**Programming Fundamentals**

**Assignment # 3: Functions and Arrays**

**NOTE:**

* **Don’t use built-in functions unless specified in the task**
* **Don’t cheat from internet and don’t share code with your fellows**
* **Try to solve the task by yourself without trying to copy from internet.**
* **Indent your code properly.**
* **Use meaningful prompt lines/labels for all input/output.**
* **You are not allowed to change prototype under any condition.**
* **Late submission will result in 0.**
* **Enjoy ☺**

**Task 1:**

Consider the following function:

**int frequency(int arr[], int size)**

This function counts the number of times ‘value’ appears in the array and returns the frequency calculated.

**Void inputArray(int arr[], int size)** //It takes input for the array

**Void displayArray(int arr[], int size)** //It displays the content of the array on screen.

Write a program that first inputs an array of integers of size 10. Your program must use **inputArray()** function to take values in the array. Then use the **frequency()** function to count the frequency of the element of array passed.

What needs to be done:

* In main(), create an array of size 10.
* Call inputArray() and take input in the array. **Note** that you will place every input at a random position. E.g. You will need to use Random() function which is a builtin function to generate a random number that will be used as a index of your array where you will insert data. Your program should not place data at index that has already been used.
* After placing data call displayArray() to output contents of your array.
* After that call frequency() function and print which number has highest frequency and also the frequency amount.
* At this point you will need to take a value from user, overload your frequency() function to make it accept user value and find the frequency of given value.
* Your program should also print “Inside function XYZ”… where XYZ is your function name after entering any function.

**EXAMPLE:**

\*Inside main function\*

\*Inside arrayInput function\*

// input your array data here

\*Inside arrayDisplay function\*

// Print array elements here

\*Inside frequency function\*

Element X has the highest frequency of Y // Where x is element and y is the frequency calculated.

Input value to find frequency: **22**

\*Inside overloaded frequency function\*

Frequency of 22 is 0// In case given input is not in array.

**Task 2:**

Write a program that will ask a user to enter a password. Your program should then check that is the entered password is strong or not. Following are the requirements of strong password:

•Password must be at least 6 characters long

•Password must contain at least 1 upper case letter

•Password must contain at least 1 lower case letter

•Password must contain at least 1 digit

Your program should display a message if the password is strong. If it is not strong, it should prompt the user about the particular message (must contain upper case/lower case/digit/etc.) and asks the user to enter the password again. Your program should keep asking the password until user provides a strong password OR until user enters “quit” in password. Note that quit is not a strong password, but it is a message for the program to exit.

**Sample Run:**

Enter Your Password: **abc**

Oops! Your password must contain at least 6 characters.

Enter Your Password: **abc123**

Oops! Your password must contain at least 1 upper case letter

Enter Your Password: **pfCS20aft**

Your Password is strong!

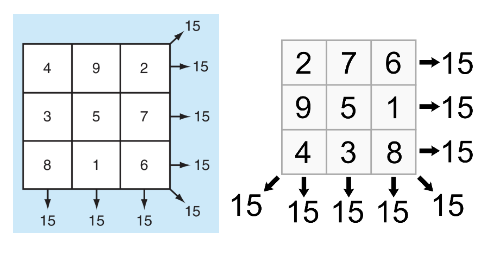
**Note**: Your output must be same as the sample run!.

**Task 3:**

The Lo Shu Magic Square is a grid with 3 rows and 3 columns. The Lo Shu Magic Square has the following properties:

* The grid contains the numbers 1 through 9 exactly.
* The sum of each row, each column, and each diagonal all add up to the same number.

Following are the examples:



In a program you can simulate a magic square using a two-dimensional array. Write a function that accepts a two-dimensional array as an argument, and determines whether the array is a Lo Shu Magic Square. Test the function in a main program.

**Task 4:**

Create 2 char arrays of size 5, create a function with prototype **void inputArray(char arr[], int size);** to take input for your arrays.

Next create:

**Void union(char arr[], char arr2[])** to calculate union of your arrays.

**Void intersection(char arr[], char arr2[]) to calculate intersection of your 2 array.**

**Void display(char arr[])** to display the final result of your union and intersection.

**Note:** Your main function should only **declare and initialize 2 char arrays** and you are not allowed to change their data at any point during program execution.

Your **main(), union(), intersection(), and input()** functions should not contain any cout statement.

**Bonus:**

Your Final output should be in **sorted format**: **1**.capital letters **2**. Small letters **3**. Numbers **4**. Punctuation and special characters

**Task 5:**

Write a program in which initialize a character array with a sentence in which **all of the words are run together without space**, but the **first character** of each word is **uppercase**. Now, convert the sentence to a string in which the words are separated by spaces and only the first word starts with an uppercase letter.

**For example:**

**The string** “StopAndSmellTheRoses.” **would be converted to** “Stop and smell the roses.”