W e b E n g i n e e r i n g

Lab 02 **Marks 100**

Instructions

Work on this lab individually. You can use your books, notes, handouts etc.

Objective

Today's lab will help you to refresh your basic programming concepts in Java.

What you have to do

Program the following tasks in Java, compile and execute them. The name of your files will be according to the task given in this lab.

Task 1 [50]

Write a class named **Student** in Java with attributes *rollno, name, e-mail* and *address*. All data members must be private. Provide constructors (default, parameterized and copy (object cloning) and setter/getter methods to initialize private data-members. Provide the *inputData()* and *showData()* methods to input and print the information of the student.

Write a class **Driver** with an array for 5 elements of Student, and demonstrate its capabilities (e.g., assigning/printing data).

Task 2 [50]

Write a class **Shape** with data members *area*(double) and *volume*(double). This class includes the following methods:

- default, parameterized and copy constructors.
- getInput() – to get the values of data members from user using GUI components.
- toString() – override this function to display the data members.

Write the following subclasses which are extending the functionalities of **Shape** Class.

- **Square** with data members *width*(double), *length*(double), and *height*(double). This class must override the functionality of super class i.e., getInput() and toString().
- **Sphere** with data members r*adius*(double), and *Pi* (must be set to 3.14). This class must override the functionality of super class i.e., getInput() and toString().

Write a **Driver** class and create 3-5 objects and test the functionality of the code.

Hint:

Area of square = $L * W$***, Volume of Square =*** $L * W * H$ ***, Area of Sphere =*** $4 * \pi * r * r$ ***, Volume of Sphere =*** $\frac{4}{3} * \pi * r * r * r$***.***

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