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| **SUBJECT** | **PBLJ** |

**Part a: Sum of Integers Using Autoboxing and Unboxing**

**Part b: Serialization and Deserialization of a Student Object**

**Part c: Menu-Based Employee Management System Using File Handling**

**Code :**

1. **import java.util.ArrayList;**

**import java.util.Scanner;**

**public class SumOfIntegers {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**ArrayList<Integer> numbers = new ArrayList<>();**

**System.out.println("Enter integers (type 'done' to finish):");**

**while (true) {**

**String input = sc.next();**

**if (input.equalsIgnoreCase("done")) {**

**break;**

**}**

**try {**

***// String parsing into int***

**int num = Integer.parseInt(input);**

***// Autoboxing: primitive int → Integer***

**numbers.add(num);**

**} catch (NumberFormatException e) {**

**System.out.println("Invalid input, please enter an integer.");**

**}**

**}**

**int sum = 0;**

***// Unboxing: Integer → int inside enhanced for loop***

**for (Integer n : numbers) {**

**sum += n;**

**}**

**System.out.println("Total Sum = " + sum);**

**sc.close();**

**}**

**}**

**(B)**

**import java.io.\*;**

**// Student class must implement Serializable**

**class Student implements Serializable {**

**private static final long serialVersionUID = 1L; // good practice**

**int studentID;**

**String name;**

**String grade;**

**public Student(int studentID, String name, String grade) {**

**this.studentID = studentID;**

**this.name = name;**

**this.grade = grade;**

**}**

**public void display() {**

**System.out.println("Student ID: " + studentID);**

**System.out.println("Name: " + name);**

**System.out.println("Grade: " + grade);**

**}**

**}**

**public class StudentSerialization {**

**public static void main(String[] args) {**

**String filename = "student.ser";**

**// Create Student object**

**Student s1 = new Student(101, "Rahul Kumar", "A");**

**// Serialization**

**try (ObjectOutputStream oos = new ObjectOutputStream(new FileOutputStream(filename))) {**

**oos.writeObject(s1);**

**System.out.println("Student object serialized to " + filename);**

**} catch (IOException e) {**

**e.printStackTrace();**

**}**

**// Deserialization**

**try (ObjectInputStream ois = new ObjectInputStream(new FileInputStream(filename))) {**

**Student s2 = (Student) ois.readObject();**

**System.out.println("\nDeserialized Student object:");**

**s2.display();**

**} catch (IOException | ClassNotFoundException e) {**

**e.printStackTrace();**

**}**

**}**

**}**

**(C)**

**import java.io.\*;**

**import java.util.Scanner;**

**class Employee {**

**int id;**

**String name, designation;**

**double salary;**

**public Employee(int id, String name, String designation, double salary) {**

**this.id = id;**

**this.name = name;**

**this.designation = designation;**

**this.salary = salary;**

**}**

**@Override**

**public String toString() {**

**return id + "," + name + "," + designation + "," + salary;**

**}**

**public static Employee fromString(String data) {**

**String[] parts = data.split(",");**

**return new Employee(**

**Integer.parseInt(parts[0]),**

**parts[1],**

**parts[2],**

**Double.parseDouble(parts[3])**

**);**

**}**

**}**

**public class EmployeeManagement {**

**private static final String FILE\_NAME = "employees.txt";**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**int choice;**

**while (true) {**

**System.out.println("\n--- Employee Management Menu ---");**

**System.out.println("1. Add Employee");**

**System.out.println("2. Display All Employees");**

**System.out.println("3. Exit");**

**System.out.print("Enter your choice: ");**

**choice = sc.nextInt();**

**sc.nextLine(); // consume newline**

**switch (choice) {**

**case 1 -> addEmployee(sc);**

**case 2 -> displayEmployees();**

**case 3 -> {**

**System.out.println("Exiting application...");**

**sc.close();**

**return;**

**}**

**default -> System.out.println("Invalid choice. Try again.");**

**}**

**}**

**}**

**private static void addEmployee(Scanner sc) {**

**System.out.print("Enter Employee ID: ");**

**int id = sc.nextInt();**

**sc.nextLine();**

**System.out.print("Enter Employee Name: ");**

**String name = sc.nextLine();**

**System.out.print("Enter Designation: ");**

**String designation = sc.nextLine();**

**System.out.print("Enter Salary: ");**

**double salary = sc.nextDouble();**

**Employee emp = new Employee(id, name, designation, salary);**

**try (BufferedWriter writer = new BufferedWriter(new FileWriter(FILE\_NAME, true))) {**

**writer.write(emp.toString());**

**writer.newLine();**

**System.out.println("Employee added successfully!");**

**} catch (IOException e) {**

**e.printStackTrace();**

**}**

**}**

**private static void displayEmployees() {**

**System.out.println("\n--- Employee Records ---");**

**try (BufferedReader reader = new BufferedReader(new FileReader(FILE\_NAME))) {**

**String line;**

**while ((line = reader.readLine()) != null) {**

**Employee emp = Employee.fromString(line);**

**System.out.println("ID: " + emp.id + ", Name: " + emp.name +**

**", Designation: " + emp.designation +**

**", Salary: " + emp.salary);**

**}**

**} catch (FileNotFoundException e) {**

**System.out.println("No employee records found. Add employees first.");**

**} catch (IOException e) {**

**e.printStackTrace();**

**}**

**}**

**}**