



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment-5

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Semester: 6th

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Date of Performance: 28/02/25

Subject Code: 22CSH-359

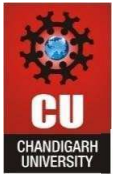
1. Aim:

Develop Java programs using autoboxing, serialization, file handling, and efficient data processing and management.

- a.) Write a Java program to calculate the sum of a list of integers using autoboxing and unboxing. Include methods to parse strings into their respective wrapper classes (e.g., Integer.parseInt()).
- b.) Create a Java program to serialize and deserialize a Student object.
The program should:
Serialize a Student object (containing id, name, and GPA) and save it to a file.
Deserialize the object from the file and display the student details.
Handle FileNotFoundException, IOException, and ClassNotFoundException using exception handling
Create a program to collect and store all the cards to assist the users in finding all the cards in a given symbol using Collection interface.
- c.) Create a menu-based Java application with the following options. 1. Add an Employee 2. Display All 3. Exit If option 1 is selected, the application should gather details of the employee like employee name, employee id, designation and salary and store it in a file. If option 2 is selected, the application should display all the employee details. If option 3 is selected the application should exit.

2. Objective:

Develop Java programs using autoboxing, serialization, file handling, and efficient data processing and management.



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1. Implement autoboxing/unboxing to compute the sum of integers from a list and parse strings to wrapper classes.
2. Serialize a Student object (id, name, GPA) to a file and deserialize it back, handling exceptions properly.
3. Create a menu-driven employee management system that adds, stores, and retrieves employee data using file handling.

3. Implementation/Code:

a.) Sum of Integers

```
import java.util.*;

public class AutoBoxingExample {
    public static int calculateSum(List<Integer> numbers) {
        int sum = 0;
        for (int num : numbers) sum += num;
        return sum;
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        List<Integer> nums = new ArrayList<>();
        System.out.print("Enter numbers (separated by space): ");
        String[] inputs = sc.nextLine().split(" ");
        for (String str : inputs) nums.add(Integer.parseInt(str));

        System.out.println("Sum: " + calculateSum(nums));

        System.out.print("Enter a number as a string: ");
        String strNum = sc.next();
        int parsedNum = Integer.parseInt(strNum);
        System.out.println("Parsed Integer: " + parsedNum);
    }
}
```



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Output :

```
Enter numbers (separated by space): 1 4 5 6
Sum: 16
Enter a number as a string: 4
Parsed Integer: 4
```

b.) Student management:

```
import java.io.*;
import java.util.Scanner;
```

```
class Student implements Serializable {
    int id;
    String name;
    double gpa;
    Student(int id, String name, double gpa) { this.id = id; this.name = name; this.gpa =
gpa; }
}
```

```
public class StudentSerialization {
    static final String FILE = "student.dat";
```

```
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Student ID: "); int id = sc.nextInt();
        sc.nextLine();
        System.out.print("Enter Student Name: "); String name = sc.nextLine();
        System.out.print("Enter GPA: "); double gpa = sc.nextDouble();
```

```
        try (ObjectOutputStream out = new ObjectOutputStream(new
FileOutputStream(FILE))) {
            out.writeObject(new Student(id, name, gpa));
        } catch (IOException e) { e.printStackTrace(); }
```

```
        try (ObjectInputStream in = new ObjectInputStream(new FileInputStream(FILE))) {
            Student s = (Student) in.readObject();
            System.out.println("Deserialized Student -> ID: " + s.id + ", Name: " + s.name +
```



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```
", GPA: " + s.gpa);  
    } catch (IOException | ClassNotFoundException e) { e.printStackTrace(); }  
    }  
}
```

Output:

```
input  
Enter Student ID: 10312  
Enter Student Name: MANTU KUMAR  
Enter GPA: 7.51  
Deserialized Student -> ID: 10312, Name: MANTU KUMAR, GPA: 7.51  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

c.) Employee Management System:

```
import java.io.*;  
import java.util.*;  
  
class Employee implements Serializable {  
    int id; String name, designation; double salary;  
    Employee(int id, String name, String designation, double salary) { this.id = id;  
    this.name = name; this.designation = designation; this.salary = salary; }  
}  
  
public class EmployeeManagement {  
    static final String FILE = "employees.dat";  
  
    public static void addEmployee() {  
        try (FileOutputStream fos = new FileOutputStream(FILE, true);  
            ObjectOutputStream out = new ObjectOutputStream(fos)) {  
            Scanner sc = new Scanner(System.in);  
            System.out.print("Enter ID: "); int id = sc.nextInt();  
            sc.nextLine();  
            System.out.print("Enter Name: "); String name = sc.nextLine();  
            System.out.print("Enter Designation: "); String desig = sc.nextLine();  
            System.out.print("Enter Salary: "); double salary = sc.nextDouble();  
            out.writeObject(new Employee(id, name, desig, salary));  
        } catch (IOException e) { e.printStackTrace(); }  
    }  
}
```



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```
}

public static void displayEmployees() {
    try (FileInputStream fis = new FileInputStream(FILE);
        ObjectInputStream in = new ObjectInputStream(fis)) {
        while (true) {
            Employee e = (Employee) in.readObject();
            System.out.println("ID: " + e.id + ", Name: " + e.name + ", Designation: " +
e.designation + ", Salary: " + e.salary);
        }
    } catch (EOFException e) {} catch (IOException | ClassNotFoundException e) {
e.printStackTrace(); }
}

public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    while (true) {
        System.out.println("1. Add Employee 2. Display All 3. Exit");
        int choice = sc.nextInt();
        if (choice == 1) addEmployee();
        else if (choice == 2) displayEmployees();
        else break;
    }
}
}
```

Output :

```
input
1. Add Employee 2. Display All 3. Exit
1
Enter ID: 10312
Enter Name: mantu kumar
Enter Designation: data scientist
Enter Salary: 10000000000
1. Add Employee 2. Display All 3. Exit
2
ID: 10312, Name: mantu kumar, Designation: data scientist, Salary: 1.0E10
1. Add Employee 2. Display All 3. Exit
```



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4. Learning Outcome:

- A. Understand autoboxing and unboxing for seamless conversion between primitive types and wrapper classes.
- B. Implement serialization and deserialization to persist and retrieve Java objects efficiently.
- C. Utilize file handling for storing and managing structured data in a menu-driven application.
- D. Apply exception handling to manage runtime errors and ensure program stability.
- E. Develop interactive Java applications with user input processing and data persistence.