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

Lab 03 **Marks 100**

Instructions

Work on this lab individually. You can use your books, notes, handouts etc. but you are not allowed to borrow anything from your peer student.

Objective

Today's lab will help you to refresh your concepts of Abstract classes and Interfaces 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]

Define an interface **Shape**, and three subclasses named as **Square**, **Rectangle** and **Circle**. A **Shape** has two abstract member functions named as *CalculateArea()* and *CalculatePerimeter()*. The subclasses must have to provide the appropriate implementation of **Shape**.

Circle has two data-members: *PI* (as constant with value 3.14), and *radius*.
Square and **Rectangle** contain two data-members: *length* and *width*.
Provide constructors (default, parameterized and copy), mutators and accessors for each data members to initialize them.

Override the *toString()* method in each class to display the class name, shape, area and its perimeter.

Write a **Driver** class to create numerous objects of type **Square**, **Rectangle** and **Circle**, and saved into an array (think about the type of array). Iterate the whole array and print the shape's information.

Task 2 [50]

Write an interface **Media** with a method *display()*. There are two types of Media: **PrintMedia** (with data-member *title*) and **SocialMedia** (with data-member *title*). You need to implement **PrintMedia** and **SocialMedia** classes with **Media** interface and make them concrete classes. Create following classes:

Book {with data-members *name* and *ISBN*} and **Magazine** {with data-members *month* and *year*} which should inherit from **PrintMedia**.

Facebook {with data-members name and likes} which should inherit from **SocialMedia**.

Write a class **Driver**, create an array of 10 elements of type **Media** to demonstrate the polymorphic behavior.

Book

```
{
      //Write default and parameterized constructor
      public void setName(String name);
      public void setISBN(String ISBN);
      public void setTitle(String title);
      String getName();
      String getISBN();
      String getTitle();
      public void display(); //override method
}
```

Magazine

```
{
      //Write default and parameterized constructor
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      public void setTitle(String title);
      public void setMonth(String month);
      public void setYear(int year);
      String getTitle();
```

```
      String getMonth();
      int getYear();
      public void display(); //override
}
```

Facebook

```
{
      //Write default and parameterized constructor
      public void setName(String name);
      public void setLikes(String likes);
      public void setTitle(String title);
      String getTitle();
      String getName();
      String getLikes();
      public void display(); //override
}
```

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