Java Assignment Library

Basic

1) Write a program to print the following pattern :
   ****

   ***

   **

   *
2) Write a program that reads a distance in kilometers from the keyboard and output the distance as miles.
3) Write an application that generates the first 15 numbers in the Fibonacci series and first 15 prime numbers.
4) Write and run a Java program to calculate factorial and the cube of the given integer number. Also find the sum and multiplication of its digits. Also check whether the no entered is palindrome or not.
5) write a Java program to calculate the minimum of three integer numbers:
6) WAP in JAVA that calculates the VAT on an amount of sale. The program takes amount of sales and VAT rate as input and outputs the total amount
   inclusive of VAT.

7) Use While loop to generate random numbers and maintain a running sum of these values. Terminate when the sum exceeds 20. (Note: use Math. random() method to obtain numbers.)
8) Write an application that counts the total number of characters in all of its command-line arguments.
9) Write a java program to calculate Simple Interest using Command Line Arguments. (Hint use Wrapper classes)

Arrays and Strings

1) Write application that creates an array of double, to provide following functionality.
   - display the length of the array and its elements.
   - Display an array. (Use for each version of loop for display).
   - compute the sume of the squares of these numbers.
   - Determine Mean and Median of an array.
   - Sort an array – Ascending and Descending. Use any two sorting algorithm. User can also select the sorting method.
   - Search an element from the array, i.e. returns the location of the element of an **array** that matches an indicated value.
   - Copy of an array.
   - Reverse of an array.

2) Write a program in Java to create variable size **array**. Data can be numeric.
   - Flush an array
   - add a number at a specified location in an anay.
   - display the array

3) Program in Java to find A+B, A-B, A*B and transpose of A, where A is a matrix of 3*3 and B is a matrix of 3*4.Take the values in matrixes A and B from the user.

4) Write and run a JAVA program that reads a string from the user and perform the following.
   - ❖ counts number of occurance of a given character (for example, " a") in a **string**.
   - ❖ searches the last occurance of a character in a **string**.
   - ❖ removes the unneccessary spaces from a **string** : leading and trailing spaces.
   - ❖ displays the substring formed by the last ten characters of a string

5) WAP that inputs a line of text, tokenizes the line with StringTokenizer and outputs the tokens in reverse order.

6) Create a StringBuffer and illustrate how to append character. Display capacity, length of the StringBuffer.

7) Write an application that reads and processes strings from the console. Perform the following functions based on the menu choice selected by the user..
   - Reverse the sequence of strings and then display it.
   - Reverse the sequence of characters in each string and then display it.
   - rearrange the strings according to the length of the string.
   - Sorting
   - Concatenation
   - Change them to uppercase, lowercase depending on user's choice.

Java Assignment – III (Classes, Inheritance, Interface and Packages)

1. Write a class called Statistics, which has a static method called average, which takes a one dimensional array for double type, as parameter, and prints the average for the values in the array.
    a. Now write a class with the main method, which creates a two-dimensional array for the four weeks of a month, containing minimum temperatures for the days of the week(an array of 4 by 7), and uses the average method of the Statistics class to compute and print the average temperatures for the four weeks.

2. Develop the following application in given steps.
    a. Step-1 :
        i. Define a class called Cartesian Point, which has two instance variables, x and y. Provide the following methods
            1. get X() and get Y() to return the values of the x and y values respectively.
            2. move() which would take two integers as parameters and change the values of x and y respectively,
            3. a method called display() which would display the current values of x and y.
        ii. Now overload the method move() to work with single parameter, which would set both x and y to the same values, .
        iii. Provide constructors with two parameters and overload to work with one parameter as well.
        iv. Now define a class called Test Cartesian Point, with the main method to test the various methods in the Cartesian Point class.
    b. Step-2 :
        i. Define a class called Triangle, which has constructor with three parameters, which are of type Cartesian Point.
        ii. Provide methods
            1. to find the area and the perimeter of the Triangle,
            2. a method display() to display the three Cartesian Points separated by ':' character,
            3. a method move() to move the first Cartesian Point to the specified x, y location, the move should take care of relatively moving the other points as well,
            4. a method called rotate, which takes two arguments, one is the Cartesian Point and other is the angle in clockwise direction.
            5. Overload the move method to work with Cartesian Point as a parameter.
        iii. Now define a class called Test Triangle to test the various methods defined in the Triangle class.
    c. Step-3 :
        i. Similarly also define a class called Rectangle which has four Cartesian Point.

3. Develop the Figure application in given steps.
    a. Design an interface IFig having the following methods:
        i. public void calcAreaQ;
        ii. public void calcVolumeO;
        iii. It must also have the variable pi of the type double and having a value 3.1428.
    b. Design an abstract class called Figure.
        i. It must have three attributes r. a and v of data type double.
        ii. It has abstract methods:
            1. public abstract void dispAreaQ;
            2. public abstract void dispVolumeO;
    c. Design three classes Cone, Sphere and Cylinder. Each of them, should extend the Figure class and implement the IFig interface.
    d. Write a test program to demonstrate polymorphism

ClassName	Attribute
Cone	h, s of the type double
Sphere	
Cylinder	h of the type double

Figure	Formulae
Cone	Area =(pi*r*s)+(pi*r*r) Volume = (pi * r * r * h)/3
Sphere	Area = 4 * p * r * r Volume = (4 * pj * r * r r) /3
Cylinder	Area =(2*pi*r*r)+(2*pi*r*h) Volume = pi * r * r * h

4. Develop a basic graphics package.
    a. Within the package create a abstract class Shape having function print().
    b. Create two subclasses Two Dimensional and three Dimensional from Shape class .
    c. These two subclasses also should be abstract.
    d. Implement the print method in the subclasses Square, Circle, Cylinder, Cube, to output the type and dimension of the shape Also include area and volume methods to calculate the area and volume of the concrete shapes
    e. Write a driver program that creates various shapes and put them in an array of Shape Use polymorphism to print and calculate the area and volume of objects stored in array.

5. Create three packages—PersonPack, FlatPack and PFPack.
    a. Package PersonPack must contain a class called Person with the following attributes: PIDNumber, name, etc.
        i. It must have a reference variable of the type Flat.
        ii. It should have a static method displayOwnershiplnfo() that takes as an input parameter a variable of PIDNumber and returns void. This method must display the information about the classes Person and Flat.
    b. Package FlatPack must contain the class F with following attributes: apartmentName, flatNo and noOfBedrooms
        i. It should have method dispFlatlnfo() that displays information of the attributes of the class Flat.
    c. Package PFPack must contain a class called PFDemo that has a main method .
        i. create objects of the classes Person and Flat and
        ii. invoke the displayOwnershiplnfo() method

Exceptions

1. Define an Employee class with Employee code , name , date of birth , and date of appointment . The Employee code must have a format of year-designation-number. The year will be two digit code . The designation is single letter code M for Manager , A for Administrative , T for Technical Staff , E for Executive Staff . The number is a three digit number. For Eg.
   87-M-123 (year is 1987 , Designation is Manager and number is 123)
   91-T-126

   Write a java program to read the employee code , name , date of birth , and date of appointment and validate the employee code. If the employee code is incorrect a suitable user defined exception must be thrown . If the date of birth is after date of appointment then throw another user defined exception.

   If all the details are correct then only create the employee object and display detail of employees and number of years of experience.

2. A method named average() has one argument that is an array of strings. It converts these to double values and returns their average. The method generates a NullPointerException if a array elements is null or NumberFormatException if an element is incorrectly formatted. Write a program that illustrates how to declare and use this method. Include throws clause in the method declaration to indicate that these problems can occur.

3. Write a program which creates an Array of character. Make one function with one argument as a character and that function throw a user defined exception if the character that u have passed is digit.

4. Write a program which creates an array of Date in form (dd/mm/yy). Analyze each element and check whether the date is correct or not. If the date is wrong then throw a User defined Exception DateException and display the appropriate message. If the Date is correct then display the date in this format. For example, if the date is 9/9/06 then display the date like 9th September 2006. You are able to display all the dates in the given String and for the date which is not proper, display the appropriate message.

Collections

1. Write a program to read employee detail and store the employee object in linkedlist. Sort the list based on salary.
    a. Create class- Employee (Attributes- empid, name , dob , salary : Methods: setDetails, getDetails and constructures)
    b. Employee class must implement comparable interface
    c. Create another class TestEmployee, here create the linkedlist of employees and sort the list.

2. Create a HashSet of 5 names. Write a menu driven program to do the following:
    a. Add a new name
    b. Remove a name
    c. Search a name
    d. Display all the names (display in reverser order also – use ListIterator)
    e. Display number of elements in hashset

3. Create a HashTable/ HashMap of students object and find the following:
    a. Check if a particular key exist in the hashtable or not. If exist then display the value
    b. Remove an entry from hashtable (key is entered by user to remove)
    c. Add a new entry
    d. Display all the entries
    e. Check if a particular value exist in the hashtable or not. If exist then display the value

1) Write a program to store a deck of 52 cards in a linked list in random sequence using a Random class object. You can represent a card as a two-character string—”1C” for the ace of clubs, “JD” for the jack of diamonds, and so on. Output the cards from the linked list as four hands of 13 cards.

2) Write a generic class Stack<T> that can be used to represent stacks of objects of type T. The class should include methods push(), pop(), and isEmpty(). Inside the class, use an ArrayList to hold the items on the stack.

3) Create two hash sets {"George", "Jim", "John", "Blake", "Kevin", "Michael"} and {"George", "Katie", "Kevin", "Michelle", "Ryan"}, and find their union, difference, and intersection.

1. Create three threads with different sleep-times from the main thread with following capabilities.
    - One thread generates prime numbers in an infinite loop. Supply the sleep time of main thread and the sleep time of prime thread from the command line.
    - Two more threads T1 and T2 doing any other work also execute simultaneously with suitable display information.
    - When prime thread prints 13, after that T1 goes into wait mode. T1 resumes back when prime thread prints 79.
    - Threads T1 and T2 should stop executing when the keys '1' and '2' are pressed respectively. Prime thread should stop after the 'ENTER' key is pressed. Exit of each thread must be displayed on the console.

2. Write a program for restaurant. Use Inter Thread Communication.
    - When customer places an order then and only then Manager can take the Order or generate a bill of an Order.
    - And display the customer order after it place the Order.
    - You have to display minimum three orders of three different customers A, B and C, in which customer A is the preferred customer with higher priority.

3. Implement three classes: Storage, Counter, and Printer.
    - The Storage class should store an integer.
    - The Counter class should create a thread that starts counting from 0 (0, 1, 2, 3 ...) and stores each value in the Storage class.
    - The Printer class should create a thread that keeps reading the value in the Storage class and printing it.
    - Write a program that creates an instance of the Storage class and sets up a Counter and a Printer object to operate on it. Ensure that each number is printed exactly once, by adding suitable synchronization.

4. Create a class 'Account' with private data like accountnumber, name, balance and method transaction() which handles withdraws and deposits with suitable display messages.
    - Create a thread class 'Teller' with private data like name, an object of class Account, amount of transaction and transaction code (deposit or withdrawal).
    - Initiate 2 teller transactions for customer A.
    - Also initiate two separate transaction for customer B and customer C.
    - Transactions for one customer must run in synchronization.
    - Transactions for different customers do not interfere with one another.

1. Write an Application program to generate Employee Payslip.

Create following classes-

Employee - emp_no,emp_name,basic ,Des

InvalidBasicException - Class for user defined Exception (if basic is negative or non numeric).

Payslip - do all calculations (da, hra) based on following rules.

If basic<=5000 Then hra=5% of basic and da=3% of basic.

If basic>=15000 Then hra=7.5% of basic and da=5% of basic

Else hra=10% of basic and da=8% of basic.

Based on that calculate netpay for each employee in Payslip class and generate the formatted pay slip in a file, with filename as <emp_no>_payslip.txt.

Note: emp_no should be generated automatically with prefix EMP, use array of objects.

2. Write an application that defines a Circle class with two constructors. The first form accepts a double value that represents the radius of the circle. This constructor assumes that the circle is centered at the origin. The second form accepts the three double values. The first two arguments define the coordinates of the center and the third argument defines the radius. create 10 objects of the Circle type and save them in an array. Randomly select a radius between 1 and 10 cm for each Circle created. After all circles have been created display each circle and total area of all the circles.

(II) Read an IP address from user in the form of- 192.11.12.112.

Separate each part from '.' And store it in an array using String Tokenizer.

---

3. (I) Write a program for Inventory. Create a class Item having attributes itemId, description, price. Define the necessary constructors and display methods.

Create a sub class Bill_Item having attributes quantity and amount (amount = quantity* price) , Define the necessary constructors and display and other required methods.

Create a Main class which create atleast 5 items . Display Details of all the items along with total bill.

(II) Create a java program to read the address from command line arguments, separate the address by ',' and store the values in variables. (using String tokenizer)

(I) Write a program which will read text and count all occurrence of a particular word and also reverse that word.

(II) Given a Interface-

```
Public interface  Grade

{

int countGrade(int[] marks);

void displayGrade();

}
```

Implement the above interface to the abstract Student class and create 2 subclasses – McaStudent and DcaStudent. Create an array of 5 Students objects , read the information of students – name , id , marks of all the semesters , calculate the grade and display the information in the following format-

Id	course	First Name	Last Name	Total Marks	Grade
Mca101	MCA	Sunil	Shah	790	A
Dca111	DCA	Akhil	Jain	250	B

- DCA- 2 semseter and MCA- 6 semester
- DCA has marks of Project also.
- Grade- DCA- total marks of 2 sem and project is considered
    - Above 75 % = A
    - 60 to 75 = B
    - 50 to 60 =C
    - Below 50= D
- Grade – MCA- total marks of 6 sem
    - Above 80%= A
    - 70 to 80 = B
    - 50 to 70 =C
    - Below 50= D