COMP 322
Winter Semester 2021

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Assignment 1: Exploring Functions and arrays.

Due date: 12 February 2021, 11:59 PM.

Before you start:

- Collaboration and research for similar problems on the internet are recommended. However, your submission should reflect individual work and personal effort.
- Some of the topics may not be covered in class due to our limited time. You are encouraged to find answers online. You can also reach out to your instructor or TAs for guidance.
- Please submit your assignment before the due date to avoid penalties or worse risking your assignment being rejected.
- Submit one file called **assignment1.cpp** containing all the functions together with their implementations. It will also contain the main() function that runs everything.

Make sure your code is clear and readable. **Readability of your code as well as the quality of your comments will be graded**.

- No submission by email. Submit your work to mycourse.
- If your code does not compile it will not be graded.
- Be happy when working on your assignment, because a happy software developer has more inspiration than a sad one :).

Question 1 (20 pts)

Write a function that asks the user to input a password. The function will then:

1. Make sure that the password is at least 8 characters long.
2. Make sure that each character does not occur more than 2 times in the word (meaning that the same character may be repeated 2 times maximum but no more than that)
3. Make sure the password contains at least one number
4. Make sure the password contains at least one of the following special characters: *, # or $.

If the password fulfills all of the above, a message will be printed out to the screen stating that the password has been accepted. If not you should display a message stating what exactly is wrong with the provided password.

Note that the password is case sensitive.

Signature of the function:

void checkPassword();

Question 2 (20 pts)

According to wikipedia: The 26 code words in the NATO phonetic alphabet are assigned to the 26 letters of the English alphabet in alphabetical order as follows: **A**lfa, **B**ravo, **C**harlie, **D**elta, **E**cho, **F**oxtrot, **G**olf, **H**otel, **I**ndia, **J**uliett, **K**ilo, **L**ima, **M**ike, **N**ovember, **O**scar, **P**apa, **Q**uebec, **R**omeo, **S**ierra, **T**ango, **U**niform, **V**ictor, **W**hiskey, **X**-ray, **Y**ankee, **Z**ulu.

https://en.wikipedia.org/wiki/NATO_phonetic_alphabet

Write a function that takes a word and translate each letter into its corresponding phonetic alphabet.

Signature of the function:

void convertPhonetic();

When running the ConvertPhonetic() function, the output should be similar to the following example:

Please enter a word: Hello

Hotel Echo Lima Lima Oscar

Question 3-1 (15 pts)

Write a function that will fill a 5x5 matrix by randomly generated numbers. You can use **rand()** and **srand()** functions provided by **<cstdlib>** library to generate random numbers. The numbers should be positive integers ranging from 0 to 25.

The signature of the function is:

void fillMatrix(int matrix[rows][cols]);

rows and cols are global constants defined as follow:

const int rows = 5;

const int cols = 5;

Question 3-2 (15 pts)

Write a function that, given a 5x5 matrix as parameter, will print each row of the matrix to the screen line by line.

The signature of the function is:

void printMatrix(int matrix[rows][cols]);

You can test your function by feeding it a randomly generated matrix from question 3-1.

The output should be similar to the following:

```
12  | 2  | 9   | 23  | 6
------------------------------
5   | 12 | 19 | 3  | 16
------------------------------
2  | 12 | 24 | 2   | 0
------------------------------
14 | 2  | 17 | 24 | 7
------------------------------
0 | 25 | 18 | 16  | 8
------------------------------
```

Question 3-3 (30 pts)

Write a recursive function that, given two 5x5 matrices as parameters, will return a third 5x5 matrix holding the result of the product of the 2 matrices.

You can test your function by feeding it two randomly generated matrices from question 3-1.

The signature of the function is:

```
void multiplyMatrices(int matrix_left[rows][cols],

                      int matrix_right[rows][cols],

                      int matrix_result[rows][cols]);
```

Please use the following main() function for testing:

```
int main() {

        checkPassword();

        convertPhonetic();

        int matrix[rows][cols];

        int matrix2[rows][cols];

        int matrix_result[rows][cols];

        fillMatrix(matrix);

        fillMatrix(matrix2);

        printMatrix(matrix);

        multiplyMatrices(matrix, matrix2, matrix_result);

        printMatrix(matrix_result);

        return 0;

}
```