National University

of Computer & Emerging Sciences Peshawar Campus

Name: _____ Roll No: _____

Program: CS
Semester: Spring – 2020
Time Allowed: 3:00 hrs.
Course: Programming Fundamentals Lab (CL118)

Examination: Lab Exam
Total Marks: 40
Date: 18th June, 2020
Lab Instructor: Safia Fatima

Note: .Don't rush, carefully understand the problem and then go for solution. Create a word file with your Roll number and name (p190001_ABC), copy all the codes with screenshots of output into the file and submit that file.

Q 1. (10 marks)

A time stamp string is a length-5 string of the form xx:yy
where the first two characters encode the hours, 00, 01, 02 ... 22, 23
And the last two characters encode the minutes, 00, 01, 02 ... 58, 59
Complete the following function so that it performs as specified.

Bool newDay(int hr, int min, additional_minutes)

""" Returns True if current time plus additional_minutes occurs on a different day as the current time. Precondition: hr and min is a time stamp that represents the current time. additional_minutes is a positive int that represents an elapsed time in minutes. """

Hint: The number of minutes in a day is 60*24.
Examples:
NewDay(01,13, 1500) is True
NewDay(01,13, 42) is False
NewDay(23,55, 5) is True
NewDay(23,55, 4) is False

Q 2. (10 marks)

Input nRows, nCols from user, create 2D list of [nRows x nCols] and initialize it with user input values?

Check whether 2D list/matrix is **Magic square** or not. A Magic Square is a n x n square matrix of distinct element from 1 to n^2 where sum of any row, column or diagonal is always equal to same number.

Note: Don't hard code for 3x3, write general code that should work for square matrix of any order.
Input : nRows = 3
nCols = 3

2D list of User input values;
2 7 6
9 5 1
4 3 8
Output : Magic matrix
Explanation: In matrix sum of each row and each column and diagonals sum is same = 15.

Input : nRows = 3
nCols = 3
2D list of User input values;
1 2 2
2 2 1
2 1 2

Output : Not a Magic Matrix
Explanation: In matrix sum of each row and each column and diagonals sum is not same.

Q 3. (10 marks)
Consider the following function main:

```
int main()

{
int inStock[10][4];
int alpha[20];
int beta[20];
int gamma[4] = {11, 13, 15, 17};
int delta[10] = {3, 5, 2, 6, 10, 9, 7, 11, 1, 8};
.
.
}
```

1. Write the definition of the function setZero that initializes any onedimensional array of type int to 0.
2. Write the definition of the function inputArray that prompts the user to input 20 numbers and stores the numbers into alpha.
3. Write the definition of the function doubleArray that initializes the elements of beta to two times the corresponding elements in alpha. Make sure that you prevent the function from modifying the elements of alpha.
4. Write the definition of the function copyGamma that sets the elements of the first row of inStock to gamma and the remaining rows of inStock to three times the previous row of inStock. Make sure that you prevent the function from modifying the elements of gamma.
5. Write the definition of the function copyAlphaBeta that stores alpha into the first five rows of inStock and beta into the last five rows of inStock. Make sure that you prevent the function from modifying the elements of alpha and beta.
6. Write the definition of the function printArray that prints any onedimensional array of type int. Print 15 elements per line.
7. Write the definition of the function setInStock that prompts the user to input the elements for the first column of inStock. The function should then set the elements in the remaining columns to two times the corresponding element in the previous column, minus the corresponding element in delta.
8. Write C++ statements that call each of the functions in parts a through g.
9. Write a C++ program that tests the function main and the functions discussed in parts a through g. (Add additional functions, such as printing a two-dimensional array, as needed.)

Q 4. (10 marks)
This program lets the user specify a text file for input and a file for output. Write about yourself in 10 line in input file. All the words are read from the input file.

- Only vowel letters in words are converted to lower case in output file.
- Fill each space with '0' in output file.
- A sorted list (A-Z) of all the words that were found, without repetition, is written to the output file, with one word per line. A word in this program is defined to be any sequence of letters.

Good Luck ☺