

National University of Computer and Emerging Sciences



**Lab Manual**  
*for*  
**Object Oriented Programming**

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**Lab Manual 5**

## **Objectives:**

After performing this lab, students shall be able to:

- ✓ Dynamic 2D arrays, allocation and deallocation.
- ✓ Classes, getters, setters and constructors

## **Problem 1**

Write a function called `rotateOuterLayerBy1`, which takes a 2 dimensional square matrix and its dimension, `n`, as parameters and rotate the outermost layer by one place, anti-clockwise. Use 2D pointers to create and access the two dimensional array.

**Constraint:** Your code cannot create an extra array to accomplish the given task. But you can create one or two extra integers.

### **Example:**

A 4x4 array

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

Outer layer rotated once

1	2	3	7
0	5	6	11
4	9	10	15
8	12	13	14

## **Problem 2**

A boy has his money deposited \$1000, \$1500 and \$2000 in banks-Bank A, Bank B and Bank C respectively. We have to print the money deposited by him in a particular bank.

Create a class 'Bank' with a function 'getBalance' which returns 0. Make its three subclasses named 'BankA', 'BankB' and 'BankC' with a function with the same name 'getBalance' which returns the amount deposited in that particular bank. Call the function 'getBalance' by the object of each of the three banks.

## **Problem 3**

Create a class named 'Rectangle' with two data members- length and breadth and a function to calculate the area which is 'length\*breadth'. The class has three constructors which are :

1 - having no parameter - values of both length and breadth are assigned zero.

2 - having two numbers as parameters - the two numbers are assigned as length and breadth respectively.

3 - having one number as parameter - both length and breadth are assigned that number.

Now, create objects of the 'Rectangle' class having none, one and two parameters and print their areas.