOTDWFTYGA ERNGUHIYOYAHT DESTRATORONNT YATHAGSUEUDOI OLEEGUWRYBSMC
UCAIENHEOEEAU TODDIIELUGETS OUOESNNIBIITF SRFAAHYCENTEI EAGTMIOKGATRN
```