Ex. No.		Practical / Exercise	No. of Hrs.
1	A A A A B C	**Installation and Setting Path Variable** 1. Install Java Development Kit (JDK). 2. Configure Path Variable. 3. Hello World Program using Java. 4. Taking user input through Command Line Argument. 5. Taking user input through Scanner class. 6. Write a java program to do sum of command line argument passed as two Double numbers.	2
2	A A B B C	**Data types and Operators** 1. Write a program to get 2 numbers from the user and print the sum of two numbers using command line and Scanner class. 2. Demonstrate the Operator precedence. a. 10 + 20 * 30 b. 100 / 10 * 100 c. 5 * 4 / 4 % 3 d. 100 + 200 / 10 – 3 * 10 3. Write a program to create basic calculator by getting 2 numbers and 1 string (operation) from the user and apply the operation given in a string on the given numbers. 4. Write a program to calculate the area of circle. 5. Write a program to convert temperature from Fahrenheit to Celsius. (Formula : c = f-32*5/9);	2
3	A A A A	**if-else ladders** 1. The marks obtained by a student in 5 different subjects are input through the keyboard. The student gets a division as per the following rules: I. Percentage above or equals to 60-first division II. Percentage between 50 to 59-second division III. Percentage between 40 and 49-Third division IV. Percentage less than 40-fail Write a program to calculate the division obtained by the student. **conditional and branching statement** 2. Write a program to find that given number or string is palindrome or not. **3.** Write a program to find maximum no from given 3 no. **4.** Write a program to check that the given number is prime or not.	2
4	A A A A	**Array and String** 1. Write a program to accept a line and check how many consonants and vowels are there in line. 2. Write a program that creates and initializes a four integer element array. Calculate and display the average of its values. 3. Write a program to print given array in reverse order. 4. Write a program to find length of string and print second half of the string.	2

	B **B** **C** **C**	5. Write an application that searches through its command-line argument. If an argument is found that does not begin with and upper case letter, display error message and terminate. 6. Write an interactive program to print a string entered in a pyramid form. For instance, the string "stream" has to be displayed as follows: s st str stre strea stream 7. Write an interactive program to print a diamond shape. For example, if user enters the number 3, the diamond will be as follows: * * * * * * * * * 8. There is an integer array nums sorted in ascending order (with distinct values). Prior to being passed to your function, nums is possibly rotated at an unknown pivot index k (1 <= k < nums.length) such that the resulting array is [nums[k], nums[k+1], ..., nums[n-1], nums[0], nums[1], ..., nums[k-1]] (0-indexed). For example, [0,1,2,4,5,6,7] might be rotated at pivot index 3 and become [4,5,6,7,0,1,2]. Given the array nums after the possible rotation and an integer target, return the index of target if it is in nums, or -1 if it is not in nums. Example 1: Input: nums = [4,5,6,7,0,1,2], target = 0 Output: 4 Example 2: Input: nums = [4,5,6,7,0,1,2], target = 3 Output: -1	
5	**A** **A** **A** **B** **B**	**Class, Object and Methods** 1. Write a program to create circle class with area function to find area of circle. **2.** Define Time class with constructor to initialize hour and minute. Also define addition method to add two time objects. **3.** Create a class which ask the user to enter a sentence, and it should display count of each 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. 4. Create a class named Bank_Account with data memebers accountNo, userName, email, accountType and accountBalance, Also create methods getAccountDetails() and displayAccountDetails(). 5. Define class for Complex number with real and imaginary as data members. Create its contructor, overload the constructors. Also define addition method to add two complex objects.	**2**

	B	6. WAP that counts the number of objects created using static. 7. Write a program in Java to demonstrate use of this keyword. Check whether this can access the Static variables of the class or not.	
6		**Classes, Inheritance**	**2**
	A	1. Declare a class called student having following data members:id_no, no_of_subjects_registered, subject_code, subject_credits, grade_obtained and spi. Define constructor and calculate_spi methods.Define main to instantiate an array for objects of class student to process data of n students to be given as command line arguments.	
	A	2. Declare a class called book having author_name as private data member. Extend book class to have two sub classes called book_publication & paper_publication. Each of these classes have private member called title. Write a complete program to show usage of dynamic method dispatch (dynamic polymorphism) to display book or paper publications of given author.Use command line arguments for inputting data.	
	B	3. Create a class named 'Member' having the following members: 1-Name 2-Age 3-Phone number 4-Address 5-Salary It also has a method named 'printSalary' which prints the salary of the members. Two classes 'Employee' and Manager' inherits the 'Member' class. The 'Employee' and 'Manager' classes have data members 'specialization' and 'department' respectively. Now assign name, age, phone number address and salary to an employee and a manager by making an object of both of these classes and print the same along with specialization and department respectively.	
	C	4. Design a class named MyPoint to represent a point with x- and y-coordinates. The class contains: The data fields x and y that represent the coordinates with getter methods. o a no-arg constructor that creates a point (0, 0). o a constructor that constructs a point with specified coordinates. o a method named distance that returns the distance from this point to a specified point of the MyPoint type. o a method named distance that returns the distance from this point to another point with specified x- and y-coordinates. Create a class named ThreeDPoint to model a point in a three-dimensional space. Let ThreeDPoint be derived from MyPoint with following additional features: o A data fields named z that represents the z-coordinate. o A no-arg constructor that creates a point (0, 0, 0). o A constructor that constructs a point with three specified coordinates. o A get method that returns the z value. o Override the distance method to return the distance between two points in the three-dimensional space.	

	A A	Write a program that creates two points (0, 0, 0) and (10, 30, 25.5) and display the distance between the two points. 5. Demonstrate the use of Super Keyword. 6. Demonstrate the use of Final Keyword.	
7	A A B B C	**Abstract class and Interface** 1. The abstract vegetable class has three subclasses named Potato, Brinjal and Tomato. Write a java program that demonstrates how to establish this class hierarchy. Declare one instance variable of type String that indicates the color of a vegetable. Crete and display instances of these objects. Override the toString() method of object to return a string with the name of vegetable and its color. 2. Write a program that illustrates interface inheritance. Interface A is extended by A1 and A2. Interface A12 inherits from both P1 and P2.Each interface declares one constant and one method. Class B implements A12.Instantiate B and invoke each of its methods. Each method displays one of the constants 3. The Transport interface declares a deliver () method. The abstract class Animal is the super class 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. 4. Create interface EventListener with performEvent() method. Create MouseListener interface which inherits EventListener along with mouseClicked(), mousePressed(), mouseReleased(), mouseMoved(), mouseDragged() methods. Also create KeyListener interface which inherits EventListener along with keyPressed(), keyReleased() methods. WAP to create EventDemo class which implements MouseListener and KeyListener and demonstrate all the methods of the interfaces. 5. The Transport interface declares a deliver () method. The abstract class Animal is the super class 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.	**2**
8	A B	**Exception Handling** 1. Write a method for computing xy doing repetitive multiplication. X and y are of type integer and are to be given as command line arguments. Raise and handle exception(s) for invalid values of x and y. 2. Write a complete program to accept N integer numbers from the command line. Raise and handle exceptions for following cases : a. - when a number is –ve b. - when a number is evenly divisible by 10 c. - when a number is greater than 1000 and less than 2000 d. - when a number is greater than 7000 Skip the number if an exception is raised for it, otherwise add it to find total sum.	**2**

	C	3. WAP to create Account class, which is representing a bank account where we can deposit and withdraw money. if we want to withdraw money which exceed our bank balance? We will not be allowed, create InSufficientFundException to handle above situation and display proper error message.	
9	**A** **A** **B** **C**	**Multithreading** 1. Write an application that executes two threads. One thread displays "Good Morning" every 1000 milliseconds & another thread displays "Good Afternoon" every 3000 milliseconds. Create the threads by implementing the Runnable interface. 2. Write a program to create two threads, one thread will print odd numbers and second thread will print even numbers between 1 to 20 numbers. 3. Write a complete multi-threaded program to meet following requirements: a. Read matrix [A] m x n b. Create m number of threads c. Each thread computes summation of elements of one row, i.e. ith row of the matrix is processed by ith thread. Where 0 <= i< m. d. Print the results. 4. It is required to have total two threads, both capable of acting as a produce as well as a consumer. If first thread acts as a producer then, the second thread becomes the consumer and vice-versa. They communicate with each other through a buffer, storing one integer number. One of the threads initiates the communication by sending 1 to the other thread. The second thread, on receiving 1 sends 2 to the first thread. On receiving 2, the first thread sends three integer numbers, one by one to the second thread. The second thread consumes the numbers by displaying them. Both threads terminate after that. Note that both threads must be capable of initiating the communication. Write complete multi-threaded program to meet above requirements.	**2**
10	**A** **C**	WAP to implement the solution to producer consumer problem in Java. WAP for given program. You have the four functions: printFizz that prints the word "fizz" to the console, printBuzz that prints the word "buzz" to the console, printFizzBuzz that prints the word "fizzbuzz" to the console, and printNumber that prints a given integer to the console. You are given an instance of the class FizzBuzz that has four functions: fizz, buzz, fizzbuzz and number. The same instance of FizzBuzz will be passed to four different threads: Thread A: calls fizz() that should output the word "fizz". Thread B: calls buzz() that should output the word "buzz". Thread C: calls fizzbuzz() that should output the word "fizzbuzz". Thread D: calls number() that should only output the integers.	**2**

		Modify the given class to output the series [1, 2, "fizz", 4, "buzz", ...] where the ith token (1-indexed) of the series is: "fizzbuzz" if i is divisible by 3 and 5, "fizz" if i is divisible by 3 and not 5, "buzz" if i is divisible by 5 and not 3, or i if i is not divisible by 3 or 5. Implement the FizzBuzz class: FizzBuzz(int n) Initializes the object with the number n that represents the length of the sequence that should be printed. void fizz(printFizz) Calls printFizz to output "fizz". void buzz(printBuzz) Calls printBuzz to output "buzz". void fizzbuzz(printFizzBuzz) Calls printFizzBuzz to output "fizzbuzz". void number(printNumber) Calls printnumber to output the numbers. Example 1: Input: n = 15 Output: [1,2,"fizz",4,"buzz","fizz",7,8,"fizz","buzz",11,"fizz",13,14,"fizzbuzz"] Example 2: Input: n = 5 Output: [1,2,"fizz",4,"buzz"]	
11	**A** **A** **B** **C**	**IO Programming** 1. Write a program that counts number of characters, words, and lines in a file. Use exceptions to check whether the file that is read exists or not. 2. Write a program to replace all “word1” by “word2” from a file1, and output is written to file2 file and display the no. of replacement. 3. Write an application that reads a file and counts the number of occurrences of digit 5. Supply the file name as a command-line argument. 4. Create a class called Student. Write a student manager program to manipulate the student information from files by using FileInputStream and FileOutputStream.	**2**
12	**A** **A** **A** **A**	**IO Programming** 1. Refine the student manager program to manipulate the student information from files by using the BufferedReader and BufferedWriter. 2. Write a program to check that whether the name given from command line is file or not? If it is a file then print the size of file and if it is directory then it should display the name of all files in it. 3. Write a program of writing binary file using multithreading. Demonstrate use of join() and yield() interrupt(). 4. Refine the student manager program to manipulate the student information from files by using the DataInputStream and DataOutputStream. Assume suitable data.	**2**