객체지향프로그래밍

Assignment 2

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<1> caesarEncryption

o Question & Explanation

After Read text file("Diary_15yearsOld.txt"), write and save a new file("Diary_15yearsOld_encryption.txt") coded by Casesar cipher algorithm. For example, if input shift number is 1, A will be changed B and C will be changed D. Shift number is must be 0 <= n <= 26. If read text file is not existence, print output "Not exist read file" and exit program.

o Result

```
Input the shift number : 1
J!bn!26!zfbst!pme/J!xjmm!hp!up!Tfpvm!0bujpobm!Vojwfstjuz/Boe!uifo-!J!xjmm!cfdpnf!uif!cftu!ibdlfs!jo!uif!xpsme""""J!dbo!d
porvftu!uif!vojwfstf/0puijoh!dbo!tupq!nf/J!DBO!EFTUSPZ!B0ZUIJOH계속하려면 아무 키나 누르십시오 . . . ▪
```

-> shift number is 1

```
Input the shift number : 4
M$eq$59$}ievw$sph2M${mpp$ks$xs$Wisyp$Rexmsrep$Yrmzivwmx}2Erh$xlir0$M${mpp$figsqi$xli$fiwx$legoiv$mr$xli${svph%%%%M$ger$g
sruyiwx$xli$yrmzivwi2Rsxlmrk$ger$wxst$qi2M$GER$HIWXVS]$ER]XLMRK계속하려면 아무 키나 누르십시오 . . . ▪
```

-> shift number is 4

o Consideration

To solve this question, when read text file, I use getline instruction for getting string line, so that need to know file open and file close. And I use ASCII code. First change Each alphabet to value type of int. Next add shift number. Finally, change result to alphabet. need to know file I/O and change string to ASCII

<2> militarytimeadd

o Question & Explanation

Calculate total time after input time and add time. input time have hour(0<= <=23), min(0<= <=59), sec(0<= <=59). input add time have addhour(0<= <=10^6), addMin(0<= <=10^6), addSec(0<= <=10^6). total time have hour(0<= <=23), min(0<= <=59), sec(0<= <=59). Make function of calculate total time.

o Result

```
input  time
h: 1
m: 30
s: 30
add time
h: 6
m: 15
s: 15
output time
h: 7 m: 45 s: 45계속하려면 아무 키나 누르십시오 .
```

```
input  time
h: 0
m: 0
s: 0
add time
h: 0
m: 60
s: 3600
output time
h: 2 m: 0 s: 0계속하려면 아무 키나 누르십시오 . .
```

```
                    input  time
                    h: 0
input  time         m: 0
h: 0                s: 0
m: 0                add time
s: 300000000        h: 100000000000000
Input Error계속Input Error계속하려면
```

o Consideration

Understanding of seconds and minutes is necessary. If an out of range number is entered, and error is output. In addition, if each element in the total time exceeds the range, the unit is incremented or removed. So, use '/' and '%'

<3> Lexicographical order

o Question & Explanation

Find the word that is larger than the input word among the words using the element for the input word. If there are no words larger than that, an error is printed("no answer"). This question have two condition. • It must be greater than the original word • It must be the smallest word that meets the first condition.

o Result

```
Input the string : ab
Output : ba계속하려면
```

```
Input the string : dkhc
Output : hcdk계속하려면 (
```

```
Input the string : bbb
Output : no answer계속히
```

o Consideration

In this assignment, there was a difficulty in setting the algorithm. I had to find a way to solve various cases at once. I did it. Compare the two letters from the best back letters. If find that behind character is bigger, find letter that is larger than previous letter and is smallest number in larger than pervious letter. Next change find number and previous number. The remaining sub-letters are sorted in ascending order. If it does not apply, it can not be changed and an error is displayed.

<4> Encode and Decode

o Question & Explanation

Encode is encoding alphabets to binary stream. Decode is reverse. Change input word to Encoding number and re-change encoded number to Decoding result. Finally print each result.

Encoding rule is a->1, b->01, ~ ,y->0001(0 is 24), z->0000(0 is 25). And need to use class include Encode.h, Decode.h.

o Result

```
Input word : bed
Encoding result
01000010001

Decoding result
bed
```

```
Input word : az
Encoding result
100000000000000000000000000

Decoding result
az
계속하려면 아무 키나 누르십
```

```
Input word : gaze
Encoding result
00000011000000000000000000000000000001

Decoding result
gaze
```

o Consideration

To solve this question, I changed each word to ASCII code and calculated the count of 0 to be added at the time of encoding. Decoding is the opposite way. Set the private value in class for each class and change the value to proceed. And I think that string end point(₩0) is very important.

<5> Matrix

o Question & Explanation

Calculate 3x3 Matrix using class. Need to calculate addition, subtraction, multiplication and rotation and find inverse matrix. using operator(+,-,*,=) function, make result matrix. First input two 3x3 matrix(A, B). Add, subtract, and multiply with two matrices, and find the L and R rotations and the inverse using the first matrix. If not exist inverse matrix print output "Not exist matrix".

o Result

```
Input 3x3 matrix
2 -1 0 1 0 -1 1 0 1
Input 3x3 matrix
1 0 1 0 1 0 1 0 1 0
+ operation
3 -1 1
1 1 -1
2 0 2

- operation
1 -1 -1
1 -1 -1
0 0 0

* operation
2 -1 2
0 0 0
2 0 2

L rotation
0 -1 1
-1 0 0
2 1 1

R rotation
2 -1 0
1 0 -1
1 0 1

Inverse
0 0.5 0.5
-1 1 1
0 -0.5 0.5
```

```
Input 3x3 matrix
1 2 3 4 5 6 7 8 9
Input 3x3 matrix
1 1 1 1 1 1 1 1 1
+ operation
2 3 4
5 6 7
8 9 10

- operation
0 1 2
3 4 5
6 7 8

* operation
6 6 6
15 15 15
24 24 24

L rotation
3 6 9
2 5 8
1 4 7

R rotation
1 2 3
4 5 6
7 8 9

Inverse
Error : Not exist Matrix
```

o Consideration

I had to learn how to use the operator. I thought about the cleanest way to multiplication of matrix.

It is apply a specific expression. When make rotation function, I applied correct way found the movement flow. Finding the inverse matrix was the most difficult. In the worst state, I apply the expression to find the inverse of 3x3 matrix. it was best way. Since it is different from the 2x2 matrix, I had to try variously.