Assignment:
Java Basics

Overview:

This assignment has eight exercises, ranging between 15-45 minutes. You are expected to complete the course/ reference reading before attempting the exercise.

Learning Objective: The learning objectives are given in the table below.

S.No	Exercise	Description	Learning Objectives
1	Calculate and display the Area of a Circle	This exercise is to write a java program using sequential statements.	Use basic language constructs in a java program.
2	Swap the values of two numbers	This exercise is to write a java program using conditional statements.	Write java conditional statements in a java program.
3	Implement Bubble Sort in java	This exercise is to write a java program using arrays.	Implement array sorting in a java program.
4	Search for a particular element in Array	This exercise is to write a java program using arrays.	Implement array searching in a java program.
5	Display all elements of an array from 1-10 except 7	This exercise is to write a java program using arrays.	Use control flow in arrays in a java program.
6	Implement Inheritance using HAS-A relationship	This exercise is to write the java classes and implement HAS-A relation using those classes.	Implement relations between objects.
7	Develop java applications using objects and validate them.	This exercise is to write the java classes and create the objects and validate objects data.	Implement call methods to perform operations on objects.

8	Develop java applications to implement Object Oriented Principles	This exercise is to write the java classes and create the objects and calling the methods of the class.	Use and implement Object Oriented Principles.
9	Develop a case study using OOPs features	This exercise is to implement java application using a sample case study.	
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Java Language Fundamentals, Control Flow, Loops, OOPS Implementation

Exercise 1: Write a program to calculate and display the Area of a Circle.
Recommended duration: *15 minutes*
Solution Guidance: Use **command line arguments** for the input values if any.

Exercise 2: Write a program to swap/interchange the values of two numbers.
Recommended duration: *15 minutes*
Solution Guidance: Use **java.util.Scanner** class for the required input.

Exercise 3: Write a program to implement Bubble Sort in java.
Recommended duration: *20 minutes*

Exercise 4: Write a program to Search for a element in Array, in case it is found, exit from loop and display the search result.
Recommended duration: *10 minutes*

Exercise 5: Write a program to display all elements of an array from 1-10 except 7
Recommended duration: *10 minutes*

Exercise 6: Write a Java class to receive employee data (employee code, employee name, position and salary) from console as an input source and produce the annual salary. An employee needs to assign to a department and as a system admin, you need to capture department number, department name and location. Write a java client to create an instance of employee and display the employee data along with department details.

Recommended duration: *30 minutes*

Exercise 7: A User need to login into the website. Check the entered user name and password should not have any leading and trailing white space and the user name should be at least 5 characters long. Password should be at least 6 and 12 characters. The java client should display the greeting message to the website user, if user supplies valid user name and password.
Recommended duration: *30 minutes*

Exercise 8: Using a Java class, accept the employee basic salary and calculate allowances like HRA, CA, and deductions like Professional tax, and PF contribution etc. The % of calculation:

- HRA 10% of Basic salary
- CA 5% of Basic Salary
- PF 12% of Basic Salary
- Professional Tax: 2% of Basic salary.

Calculate the Gross salary and the Net salary of the employee and display the employee salary details.

Recommended duration: *30 minutes*

Exercise 9: In an Online Ticket booking reservation system, passenger need to book the tickets. A ticket is in the form of either a confirmed ticket or a waitlist ticket. All types of tickets should consist of PNR, origin, destination, and the journey date. A confirmed ticket must provide a seat number. A waitlist ticket must provide the W/L status.

The System should capture the passenger details with passenger name, age, gender, contact number, email id. Passenger need to register/login into the system to avail ticket booking service. Allow the passenger to book and cancel the ticket by the help of ticket booking service. The system should provide a value for MAX_NO_SEATS. In case of booking ticket, value of MAX_NO_SEATS should decrease by 1 and in case of canceling ticket, value of MAX_NO_SEATS should increase by 1. Design the above scenario, identify the interface, implementation classes and present it in a Java Code.

Recommended duration: *45 minutes*

Exercise 10: In a Vehicle Rent Management System, a Vehicle should be available for Rent. The system should allow renting four wheelers only. A four-wheeler should consist of model, price, and the seating capacity. Allow the passenger to rent a Toyota CAR and display the rented vehicle data, while displaying passenger data. Car Rental Service facilitate passenger to rent a car. Design the above scenario, identify the interface, implementation classes and present it in a Java Code.
Recommended duration: *30 minutes*