CL-1002
Programming Fundamentals
Lab # 13

Objectives:

- Practice and understanding on basic c++ programs

Note: Carefully read the following instructions (*Each instruction contains a weightage*)

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function about its functionality.
3. Use understandable name of variables.
4. Proper indentation of code is essential.
5. Write a C++ statement(s) for each of the following task one after the other, in the same order.
6. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of **every task output in MS word and submit .cpp file with word file**.
7. Make separate .cpp files for all tasks and use this format **23F-1234_Task1.cpp.**
8. First think about statement problems and then write/draw your logic on copy.
9. After copy pencil work, code the problem statement on MS Studio C++ compiler.
10. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Google classroom. (Make sure your submission is completed).
11. Please submit your word file in this format **23F-1234_L1.docx**
12. Do not submit your assignment **after the deadline**.
13. **Do not copy code from any source otherwise you will be penalized with negative marks.**

Problem: 1 |

Jason, Samantha, Ravi, Sheila, and Ankit are preparing for an upcoming marathon. Each day of the week, they run a certain number of miles and write them into a notebook. At the end of the week, they would like to know the number of miles run each day, the total miles for the week, and average miles run each day. Write a program to help them analyze their data. Your program must contain parallel arrays: an array to store the names of the runners and a two-dimensional array of five rows and seven columns to store the number of miles run by each runner each day. Furthermore, your program must contain

1. Read and store the runners' names
2. Initialize and store the numbers of miles run each day.
3. Find the total miles run by each runner and the average number of miles run each day.
4. Output the results: runnerName: milesDay1 milesDay2 milesDay3 milesDay4 milesDay5 milesDay6 milesDay7

Problem: 2 | 2d Array

Write a program that can be used to assign seats for a commercial airplane. The airplane has 13 rows, with six seats in each row. Rows 1 and 2 are first class, rows 3 through 7 are business class, and rows 8 through 13 are economy class. Your program must prompt the user to enter the following information:

1. Ticket type (first class, business class, or economy class)
2. Desired seat

Output the seating plan in the following form:

	A	B	C	D	E	F
Row 1	*	*	X	*	X	X
Row 2	*	X	*	X	*	X
Row 3	*	*	X	X	*	X
Row 4	X	*	X	*	X	X
Row 5	*	X	*	X	*	*
Row 6	*	X	*	*	*	X
Row 7	X	*	*	*	X	X
Row 8	*	X	*	X	X	*
Row 9	X	*	X	X	*	X
Row 10	*	X	*	X	X	X
Row 11	*	*	X	*	X	*
Row 12	*	*	X	X	*	X
Row 13	*	*	*	*	X	*

Here, * indicates that the seat is available; X indicates that the seat is occupied. Make this a menu-driven program; show the user's choices and allow the user to make the appropriate choices.

Problem: 3 | C string

Given the declaration:
char str1[15];
char str2[15] = "Good day";
mark the following statements as valid or invalid. If a statement is invalid, explain why.
a. str1 = str2;
b. if (str1 == str2)
cout << " Both strings are of the same length." << endl;
c. if (strlen(str1) >= strlen(str2))
str1 = str2;
d. if (strcmp(str1, str2) < 0)
cout << "str1 is less that str2." << endl;

Problem: 4 | C string

Given the declaration:
char str1[21];
char str2[21];
a. Write a C++ statement that stores "Sunny Day" in str1.
b. Write a C++ statement that stores the length of str1 into the int variable length.
c. Write a C++ statement that copies the value of name into str2.
d. Write C++ code that outputs str1 if str1 is less than or equal to str2, and otherwise outputs str2

Problem: 5 | C string

Assume the following declarations:
char name[21];
char yourName[21];
char studentName[31];
Mark the following statements as valid or invalid. If a statement is invalid, explain why.
a. cin >> name;
b. cout << studentName;
c. yourName[0] = '\0';
d. yourName = studentName;
e. if (yourName == name)
studentName = name;
f. int x = strcmp(yourName, studentName);

g. strcpy(studentName, Name);
h. for (int j = 0; j < 21; j++)
cout << name[j];

Problem: 6 | C string

Write a program that prompts the user to input a character array and outputs the uppercase letters. (Use a character array to store the string.)

Problem: 7 | C string

Write a C++ Program to Swap Two String using Third variable.

Problem: 8 | C string

Write a C++ Program to Reverse an Array of Strings.

Problem: 9 | C string

Write a C++ Program to check whether a String is Palindrome or not.

Problem: 10 | C string

Write a C++ Program to input a string and then find the number of vowels in that string .

Problem: 11 | 2d array

Write a program which input a 2-Dimensional array of size 5x5, find the largest element in it

Problem: 12 | 2d Array

Write a C++ Program to Find if an Array is a Square Matrix and Print the Diagonals.
The program takes an array and checks if it is a square matrix and prints the diagonals. A square matrix is one which has equal number of row and columns.

Problem: 13 | 2d Array

Write a C++ Program to Find the Transpose of a Matrix.
The program takes a matrix and prints the transpose of the matrix. In a transpose matrix, rows become columns and vice versa.

Problem: 14 | 2d Array

Write a C++ Program to Perform Matrix Multiplication.

1. The program takes two matrices and multiplies them
2. If number of columns of matrix A is not equal to number of rows of matrix B, then matrices cannot be added.
3. The program is exited.
4. Else they are multiplied and the result is printed.
5. Exit.