Object-Oriented Programming Lab#3, Fall 23

Today's Topics

- Class and Object
- Constructor

Problems/Assignments

Problem#1

Create a Banking System, where a user can create new account, deposit money, withdraw money and check the balance. A **BankAccount** is identified by its ***name***, ***account number*** and the ***amount of money*** available to that account. For today's lab we will define the BankAccount class, create object and call some methods.

What you need to do:

1) Create a **BankAccount** class and add the following.
   a. Add **3 instance variables**; ***name***, ***id*** and ***balance***.
   b. Create a constructor which will take parameters for all 3 attributes. Inside the constructor, initialize the attributes with that parameter passed to the constructor.
   c. Add the **following 4 methods** as described;
      i. ***public void deposit(double depAmount)***
      Inside the method increase the ***balance*** by the "***depAmount***" amount.
      ii. ***public void withdraw(double withAmount)***
      Inside the method decrease the ***balance*** by "***withAmount***" amount. **Do necessary checks so that the balance does not become negative.**
      iii. ***public double getBalance()***
      Return the ***balance*** attribute from the method.
      iv. ***public void display()***
      Inside the method, display the attributes in the format "Name:[name]; Id:[id]; Balance:[balance]".

2) Now create another class **Bank** and implement the **main** method. In main method do the following.
   a. Create an **object** of the **BankAccount** class using the constructor you created and pass appropriate values. Assign the reference of the object to a variable name ***account***.
   b. Call **withdraw**(…) method using the ***account*** variable.
   c. Call the **display()** method using the ***account*** variable.
   d. Deposit some money by executing the ***deposit***(…) method.
   e. Display the balance using the ***getBalance***() method.

Problem#2

Create an Inventory management system for "UAP Bazar" online store. For simplicity we will work with one product today. Each Product is identified by **its name, id, category and price**. The System should be able **to keep track of the product, check the price, update the price, and view the product** info. For today's lab we will define the Product class, create object and call some methods.

What you need to do:

1) Create a **Product** class which has **4 instance variables*; name, id, category*** *and* ***price***. Add the **following 4 methods as** described

   a. public void updatePrice(double newPrice)
   - Inside the method the ***price*** attributes need to be set to this ***newPrice***.

   b. public double getPrice()
   - The method returns the ***price***.

   c. public double getDiscountedPrice(double discountPercentage)
   - Store sometimes provide 10-30% discount on certain products. The method will return the ***price*** after discount.

   d. public void display()
   - This method displays the attributes.

2) Now create another class **UapBazar** and implement the **main** method. In main method do the following.
   a. Create an **object** of the **Product** class.
   b. Assign values to all attributes.
   c. Display the price.
   d. Update the price by calling the ***updatePrice***(…) method.
   e. Call the ***display***() method.
   f. Call the ***getDiscountedPrice(…)*** and pass 20% as ***discountPercentage***
   g. Print the discounted price.

Problem#3

Create a Student Record System for "UAP CSE" department. For simplicity we will work with one Student today. Each Student is identified by **his/her name, id, creditCompleted,** and **cgpa**. The System should be able **to check the CGPA of a student, update the cgpa and view the student** info. For today's lab we will define the **Student** class, create object and call some methods.

What you need to do:

1) Create a **Student** class and add the following inside the class.
   a. Add **4 instance variables*; name, id, creditCompleted*** *and* ***cgpa***.
   b. Create a constructor which will take parameters for all 3 attributes. Inside the constructor, initialize the attributes with that parameter passed to the constructor.
   c. Add the **following 4 methods as** described
      i. ***public void updateCgpa(double courseCredit, double courseGpa)***
      This method is to implement the cgpa changes when a Student pass a course such as CSE 201. When a student passes a course, his/her cgpa ger updated and also the total credit he/she completed. To mimic this scenario, inside the method, calculate the new ***cgpa*** based on the ***creditCompleted***, ***courseCredit*** and ***courseGpa***. Also update the ***creditCompleted***.
      ii. ***public void display()***
      This method displays the attributes in the format "Name:[name]; Id:[id]; Credit Completed:[creditCompleted]; CGPA:[cgpa]".

2) Now create another class **UapCse** and implement the **main** method. In main method do the following.
   a. Create an **object** of the **Student** class using the constructor you created.
   b. Update the cgpa by calling the ***updateCgpa***(…) method.
   c. Call the ***display***() method.