National University of Computer and Emerging Sciences



Lab Manual 04

Object Oriented Programming

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## Objectives

After performing this lab, students shall be able to handle:

* Dynamic 2D arrays
* Classes, getters and setters

**TASK 1:**

As we already know that a class is simply a representation of a type of object. It is the blueprint/ plan/template that describes the details of an object.

Your task is to design a class for Student. You must take any 5 necessary data members as Roll No, Name, CNIC, Degree and Address. Now implement all the required functions i.e. getters, setters, print function.

Now create an object of Student in the main, take input from user and print Roll No, Name, CNIC, Degree and Address using getters, setters and print function.

**TASK 2:**

Create a class named **Matrix** which has data members (rows, cols) and following functions:

1. **Getters**

Functions to get the values of data members. Make separate getter functions for each data member

1. **Setters**

Functions to set the values of data members. Make separate getter functions for each data member

1. **AllocateMemory**  
   This function takes rows and columns as parameter, create a 2D matrix and return it
2. **Input**

This function takes filename and empty matrix as parameter, read data from file, save in empty 2 matrix (array) and return the matrix

1. **rotateOuterLayerBy1**

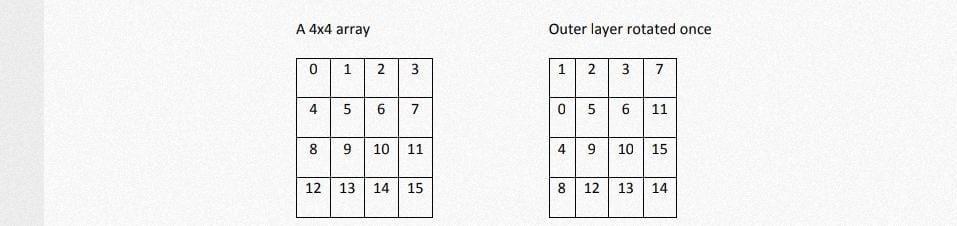
This function takes a 2 dimensional square matrix, rows and cols as parameters and rotate the outermost layer by one place, anti-clockwise.

1. **Display**Output the resultant matrix

Create the object of Matrix class in main() function, perform matrix rotation and display the output.

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

**Example:**



**Main function**void main()

{

**//take input from user for rows and cols**

**//Create object of Matrix class**

**//set rows and cols values**

**//Call AllocateMemory function**

**//Call Input function  
//Call rotateOuterLayerBy1 function**

**//Call Display function**

**//deallocate matrix**

}