Assignment 03
Programming Fundamentals-CS-1104, Fall 2022
BSCS-1A/BSCS-1B/BSGM-1A/BSROB-1A

Department of Computer Science,
Faculty of Computer Science & Information Technology,
The Superior University Gold Campus, Lahore.
Submission Deadline: Wednesday 08:00 AM, February 15, 2023

Question	CLO	Domian/BT Level	Total Marks
1-20	4	C6	190

Advice and Submission Guidelines for Assignment

- Make sure that you read and understand each and every instruction. If you have any questions or comments you are encouraged to discuss (only) with your colleagues and instructor.
- In case of coding assignment, paste all codes and screenshots of output on word file, later you can convert this word file into PDF file as well. **Upload PDF file on the LMS** and keep code files with you (better in your own email) as it will be used for evaluation and viva.
- **Handwritten assignment shall be submitted in class.**
- All the submitted evaluation instruments (quizzes, assignments, lab work, exams, and the project) will be checked for plagiarism.
- Later Submission and Plagiarism will be dealt as per university Policy
- Start early otherwise you will struggle with the assignment.

Note: Keep all your code files. It will be required at any time of evaluation.

Question 01-10: **(10 Points each)**

Using the concept of 1D array solves the following problems.

1. Write a program in C++ to find the sum of elements in an array.
2. Write program to read five numbers, find their sum, and print the numbers in reverse order.
3. Write a program in C++ to find the sum of all elements of an array.
4. Write a program in C++ to find the largest and smallest elements in an array.
5. Write a program in C++ to search for a specific element in an array.
6. Write a program in C++ to find the second largest element in an array.
7. Write a program in C++ to reverse an array.
8. Write a program that inputs five integers from the user and stores them in an array. It then displays all values in the array without using loops.
9. Write a program that inputs five integers from the user and stores them in an array. It then displays all values in the array using loops.
10. Write a program that inputs five values from the user, stores them in an array and displays the sum and average of these values.
11. Write a program that inputs current day and month from the user. It then calculates and displays the total number of days in the current year till the entered date.
12. Write a program that inputs the age of different persons and counts the number of persons in the age group 50 and 60.

13. Write a program that uses 4 arrays "numbers, squares, cubes, sums" each consisting of 5 elements. The "numbers" array stores the values of its indexes, the "squares" array stores the squares of its indexes, the "cubes" array stores the cubes of its indexes and the "sums" array stores the sum of corresponding indexes of these three arrays. The program should display the values of all arrays and the total of all values in sums array.
14. Write a program that inputs ten numbers from the user in an array and displays the maximum number and minimum numbers.
15. Write a program that inputs five numbers in an array and displays them in actual and reverse order.
16. Write a program that inputs value from user and searches the number in the array.
17. Write a program that initializes array of ten integers. It inputs an integer from the user and searchers the value in the array using binary search.
18. Write a program that gets five inputs from the user in an array and sorts the array in ascending orders.
19. Write a program that stores five values in an array and sorts the array using bubble sort. It also displays the values of unsorted and sorted array.
20. Write a program that inputs ten integers in an array. It then sorts the array using any sort method (of your own choice) and displays the number of occurrences of each number in the array as:

    "1" is stored 4 times in the array
    "2" is stored 2 times in the array

Question 11-19: (10 Points each)

Using the concept of 2D array solves the following problems.

1. Write a program that initialize a 2-D array called doubleArray of type double. Take input for rows and columns from user and input 10 random values using loop in the array and display the array.
2. Write a program that defines a function printArray that prints any 2-D array of type int. Having 5 elements in each row, take input of number of rows from user and Print all elements in rows format.
3. Write a program in C++ to find the sum of elements of each row in a 2D array.
4. Write a program in C++ to find the transpose of a 2D array.
5. Write a program in C++ to find the sum of elements of each column in a 2D array.
6. Write a program in C++ to multiply two 2D arrays.
7. Write a program in C++ to find the sum of diagonal elements in a 2D matrix.
8. Write a program in C++ to search for a specific element in a 2D matrix.
9. Write a program in C++ to add two 2D matrices.
10. Write a program that stores integer values in an array of 2 rows and 4 columns and display the values like:

    1 2 3 4
    5 6 7 8

11. Write a program that initializes a 2-D array of 2 rows and 3 columns and then displays its values as:

    Arr[0][0] = 1 Arr[0][1] = 2 Arr[0][3] = 3
    Arr[1][0] = 4 Arr[1][1] = 5 Arr[1][2] = 6

12. Write a program that initializes a 2-D array of 2 rows and 3 columns and then displays the minimum and maximum number in the array.

13. Write a program to add two matrices (2-D arrays). Input the order of matrix (rows and columns) from the user. The matrices must be of same size to be added. Get the input for each element of the first matrix and then second matrix. Add the two matrices and store the values in a third matrix & display all matrices.

14. Write a program that inputs integer values in a 4x4 matrix and displays the sum of diagonal elements of the matrix.

15. Write a program that inputs the number of rows and columns from user. It then inputs the elements to store in the matrix. The program calculates the sum of each row and each column and displays on the screen. If it is a square matrix, also calculates the sum of diagonal elements and displays on screen as:

Matrix A:				Row Sum:
	1	2	3	6
	4	5	6	15
	7	8	9	24
Column Sum:	12	15	18	

Diagonal Sum: 15

16. Write a program that uses 2-D array to initialize the scores of students. The students are arranged in five rows with five students in each row. The program inputs the row number and student number in that row and then displays the score of the student.

17. Write a program that print the values of each element of 2-D array in tabular format with 3 rows and 3 columns. Assume that the array was initialized with the declaration.

18. Write a program that uses a two-dimensional array to store the highest and lowest temperatures for each month of the year. The program should output the average high, average low, and the highest and lowest temperatures for the year. Your program must consist of the following functions:

- **a.** Function getData: This function reads and stores data in the two-dimensional array.
- **b.** Function averageHigh: This function calculates and returns the average high temperature for the year.
- **c.** Function averageLow: This function calculates and returns the average low temperature for the year.
- **d.** Function indexHighTemp: This function returns the index of the highest high temperature in the array.
- **e.** Function indexLowTemp: This function returns the index of the lowest low temperature in the array.

19. 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:

- **a.** Ticket type (first class, business class, or economy class)
- **b.** 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.