

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

(Common to CSE & IT)

Course Code: 20CT1107

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COURSE OUTCOMES:

At the end of the Course the student shall be able to

CO1: write basic Java applications and use arrays (L3).

CO2: demonstrate classes, objects and apply Inheritance (L3).

CO3: implement Packages and build applications using default packages (L3).

CO4: illustrate Exceptions and develop multithreaded applications (L4).

CO5: outline GUI applications which are event based and write network programs (L4).

LIST OF PROGRAMS:

(Any 12 programs from the following to be performed)

- 1) a) Implement the following programs using command line arguments and Scanner class
 - i) Accept two strings from the user and print it on console with concatenation of “and” in the middle of the strings.
 - ii) To find the perimeter and area of a circle given a value of radius.
- b) Write a program using classes and objects in java?
- 2) a) Write a program to call default constructor first and then any other constructor in the class?
- b) Write a program that accepts an array of integers and print those which are both odd and prime. If no such element in that array print “Not found”.
- c) Write a program to accept contents into an Integer Array and print the frequency of each number in the order of their number of occurrences.
- d) Write a program that accepts an ‘m x n’ double dimension array, where ‘m’ represents financial years and ‘n’ represents Ids of the items sold. Each element in the array represents number of items sold in a particular year. Identify the year and id of the item which has more demand.
- 3) a) Create a class Box that uses a parameterized constructor to initialize the dimensions of a box. The dimensions of the Box are width, height, depth. The class should have a method that can return the volume of the box. Create an object of the Box class and test the functionalities.
- b) Create a new class called Calculator with the following methods:
 - A static method called powerInt(int num1,int num2) This method should return num1 to the power num2.
 - A static method called powerDouble(double num1,double num2). This method should return num1 to the power num2.Invoke both the methods and test the functionality. Also count the number of objects created

- 4)
 - a) Accept a String and a number 'n' from user. Divide the given string into substrings each of size 'n' and sort them lexicographically.
 - b) Accept an array of strings and display the number of vowels and consonants occurred in each string.
 - c) Accept two strings from the user and determine if the strings are anagrams or not.
- 5)
 - a) Create a multilevel inheritance for classes vehicle, brand and cost. The vehicle class determines the type of vehicle which is inherited by the class brand which determines the brand of the vehicle. Brand class is inherited by cost class, which tells about the cost of the vehicle. Create another class which calls the constructor of cost class and method that displays the total vehicle information from the attributes available in the super classes.
 - b) Create an inheritance hierarchy of Figure_3D, Cylinder, Cone, Sphere etc. In the base class provides methods that are common to all Figure_3Ds and override these in the derived classes to perform different behaviors, depending on the specific type of Figure_3D. Create an array of Figure_3D, fill it with different specific types of Figure_3Ds and call your base class methods.
- 6)
 - a) Design a package to contain the class Student that contains data members such as name, roll number and another package contains the interface Sports which contains some sports information. Import these two packages in a package called Report which process both Student and Sport and give the report.
 - b) Write a program that accepts values of different data types and convert them to corresponding wrapper classes and display using the vector
- 7)
 - a) Write a program to generate a set of random numbers between two numbers x1 and x2, and $x1 > 0$.
 - b) Write a program to implement a new ArrayList class. It should contain add(), get(), remove(), size() methods. Use dynamic array logic.
 - c) Create an employee class containing at least 3 details along with Id, setters, and getters. Insert the employee objects dynamically key as employee id and value as it's corresponding object into a HashMap. Perform Id based search operation on the HashMap.
- 8)
 - a) Write a program that reads file name from the user then displays information about that file, also read the contents from the file in byte stream to count the number of alphabets, numeric values, and special symbols. Write these statistics into another file using byte streams

b) Write a program that reads a CSV file containing a super market data containing product ID, Name, Cost and Quantity of sales and calculate the total revenue of the supermarket also sort the products in the order of their demand.

c) Write a program that reads a text file containing some technical content and identify the technical terms and sort them alphabetically.

Note: use a file containing stop words (general English and Grammar terms as many as possible)

9) a) Write a program that reads two numbers from the user to perform integer division into Num1 and Num2 variables. The division of Num1 and Num2 is displayed if they are integers. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception.

b) Create a user defined exception.

10) a) Write a program that creates 3 threads by extending the Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays “Welcome” every 3 seconds. (Repeat the same by implementing Runnable).

b) Write a program to illustrate Thread synchronization.

11) a) Create a JApplet that displays a message which is scrolling from left to right.

b) Write a program that displays a sample registration page using Swing controls use appropriate layout managers.

c) Write a program for handling mouse events with adapter classes.

12) a) Create an interface containing 3 radio buttons named line, rectangle, and oval. Based on the radio button selected, allow user to draw lines, rectangles, or ovals as per the locations selected by the user.

b) Write a program to create a Table inside a JFrame.

c) Create an interface that illustrates JFileChooser class and read CSV file containing employee data of various departments and display the records department wise on the interface.

13) Check all the fields filled or not, display success dialogue if all fields are filled with the help of ActionListener for program 11(b). Display respective error dialogue if a field is empty.

14) Write a program to create three JSliders where each represents colors RED, GREEN and BLUE. Each slider has a value from 0 to 255. The background color of the applet is set based on the values retrieved from each slider to form a color using the color class constructor. On sliding any slider, the background color of the applet changes.

15) Complete the code to develop an ADVANCED CALCULATOR that emulates all the functions of the GUI Calculator as shown in the image.



16) Write a program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle.

CASE STUDIES:

- 1) Grading a Multiple-choice Test for students
- 2) Create a Person class containing basic details like Name, Gender, Mobile and Email. Based on that create and manage the objects that are related to student and employee Classes
- 3) Create a package called Banking containing classes and interfaces related to various banking operations such as withdrawal, deposits, loans and insurance etc. Create two classes related to any two specific banks that uses this package.
- 4) Write a program that implements simple chat application using GUI.

TEXT BOOKS:

1. Herbert Schildt, *Java The complete reference*, 11th Edition, McGrawHill, 2019
2. Timothy budd, *An introduction to object-oriented programming*, 3rd Edition, Pearson Education, 2009.

REFERENCE BOOKS:

1. Cay S. Horstmann, *Core Java Volume I–Fundamentals*, 11th Edition, Pearson 2019
2. Y. Daniel Liang *Introduction to Java Programming Comprehensive Version*, 10th Edition, Pearson, 2015.
3. Bruce Eckel, *Thinking in Java*, 4th Edition, Prentice Hall, 2006

WEB REFERENCES:

1. https://onlinecourses.nptel.ac.in/noc19_cs84/preview