Basic Programming on Loops, Arrays, and Functions

Course Code: CSC 2107 Course Title: Data Structure (Lab)

Dept. of Computer Science
Faculty of Science and Technology

Lecturer No:	**1**	**Week No:**	**1**	**Semester:**	
Lecturer:	*Name & email*				

Lecture Outline

1. Rules & Guidelines
2. Lab Tasks
3. Prerequisites
4. Objectives
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Rules & Guidelines

Write your own rules to evaluate lab tasks.

Lab Tasks

1. Write C++ code to solve all the problems starting from slide 7 to 11.
2. Any remaining problem unsolved will be home task.

Prerequisites

- Have a basic understanding of Loops, Arrays, and Functions.

Objectives

- To know how to solve basic programming problems with Loops, Arrays, and Functions.
- To know basic relationship between the usage of Loops and Arrays.
- To know basic structure of a function and its usage.

Problem Descriptions

Problem 1

1. Initialize an array of 10 elements and print the array elements both in normal and reverse order.

For example,
Input: `12 32 43 1 54 53 15 64 3 13`

Output: `13 3 64 15 53 54 1 43 32 12`

Problem Descriptions

Problem 2

2. Initialize an integer array of 10 elements and print how many numbers are odd and how many numbers are even.

For example,
Input: `12 32 43 1 54 53 15 64 3 13`

Output:

```
6 odd numbers
4 even numbers
```

Problem Descriptions

Problem 3

3. Write a function that takes TWO parameters to print all the odd numbers between a given range. Input the starting value of the range and ending value of the range. Then, send them as the parameters to your function.

For example,
Output:

```
Starting value: 12
Ending value: 23

13 15 17 19 21 23
```

Problem Descriptions

Problem 4

4. Write a program to perform matrix addition between 3 matrices.

For example,
Input:

```
12 13 14      1 2 3      101 104 107
15 16 17      4 5 6      102 105 108
18 19 20      7 8 9      103 106 109
```

Output:

```
114 119 124
121 126 131
128 133 138
```

Problem Descriptions

Problem 5

5. Write a function to calculate factorial of a given integer number if that number is a prime number. If it is not, it will give an error.

For example,
Scenario 1
Input: `5`
Output: `120`

Scenario 2
Input: `4`
Output: `Error! Not a prime number.`

Books

- **“Schaum's Outline of Data Structures with C++”**. By John R. Hubbard
- **“Data Structures and Program Design”,** Robert L. Kruse, 3rd Edition, 1996.
- **“Data structures, algorithms and performance”,** D. Wood, Addison-Wesley, 1993
- **“Advanced Data Structures”,** Peter Brass, Cambridge University Press, 2008
- **“Data Structures and Algorithm Analysis”,** Edition 3.2 (C++ Version), Clifford A. Shaffer, Virginia Tech, Blacksburg, VA 24061 January 2, 2012
- **“C++ Data Structures”,** Nell Dale and David Teague, Jones and Bartlett Publishers, 2001.
- **“Data Structures and Algorithms with Object-Oriented Design Patterns in C++”,** Bruno R. Preiss,

References

1. https://en.wikipedia.org/wiki/LOOP_(programming_language)
2. https://en.wikipedia.org/wiki/Array_data_structure
3. https://www.programiz.com/cpp-programming/function