So, the assignment was very interesting and challenging at the same time. By attempting this assignment, I've learnt many concepts, which includes:

- How to create our own header files and use them in other ones.
- How to read a file char by char and handle inputs like numbers with more than one-digit, decimal numbers, and numbers with more than one decimal point.
- How to keep track of the sequence of the user inputs or file inputs to do the legit calculations.
- How to store the current displayed value to the memory and how to retain that stored value.
- How to use vector, map, and stack to store the file inputs, to store the value to the memory as a key-value pair, and to keep track of the sequence of inputs respectively.

Using the stack and the operator precedence, I keep track of the input sequence according to the mathematics rules and perform the legit calculations. For example, if the input sequence is **4 + 2 * 3.33 / 1.11 =** , then division should be performed first, then multiplication and then addition.

The code snippets, which handle the file input and user input for 4-four-calculator and the code which keep tracks of the input sequence using stack and operator precedence, are the ones of which I'm very proud of.

The entire assignment is done by me. I've copied any code from any resources.

Following are the mandatory tests, which I run to prove the working of the calculator.

Console Input: 3.11+19.02=

Output:

Console Input: 4+2*3.33/1.11=

Output:

```
C:\Windows\system32\cmd.exe - Calculator
|==============================================================|
|                        CALCULATOR MENU                       |
|==============================================================|
|; - ALSO EXIT                                                 |
|M - SHOW MEMORY                                               |
|E - EXIT                                                      |
|S - SET DIRECTORY                                             |
|4 - RUN 4 FUNCTION CALCULATOR FROM KEYBOARD INPUT             |
|R - READ SINGLE TEST FILE AND RUN                             |
|==============================================================|

SELECT AN OPTION FROM THE MENU:
OPTION SELECTED: 4

(?)     :0.000000
 +------------+
 |            |
 +------------+
4
(?)     :4.000000
 +------------+
 |       4.00|
 +------------+

+
(+)     :4.000000
 +------------+
 |            |
 +------------+

2
(?)     :4.000000
 +------------+
 |       2.00|
 +------------+

*
(*)     :2.000000
 +------------+
 |            |
 +------------+
```

```
3.33
(?)    :2.000000
 +------------+
 |       3.33|
 +------------+

/
(/)    :3.330000
 +------------+
 |           |
 +------------+

1.11
(?)    :3.330000
 +------------+
 |       1.11|
 +------------+

=
(?)    :1.110000
 +------------+
 |      10.00|
 +------------+
```

Console Input: 4.2.11+6=

Output:

```
C:\Windows\system32\cmd.exe - Calculator
|================================================================|
|                        CALCULATOR MENU                         |
|================================================================|
|; - ALSO EXIT                                                   |
|M - SHOW MEMORY                                                 |
|E - EXIT                                                        |
|S - SET DIRECTORY                                               |
|4 - RUN 4 FUNCTION CALCULATOR FROM KEYBOARD INPUT               |
|R - READ SINGLE TEST FILE AND RUN                               |
|================================================================|

SELECT AN OPTION FROM THE MENU:
OPTION SELECTED: 4

(?)    :0.000000
 +------------+
 |           |
 +------------+
4.2.11
A DECIMAL NUMBER CAN'T CONTAIN MORE THAN ONE DECIMAL POINT!
```

File Input: Filename: Task2ma.txt

Output:

```
|===============================================================|
|                      CALCULATOR MENU                          |
|===============================================================|
|; - ALSO EXIT                                                  |
|M - SHOW MEMORY                                                |
|E - EXIT                                                       |
|S - SET DIRECTORY                                              |
|4 - RUN 4 FUNCTION CALCULATOR FROM KEYBOARD INPUT              |
|R - READ SINGLE TEST FILE AND RUN                              |
|===============================================================|

SELECT AN OPTION FROM THE MENU:
OPTION SELECTED: R

ENTER THE FILENAME:
Task2ma.txt
FILENAME: E:\A_ST2\ST2_2022\Assignment2\Task2ma.txt
key in: 4
(?)   :4.000000
 +------------+
 |        4.00|
 +------------+

key in: +
(+)   :4.000000
 +------------+
 |            |
 +------------+

key in: 2
(?)   :4.000000
 +------------+
 |        2.00|
 +------------+

key in: =
(?)   :2.000000
 +------------+
 |        6.00|
 +------------+
```