**Faculty of Engineering Technology and Reserch,Isroli-Afwa**

**Computer Sci. and Engg. Department**

**Practical List**

Object Oriented Programming using JAVA (2150704)

Term 171: 19th June ’17 to 13st Oct ’17

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| **1** | **Operators and Expressions** |
|  | 1.1 Write a java program to find the area of rectangle. |
| 1.2 Write a java program to convert rupees to dollar. 60 rupees=1 dollar |
| 1.3 Write a java program that calculates percentage marks of the student if marks of 6 subjects are given. |
| **2** | **Looping Statements** |
|  | 2.1Generate following patterns:   1. (B) (C) E:\BGP\Untitled.png E:\BGP\1.png |
| 2.2 Write a program to make a Calculator using switch case. |
| 2.3 Write a program to find that given number is palindrome or not. |
| **3** | **Array** |
|  | 3.1 Write a java program to find the largest and smallest number in an array. |
| 3.2 Write a java program to display multiplication of two 3\*3 matrices. |
| 3.3 Write a program to merge two arrays in third array. Also sort the third array in ascending order.  Case 1: Duplication of digit is allowed.  Case 2: Duplication of digit is not allowed. |
|  | 3.4 Write a program that reads email address from user and check whether email address is valid or  not and separate out email id from email server name.  If input is abc@xyz.com  Output: It is valid address  Email id: abc  Email server address: xyz.com |
| **4** | **Classes, Objects, Methods and Constructor** |
|  | 4.1 To write a java program to display total marks of 5 students using student class.Given the  following attributes: Regno(int), Name(string), Marks in subjects(Integer Array), Total (int). |
| 4.2 Design a class named Triangle to represent a triangle:  The class contains-  Three double data fields named side1,side2 and side3 that specify the three sides of the triangle.the  default values are 1 for all the sides.  A no-arg constructor creates a default triangle.  A constructor that creates a triangle with specified sides.  A method named getarea() that returns the area of this triangle. |
| 4.3 Write a class that contain the following two methods  a-converts from Celsius to Fahrenheit  b-converts from Fahrenheit to Celsius. |
| 4.4 To write a java program to define a class that represent Complex numbers with constructor to  enable an object of this class to be initialized when it is declared and a default constructor when no  argument is provided and define methods to do the following by passing objects as arguments  a) Addition of two Complex numbers  b) Subtraction of two Complex numbers  c) Printing the Complex numbers in the form (a, b). |
|  | 4.5 Design a class named Fan to represent a fan. The class contains: -   * Three constants named SLOW, MEDIUM and FAST with values 1,2 and 3 to denote the fan   speed.   * An int data field named speed that specifies the speed of the fan (default SLOW). * A boolean data field named f\_on that specifies whether the fan is on(default false). * A double data field named radius that specifies the radius of the fan (default 4). * A data field named color that specifies the color of the fan (default blue). * A no-arg constructor that creates a default fan. * A parameterized constructor initializes the fan objects to given values. * A method named display() will display description for the fan. If the fan is on, the display() method displays speed, color and radius. If the fan is not on, the method returns fan color and radius along with the message “fan is off”.Write a test program that creates two Fan objects. One with default values and the other with medium speed, radius 6, color brown, and turned on status true. Display the descriptions for two created Fan objects. |
|  | 4.6 Define the Rectangle class that contains: Two double fields x and y that specify the center of the  rectangle, the data field width and height ,   * A no-arg constructor that creates the default rectangle with (0,0) for (x,y) and 1for both width   and height.   * A parameterized constructor creates a rectangle with the specified x,y,height and width. * A method getArea() that returns the area of the rectangle. * A method getPerimeter() that returns the perimeter of the rectangle. |
| 4.7 Declare a class called employee having employee\_id and employee\_name as members. Extend  class employee to have a subclass called salary having designation and monthly\_salary as  Members. Define following:   * + Required constructors.   + A method to find and display all details of employees drawing salary more than Rs. 20000/-.   + Method main for creating an array for storing these details given as command line arguments and showing usage of above methods. |
| **5** | **Strings and StringBuffer class** |
|  | 5.1 Write a program to find length of string and print half of the string. |
| 5.2 Write a program to check given string is palindrome or not |
| 5.3 Write a program to accept a line and check how many constants and vowels are there in line. |
| 5.4 Given the String “ Faculty of Engineering Technology and Reserch “  a). Find the Character at index 10.  b). Find the Index of ‘T’.  c). Find the Last index of ‘o’.  d). Find the length of the String.  e). Create another string with all letters in the Uppercase of given string.  f). Create another string with ‘o’ replaced with ‘x’.  g). Create an array of String with all the words of given string with delaminating character Space.  h). Check whether the “Research” is Substring of given string or not. |
| 5.5 Write a program to count the number of words that starts with capital letters. |
| 5.6 Create a class which ask user to enter a sentence and it should display count of vowel type in the sentence. The program should continue till user enters a word quit. Display the total count of each vowel for all sentences. |
| **6** | **Generic class, Inheritance, Package and Interface** |
|  | 6.1 Write a program to add and to multiply two matrices using Generic class concept. |
| 6.2 Create an abstract class Shape and derived classes Rectangle and Circle from Shape class.  Implement abstract method of shape class in Rectangle and Circle class.Shape class contains:  origin (x,y) as data member.display() and area() as abstract methods.Circle class contains: radius  as data member.Rectangle class contains: length and width(Use Inheritance, overloading and  overriding concept) |
| 6.3 To write a java program to create a Player class and inherit three classes Cricket\_Player,  Football\_Palyer and Hockey\_Player. |
| 6.4 To write a java program to create a package for Book details giving Book name,Author name,  price and year of publishing. |
|  | 6.5 Write a program to demonstrate combination of both types of inheritance as shown in figure 1.  i.e.hybrid inheritance |
| 6.6 Write a program to demonstrate the multipath inheritance for the classes having relations as shown  in figure 2. A->(B,C)->D |
| 6.7 The abstract Vegetable class has three subclasses named Potato, Brinjal and Tomato. Write an  application that demonstrates how to establish this class hierarchy. Declare one instance variable of  type String that indicates the color of a vegetable. Create and display instances of these objects.  Override the toString() method of Object to return a string with the name of the vegetable and its  color. |
| 6.8 The Transport interface declares a deliver() method. The abstract class Animal is the superclass of  the Tiger, Camel, Deer and Donkey classes. The Transport interface is implemented by the Camel  and Donkey classes. Write a test program that initialize an array of four Animal objects. If the  object implements the Transport interface, the deliver() method is invoked. |
| **7** | **Exception Handling and File I/O.** |
|  | 7.1 To write a java program to create our exception subclass that throws exception if the sum of two  integers is greater than 99. |
| 7.2 Write a program that takes input for filename and search word from command line arguments and  checks whether that file exists or not. If exists, the program will display those lines from a file that  contains given search word. |
| 7.3 Create a class called Student. Write a student manager program to manipulate the student information from files by using FileInputStream and FileOutputStream |
| 7.4 Refine the student manager program to manipulate the student information from files by using BufferReader and BufferedWriter. |
|  | 7.5 Refine the student manager program to manipulate the student information from files by using the DataInputStream and DataOutputStream. Assume suitable data. |
| **8** | **Threads** |
|  | 8.1 To write a java program for generating two threads, one for generating even number and one for  generating odd number. |
| 8.2 Write a complete multi-threaded program to meet following requirements:   * Read matrix [A]. m x n. * Create m number of threads. * Each thread computes summation of elements of one row, i.e. i th row of the matrix   is processed by i th thread. Where 0 <= i < m.   * Print the results. |
| 8.3 Write a program to add (keyword, URL) list for a web crawler in suitable data structure in  concurrent manner but one process at a time, and retrieving data from the data structure in  concurrent manner. |
| 8.4 Write a program of writing binary file using multithreading. Demonstrate use of join() and yield()  interrupt (). |
| **9** | **Class Diagrams with Generalization, Aggregation and Association concepts** |
|  | 9.1 Prepare a class diagram for given group of classes using multiplicity, generalization, association concepts. And add at least 5-7 attributes and 3-5 operations for particular class Page, Shape, Point, Line, Arc, Ellipse, Rectangle, Circle |
| 9.2 Prepare a class diagram for given group of classes using multiplicity, generalization, association concepts. And add at least 5-7 attributes and 3-5 operations for particular class. City, Airport, Airline, Pilot, Flight, Plane, Seat, Passenger |
|  | 9.3 Categorize the following relationships into generalization, aggregation or association.  [A] A country has a capital city  [B] A dining philosopher uses a fork  [C] A file is an ordinary file or a directory file  [D] Files contains records  [E] A polygon is composed of an ordered set of points  [F] A drawing object is text, a geometrical object, or a group  [G] A person uses a computer language on a object  [H] Modems and keyboards are input/output devices  [I] Classes may have several attributes  [J] A person plays for a team in a certain year  [K] A route connects two cities  [L] A student takes a course from a professor |
| 10 | **Behavior Diagrams** |
|  | 10.1 Prepare a state diagram for an interactive diagram editor for selecting and dragging objects |
|  | 10.2 Prepare a use case diagram and sequence diagram for a computer email system |
|  | 10.3 Prepare an activity diagram for computing a restaurant bill, there should be charge for each delivered item. The total amount should be subject to tax and service charge of 18% for group of six and more. For smaller groups there should be a blank entry. Any coupons or gift certificates submitted by the customer should be subtracted |
|  | 10.4 Prepare a sequence diagram for issuing a book in the library management system |