GIFT School of Engineering and Applied Sciences

Spring 2022

CS-240: Object-oriented Programming

Lab-5 Manual

Basics of Classes and Objects

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Task #1: Creating Classes and Objects

In this task, you are being asked to write a class and create objects in Java.

NOTE: Write your class and the *main* method in separate files.

Write a class definition **`DayOfYear`** with two data member **`day`,** and **`month`** of integer type. It also contains the methods **`input`**, **`output`**, **`set`**, **`getMonth`**, and **`getDay`**. These methods should perform the actions as described in the **procedure** below:

Procedure

- Build a class with two **`private`** data member **`day`** and **`month`** of integer type for holding data like birthdays and holiday.
- This class also contains methods described as follows:
    - **`void input()`**

      Gives input to the data members of the object. Use a **`Scanner`** object to read input. Here's an example:

      ```
      Scanner read = new Scanner(System.in);

      System.out.println("Enter the month as a number: ");
      int m = read.nextInt();

      System.out.println("Enter the day of the month: ");
      int d = read.nextInt();

      //call the set method and pass values
      set(m, d);
      ```

    - **`void output()`**

      Displays the month and day of the year.

    - **`void set(int m, int d)`**
      Assign new values to the data members of the object.
    - **`int getMonth()`**
      Returns the month
    - **`int getDay()`**
      Returns the day of the month
- Create two objects **`today`** and **`birthday`** of **`DayOfYear`** in the **`main()`** method.
- Call the **`input`** method of **`today`** object for input from the user in today's data members. Display these on the screen.
- Assign values to **`birthday`** members using **`set`** method and display these on the screen.

Exercise Output

```
Enter today's date :

Enter the month as a number : 3
Enter the day of the month : 21
Today's date is month = 3, day = 21

Ali's birthday is month = 3, day = 21
Happy Birthday Ali!
```

1. Create a program called **DayOfYear.java** for the class, and **RunDayOfYear.java** having the **main** method**.**
2. Correctly display appropriate messages.

Task #2: Creating Classes and Objects

In this task, you are being asked to write a class and create objects in Java.

NOTE: Write your class and the *main* method in separate files.

Write a class definition **`Book`** with three data member **`bookId (int)`**, **`pages (int)`** and **`price (double)`**. The class has the following methods as described in the **procedure** below:

Procedure

- Build a class with three **`private`** data member **`bookId`**, **`pages`** and **`price`** for holding data about books.
- This class also contains the following methods:
    - **`void get()`**

      Gives input to the data members of the object. Use a **`Scanner`** object for getting the input. You will then pass these values to the **`set`** method.
    - **`void show()`**
      Displays all the values of data members of an object.
    - **`void set(int b, int p, double pr)`**
      Assigns new values to the data members of the object.
    - **`Setter`** and **`Getter`** methods
      Create all setter and getters methods
- Create two objects **`maths`** and **`english`** in the **`main`** method.
- Call **`get`** function of **`maths`** for input from the user in **`maths`** data members. Assign value to this object using the **`set`** method.
- Do the same for the **`english`** object and use the **`set`** method to assign values.
- Display the values of **`maths`** and **`english`** objects.
- Change values of the **`maths`** object by using its *setter* functions.
- Display the values of the **`maths`** object by using the *getter* functions.
- Show the details of the costliest book amongst **`maths`** and **`english`**.

Exercise Output

```
Enter Book ID: 1
Enter Pages: 250
Enter Price: 125.20

The details of the costliest book are:
BookID = 2
Pages = 320
Price = 150.75
```

1. Create a program called **Book.java** for the class, and **RunBook.java** having the **main** method**.**
2. Correctly display appropriate messages.

Task #3: Creating Classes and Objects

In this task, you are being asked to write a class and create objects in Java.

NOTE: Write your class and the *main* method in separate files.

Design a class named **`Pet`**, which should have the following fields:

- **`name`**. The name field holds the name of a pet.
- **`animal`**. The animal field holds the type of animal that a pet is. Example values are **`"Dog", "Cat", and "Bird".`**
- **`age`**. The age field holds the pet's age.

The **`Pet`** class should also have the following methods:

- **`setName`**. The **`setName`** method stores a value in the **`name`** field.
- **`setAnimal`**. The **`setAnimal`** method stores a value in the **`animal`** field.
- **`setAge`**. The **`setAge`** method stores a value in the **`age`** field.
- **`getName`**. The **`getName`** method returns the value of the **`name`** field.
- **`getAnimal`**. The **`getAnimal`** method returns the value of the **`animal`** field.
- **`getAge`**. The **`getAge`** method returns the value of the **`age`** field.

1. Create a program called **Pet.java** for the class, and **RunPet.java** having the **main** method**.**
2. Create objects of all types of pets, such as a **Dog, Cat,** and a **Bird.**
3. Set the object's values using the **set** methods, and display the values using the **get** methods.

Task #4: Creating Classes and Objects

In this task, you are being asked to write a class and create objects in Java.

NOTE: Write your class and the *main* method in separate files.

Look at the following partial class definition, and then respond to the questions that follow it:

```
class BookDescription {
     private String title;
     private String author;
     private String publisher;
     private int copiesSold;
}//class
```

- Write accessor (**get**) and mutator (**set**) methods for each field.
- Write a **display** method to print all values of the object.
- Create at least **three** objects of the class having different values.
- Call all setter and getter methods on each object. Call the **display** method for all objects.

1. Create a program called **BookDescription.java** for the class, and **RunBookDescription.java** having the **main** method**.**
2. Correctly display appropriate messages.

Class Participation: Creating Classes and Objects

In this task, you are being asked to write a class and create objects in Java.

NOTE: Write your class and the *main* method in separate files.

Write a class named **`Employee`** that has the following fields:

- **`name.`** The **`name`** field references a **`String`** object that holds the employee's name.
- **`idNumber.`** The **`idNumber`** is an **`int`** variable that holds the employee's ID number.
- **`department.`** The **`department`** field references a **`String`** object that holds the name of the department where the employee works.
- **`position.`** The **`position`** field references a **`String`** object that holds the employee's job title.

Write appropriate mutator methods that store values in these fields and accessor methods that return the values in these fields.

Once you have written the class, write a separate program that creates three **`Employee`** objects to hold the following data:

Name ID	Number	Department	Position
M Usman	21414	HR	Vice President
Abdul Hadi	21147	IT	Programmer
Afshaan	21698	Manufacturing	Engineer

The program should store this data in the three objects and then display the data for each employee on the screen.

1. Create a program called **Employee.java** for the class, and **RunEmployee.java** having the **main** method**.**
2. Correctly display appropriate messages.