# Indian Institute of Information Technology, Allahabad
# Object Oriented Methodology (OOM)
# Lab Assignment-3

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**Date of assignment: 06/08/2015** **Due Date: 13/08/2015** **Instructors: Prof. O. P. Vyas and Dr. Ranjana Vyas**

**Note:**

1) **All Assignments should be done independently.**
2) **Try to develop Object Oriented Thinking for the problem given.**
3) **Write simple code in java for printing appropriate values.**
4) **Ready for line-by-line explanation of your code running on your system.**

**Q1. Powerball is a lottery played in many countries. The lottery numbers are chosen randomly from two containers of numbered balls. Five white balls are chosen from a container of 49 balls, and one red ball is chosen from a container of 42 balls.**

In this lab, you will make your Powerball program object oriented by writing a class called Powerball.
1. Write a class named Powerball that contains six fields to represent the five white balls and one red ball.
2. Add a method named play() that simulates the playing of Powerball. This method should assign a value to each of the six fields.
3. Add a method named displayResults() that prints out the values of the five white balls and one red ball.
4. Save and compile your Powerball class.
5. Write a class named PlayLottery that contains main(). Within main(), instantiate a Powerball object and invoke the methods of the Power-ball class to ensure that they are working successfully.

**Q2. Write a Patient class which inherits from the Person class. You may also need to use the Money class. The Patient class requires the following:**

1. A variable to store the patient number for the patient
2. A variable to store the hospital
3. A variable to store the patient 's year of joining the hospital
4. A variable to store the patient 's address
5. a variable to store the medical fees that the patient pays
6. constructor methods, which initialize the variables
7. Methods to set the hospital , year of joining and address
8. Methods to get the hospital, year of joining and address
9. A method to calculate the medical fees : It should take a Money object (the basic fee per year) as a parameter and use it to return the basic fee for the patient. A patient should pay the basic fee for the year of Rs 1200,50.

**Q3. Assume that you are the manager of a restaurant. Create a class called Restaurant Program. Include:**

1. Instance variables for the price for cokes, fries, and burgers and set a tax rate. Make them private instance variables.
2. A parameterized constructor that will set the values of the variables in part 1 as passed by the main method described below.

3. Additional instance variables as required (numCokes, for example)
4. A method to greet the customer (assume only 1 customer - do not use a loop)
5. A method to state prices
6. A method to take number of cokes and assign this number to the appropriate instance variable in part 3 above.
7. A method to take number of fries and assign this number to the appropriate instance variable in part 3 above.
8. A method to take number of burgers and assign this number to the appropriate instance variable in part 3 above.
9. A method to calculate the total price.
10. A method to announce the total price.

**Q4.** Create a class called IDCard that contains a person's name, ID number, and the name of a file containing the person's photograph.

**Write Accessor and Mutator methods for each of these fields. Add the following two overloaded Constructors to the class:**

public IDCard() public IDCard(String n, int ID, String filename)

Test your program by creating different objects using these two constructors and printing out their values on the console using the Accessor and Mutator methods.

**Q5.** Jerry Matthews is the owner of a small startup music store called MusicWorld. The store sells music CDs, among the other things. Jerry plans to eventually develop a sales transaction processing system that allows him to enter data for a CD purchase and output vital information such as quantities, prices, subtotal, tax, and total. Jerry is a beginning Java programmer, so he plans to develop the system one small step at a time. To start with, Jerry needs a program that asks the cashier to enter this vital information about the single CD title being purchased: the identification code, the title, the price, and the quantity. In addition to outputting these data to the user, the program will display the subtotal (price times quantity) and the total (subtotal plus tax) for a single CD title. The sales tax rate is 6.25 percentage. Jerry realizes that he will eventually need to add much more functionalities than processing the sale of just one CD title, but he plans to get this much to work before adding various enhancements. He now want a function of forming the unique identification number for each transaction. This will help in receiving the variable that holds the complete date and time information of the transaction. It also manipulates the date into the desired format of the transaction ID. It holds a 24-hour date and time that looks like :DD/MM/YY HH:MM:SS TMZ" for example "06/08/2015 13:00:00 EST" is equivalent to August 8,2015, 1:00PM EST.
**Determine Class and object. For each object, determine its attributes and behaviors. Write simple code in java for printing appropriate value for identified class instances.**

**Q6**. Bank System Scenario:
You have just been employed by the Bank of Scotland as a developer. They have been examining their banking system and have realized it is implementing a large amount of procedural code and it is becoming hard to maintain and add further functionality. They would like you as a developer to design and create a prototype system that could be further implemented into a full system. Account Types The bank has a number of different accounts with different attributes as follows.

**Current Account**

The current account is held by most customers and some have overdraft facilities. The account also earns interest at a small rate of 1.5 % AER if it has a positive balance.

**Savings Account**

This is the generic savings account with a higher rate of interest than the current account (the current interest rate on this account will be 2.0% AER). Money can be withdrawn and deposited at any time. There is no overdraft facility for this type of account.

**High Interest Saver**

This account can accept a deposit at any time but it has limited withdrawals. Once money is deposited it cannot be withdrawn until 12 months later. This has a higher rate interest compared to the savings account with a rate of 2.5% AER.

**Mini Cash ISA**

The mini cash ISA allows for a limit of RS.3000 per year to be deposited. Money can be withdrawn at any time although this cannot be re-deposited. The Mini cash ISA has a higher rate of interest than the High interest Saver with a going rate of 3.0%.

On successful authentication the customer should be able to;

1. Create Accounts
2. Deposit money
3. Withdraw money
4. Transfer money between accounts
5. Check balance per account
6. Obtain a transaction listing showing the balance of the account.
7. Close account
8. All account activity should be written to a log (text file)

**Determine Class/Subclass and object. For each object, determine its attributes and behaviors. Also determine Abstract, Derived and Concrete classes. Write simple code in java for printing appropriate value for identified class instances.**

**Q7.** When we take a mobile, its basic functionality for which it was invented were Calling & Receiving a call & Messaging. But now a day's thousands of new features & models were added & the count is still increasing. A Mobile is a electronic device which has some features like Profile Type, IMEI Number, Processor, and some more.) & operations like Dial, Receive & SendMessage. Any mobile like Nokia, Samsung, IPhone have some basic features like:

**Some features of mobiles**

1. Dialing a number call some method internally which concatenate the numbers and displays it on screen but what is it doing we don't know.

2. Clicking on green button actual send signals to calling person's mobile but we are unaware of how it is doing.

Talking about Bluetooth which we usually have it in our mobile. When we switch on the Bluetooth we are able to connect another mobile but not able to access the other mobile features like dialing a number, accessing inbox etc. Another point is when mobile A is connected with mobile B via Bluetooth whereas mobile B is already connected to mobile C then A is not allowed to connect C via B. This is because of accessibility restriction. A base mobile features is extended by Samsung brand. Now Samsung brand has manufactured its new model with new added

features or advanced OS like Android OS, v4.4.2 (kitkat). Samsung will use the function of multiple Phone (Mobile & Telephone).

**Determine Class/Subclass and object. For each object, determine its attributes and behaviors. Also determine Abstract, Derived and Concrete classes. Write simple code in java for printing appropriate value for identified class instances.**

**Q8.** Create a class called "Rectangle" that can be used to create customized rectangle objects. Your class should include the following – be sure to comment your class appropriately:

1. A double data field named width that specifies the width of the rectangle.
2. A double data field named height that specifies the height of the rectangle.
3. A double data field named xPosition that specifies the x position of the rectangle.
4. A double data field named yPosition that specifies the y position of the rectangle.
5. A constructor that creates a rectangle with a specified width, height, x and y (i.e. your constructor should accept four double values and use those when setting up a new instance of the Rectangle class)
6. A method named getArea() that returns the area of the rectangle.
7. A method named getPerimeter() that returns the perimeter of the rectangle.

**Q9.** Write a program to maintain the office database using single inheritance. Superclass is Employee that contain the information as follows- Emp_code, Emp_name, Address, Ph_no, DA-10%, HRA-20%. Create three subclass of Manager, Typist, officer each class having their own basic pay &DA, HRA remain same. Create a class Employee that has related variables, and a method for salary calculation. Now create Manager, Typist and Officer Class that extends Employee. For initialization of variables use parameterized constructor. Define the same method salary that performs different calculation over basic pay. Write a main method for execution of code. Observe your code and tell the concept of Method Overriding to the assigned TA.
Method inside the superclass:
salary= basic_pay +(basic_pay * DA/100)+ (basic_pay * HRA/100);
Method inside the Manager subclass:
salary= (basic_pay * DA/100)+ (basic_pay * HRA/100);