Bidhan Chandra College, Rishra
Department of Computer Science

LAB ASSIGNMENT

Subject: Object Oriented Programming using Java

Assignment-1

Objective:

The objective of this assignment is to learn how to write some Simple JAVA Programs.

1. Write a program to print your name.
2. Write a program to read the price of an item in the decimal form (like 75.95) and print the output in paise (like 7595 paise).
3. WAP to calculate the area and the perimeter of a Rectangle.
4. Write a program to convert the given temperature in Fahrenheit to Celsius using the following conversion formula: C = (F-32)/1.8
5. Write a program to determine sum of the following series for given value of n:(1 + 1/2 + 1/3 + …… + 1/n). Print the result up to two decimal places.
6. WAP to take your first and last name as command line argument and print by converting into a single string.
7. Write a program to find the product the sum of digits and reverse of a given integer number (take input using command-line argument).
8. Write a program to find the factorial of a given integer number using recursion (take input using command-line argument).
9. Write a program to show Fibonacci series up to n-th terms using recursion.
10. Write a Program of Sum of Series ($1+x+x^2+x^3+x^4+$…… up to n-th terms).
11. Write a program to calculate the simple interest (si) while your inputs are principle (p), time in years (n) and rate of interest (r) [take input using command-line argument].
12. Write a program to find the real roots of the quadratic equation $ax^2 + bx + c = 0$ where a, b and c are constants.
13. WAP to print all prime number within a given range.
14. WAP to print all Armstrong number within a given range.
15. WAP to calculate GCD and LCM of two numbers. (Implement 2 Versions).
16. WAP to find sum and average of several integers (in an array) using enhanced-for loop.
17. WAP to implement Linear Search. Take the values via command line argument.
18. WAP to implement Binary Search.
19. WAP to implement Bubble sort, Selection Sort, Insertion sort in a single menu driven program.
20. WAP to count number of words in a string.
21. WAP to check whether a string is palindrome or not. Make this Case Insensitive.
22. Write a program to show addition, subtraction and multiplication of two matrices using menu driven program.

Assignment-2

Objective:
The objective of this assignment is to learn about Classes and Objects concept.

1. Add two numbers by taking input using Command Line Input, Scanner class and BufferedReader class. Implement two versions.

2. Write a program to find surface area and volume of Cylinder Using Constructors - Keyboard Input or Command Line Input.

3. Write a program to find surface area and volume of Cone Using Constructors - keyboard input or command line input.

4. write a program to add two complex numbers using concept of method returning object and method taking object as parameter.

5. Write a Java code to find a number from an array of numbers.

6. Show that static block execute before any object creation and implement the use of static variable.

7. Create a class; put a method inside this class which will return a class reference return same class and/or different class object.

8. See the problems below:

   a) Write a JAVA Program to make a Student class with proper attributes like roll no, name, stream, and college. From main create such two students and show their information.

   b) Write a JAVA Program to consider the Student class in the previous Program.

   Assume that a student studies 6 subjects. Each subject has a title, internal marks and theory marks. Write a Program to define Student class including the subjects as array. From main create such two students and show their information including subjects' name and grand total marks.

   c) Write a JAVA Program to consider the Student class in the first Program 8a. Assume that students study varying number of subjects. Each subject has a title, internal marks and theory marks. Write a Program to define Student class including the subjects as vararg argument of constructor. From main create such two students and show their information including subjects' name and grand total marks.

13. Design a class to represent a Bank Account. Include the following things: Fields

    Name of the depositor
    Address of the depositor
    Account number
    Balance amount in the account

Methods

    To assign initial values
    To deposit an amount
    To withdraw an amount after checking balance
    To display the name, address and balance of a customer

From main create object and call these methods.

Assignment-3

Objective:

The objective of this assignment is to learn about ***inheritance, polymorphism, and abstract*** *classes.*

1. Create a class shape with three methods to calculate area of Triangle, Rectangle and Square with method overloading.
2. Create an abstract class Shape with two abstract methods, area() & disp(). Now design three concrete classes Rectangle, Circle & Triangle can compute area and display its separately.
3. Overload the constructors for classes Area and Volume of a rectangular figure and also display its area and volume. Area is the superclass and Volume is the subclass.
4. Create a class **Employee,** having instance variables *name* and *id*. Create its subclass named **Scientist** which has instance variables *no_of_publication* and *experience*. Now create its subclass, say **DScientist** which has instance variable award. Put a method like: `public String toString(){ }` in every class where you describe about the class and from main() method create object of each class and print each object.
5. Create a class with a method `void show()` and make three subclasses of it and all subclasses have this show() method overridden and call those methods using their corresponding object references.
6. Do the problem 4 using dynamic method dispatching.
7. Assume that a bank maintains two kinds of account for its customers, one called savings account and other called current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance (say Rs. 1000) and if the balance falls below this level a service charge is imposed (say Rs. 100).

   Create a class **Account** that stores customer name, account number and type of account. From this class derive two classes **Curr_Acct** and **Savn_Acct** respectively to make them more specific to their requirements. Include the necessary methods to achieve the following tasks:

   a) Accept deposit from a customer and update the balance.
   b) Display the balance.
   c) Compute and deposit interest.
   d) Permit withdrawal and update the balance.
   e) Check for minimum balance, impose penalty, if necessary, and update balance.Use constructors to initialise the class members.

8. Create a class Parent having instance variables id, name and address. Create a class ChildOne having instance variables id, name, address and marks. Also create another class ChildTwo with instance variables id, name, address, qualification and salary.Within each class define your own method to display values of these variables. Design the program using super call with proper parameter and use object of each class from main() to display their properties.

Assignment-4

Objective:

*The objective of this assignment is to learn i**nterface, inner class and package** concept.*

1. Create an interface named Shape. Create two subclasses of it named Circle and Sphere. Create objects of the two classes and calculate their area/surface area.
2. Create an interface named circularBase (that contains base details). Create another class 3dShape (Contains height, volume). Inherit two classes Cone and Cylinder from the interface and the class.
3. Create a class which contains an inner class. Show that inner class can use member of outer class directly, but Outer class can use member of Inner class only through its object. Check the name of class file, you created.
4. Create two interfaces, each with two methods. Inherit a new interface from the two, adding a new method. Create a class by implementing the new interface and also inheriting from a concrete class. In main() method, create an object of derived class and call the methods [do all without package statement].
5. Create a class with variable(s) and method(s) (all will be default accessed) under package pOne. Now create a class under package pTwo, which is subclass of firstly created class. In the method here (i.e. class of pTwo) call variable(s) and method(s) of previous class (i.e. class of pOne). If errors come, rectify them. Now from Main (under working directory) access second class's members.
6. Create an interface containing three methods, in a package 'pkgOne'. Implement the interface from a class under package pkgTwo. From main, under working directory, create object of the class and call methods of interface.

Assignment-5 (Two days)

Objective:

*The objective of this assignment is to learn **String, Collection and File** concept.*

1. Take a sting from keyboard and convert into character array (new one).
2. Take a string from keyboard and a char array (filled up to length 5). Now append thestring to that char array. Show the char array.
3. Write a java code to differentiate equals() method and == operator.
4. Find length of a string taken from keyboard and also find the length of that stringexcept front and end spaces.
5. Write a Java code to sort ten names in ascending order.
6. Check if "Tech" presents in "University of Technology" or not. If yes return itsposition.
7. Write a program to take a sentence and convert it into string arrays and sort the wordsusing any sorting technique.
8. Show that the String class type objects are immutable but StringBuffer class objectsare mutable.
9. Convert the StringBuffer type object into a String object. Print the final result.
10. Write a program in Java that checks whether a given string is a palindrome or not.Ignore the cases.
11. Write a program in Java that converts a string into an array of strings and displaythem [use command-line argument].
12. Write a program in Java that accepts a shopping list of five items from the commandline and stores them in a vector.
13. Write a program to concatenate the contents of two Strings .