

## 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 get 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.