EC6L3   **OOPS LAB**   **Credits: 2**
Lecture: ---   **Internal assessment: 25 marks**
Lab: 3 periods/week   **Semester end examination: 50 marks**

Course Objectives:
- To make the student learn a object oriented way of solving problems.
- To teach the student to write programs in Java to solve the problems

Learning Outcomes:
Student will be able to
- Use basic I/O to communicate with the user to populate variables and control program flow.
- Use arithmetic, logical, relational, and string manipulation expressions to process data.
- Write a complete class definition with in the class definition, write class and instance methods including the constructor and overloaded methods.
- Implement appropriate program design using good programming style. Conceptualize, Analyze and write programs to solve more complicated problems using the concepts of Object Oriented and java technology.
- Apply validation techniques to build a reliable solution to a given problem. Apply all the programming concepts as and when required in the future application development.

Recommended Systems/Software Requirements:
Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space and JDK Kit.

Exercise 1:   a) Write a java program to display simple text message.
b) Write a Program to Perform Arithmetic operations (+,-,*,/,%) reading the value through key board.

Exercise 2:   a) Write a Program to display colors using switch case (VIBGYOR).
b) Write a Program to check whether the given number is even or odd using switch.

Exercise 3: (using while and do-while)
a) Write a program to calculate sum of individual digits of a given number.
b) Write a program to print given number in reverse order and check the number is palindrome or not
c) Write a program to check whether given number is Armstrong or not.

Exercise 4:   a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.
b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program to print the nth value in the Fibonacci sequence .

Exercise 5:   a)   Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

                     b)   Write a Java program to multiply two given matrices and find it's transpose (Exercise Find identity Matrix of a given size)

Exercise 6:   a)   Write a Java program that checks whether a given string is a palindrome or not. Ex MALAYALAM is a palindrome.

                     b)   Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

Exercise 7:   a)Write a java Program that Demonstrates the Concept of Inheritance

Exercise 8:   a) Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.
                  (b) Write a Java program that demonstrates Packages

Exercise 9:   a) Write a Java program demonstrating the life cycle of a thread.

Exercise 10:   a)Develop an applet that displays a simple message.
.   b)Write a Java program that allows user to draw lines, rectangles and ovals.

Exercise 11:   a) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.
                  b)Write a Java program for handling mouse events.

Exercise 12:   a) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

Exercise 13:   Write a java program that lets user create pie charts. Design your own user interface (with swings and AWT)

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Learning Resources

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References:
1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education
3. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Pvt. Ltd.