



## Experiment 5

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**1. Aim:** Develop Java programs using autoboxing, serialization, file handling, and efficient data processing and management.

**A) Easy Level:**

- 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) Medium Level:**

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.

**C) Hard Level:**

- 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. Objectives:

- ❖ To demonstrate the use of Java Wrapper classes and automatic conversion between primitive types and their wrapper equivalents.
- ❖ To demonstrate object serialization, file handling, and exception management in Java.
- ❖ To combine object-oriented programming, file handling, and menu-driven console interaction.

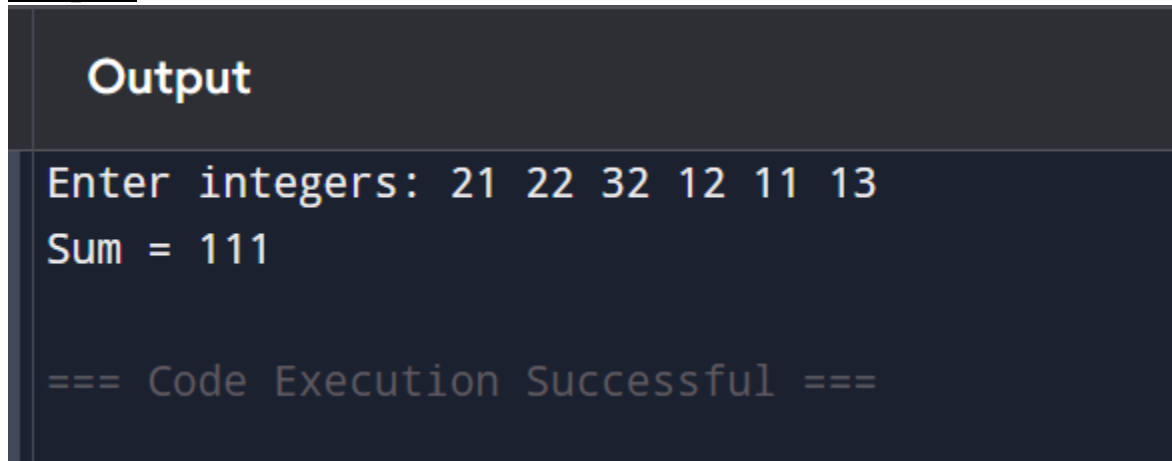
## 3. JAVA script and output:

### EASY-LEVEL PROBLEM

```
import java.util.*;
public class SumList {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        List<Integer> numbers = new ArrayList<>();

        System.out.print("Enter integers: ");
        String input = sc.nextLine();
        String[] parts = input.split(" ");
        for (String s : parts) {
            numbers.add(Integer.parseInt(s));
        }
        int sum = 0;
        for (Integer num : numbers) {
            sum += num;
        }
        System.out.println("Sum = " + sum);
        sc.close();
    }
}
```

### Output:



```
Output
Enter integers: 21 22 32 12 11 13
Sum = 111

=== Code Execution Successful ===
```



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## **MEDIUM LEVEL PROBLEM:**

```
import java.io.*;

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 String toString() {

        return "ID: " + id + ", Name: " + name + ", GPA: " + gpa;

    }

}

public class StudentSerialization {

    public static void main(String[] args) {

        String filename = "student.dat";

        try {

            Student s = new Student(1, "Diksha", 8.5);

            ObjectOutputStream oos = new ObjectOutputStream(new FileOutputStream(filename));

            oos.writeObject(s);

            oos.close();

            System.out.println("Student serialized.");

        }

    }

}
```



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```
ObjectInputStream ois = new ObjectInputStream(new FileInputStream(filename));
Student deserialized = (Student) ois.readObject();
ois.close();
System.out.println("Deserialized Student: " + deserialized);

} catch (FileNotFoundException e) {
    System.out.println("File not found: " + e.getMessage());
} catch (IOException e) {
    System.out.println("I/O Error: " + e.getMessage());
} catch (ClassNotFoundException e) {
    System.out.println("Class not found: " + e.getMessage());
}
}
}
```

## Output:

A screenshot of a Java IDE's console window. The window has a title bar with standard icons (checkmark, cursor, window, gear, and a document with an arrow). The console background is black with white text. The output shows the program successfully serializing and deserializing a student object. At the end, it indicates the program finished with exit code 0 and prompts the user to press ENTER to exit the console.

```
Student serialized.
Deserialized Student: ID: 1, Name: Diksha, GPA: 8.5

...Program finished with exit code 0
Press ENTER to exit console.
```



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## HARD LEVEL PROBLEM

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

class Employee implements Serializable {
    int id;
    String name;
    String 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 String toString() {
        return "ID: " + id + ", Name: " + name + ", Designation: " + designation + ", Salary: " +
salary;
    }
}

public class EmployeeApp {
    static String filename = "employees.dat";
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        List<Employee> employees = new ArrayList<>();
        try (ObjectInputStream ois = new ObjectInputStream(new FileInputStream(filename))) {
            employees = (List<Employee>) ois.readObject();
        } catch (Exception e) {
        }

        while (true) {
            System.out.println("\n1. Add Employee");
            System.out.println("2. Display All");
            System.out.println("3. Exit");
            System.out.print("Enter choice: ");
            int choice = sc.nextInt();
```



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```
switch (choice) {
    case 1:
        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 designation = sc.nextLine();
        System.out.print("Enter Salary: ");
        double salary = sc.nextDouble();
        employees.add(new Employee(id, name, designation, salary));

        try (ObjectOutputStream oos = new ObjectOutputStream(new
FileOutputStream(filename))) {
            oos.writeObject(employees);
        } catch (IOException e) {
            System.out.println("Error saving: " + e.getMessage());
        }
        System.out.println("Employee added.");
        break;
    case 2:
        if (employees.isEmpty()) {
            System.out.println("No employees found.");
        } else {
            for (Employee emp : employees) {
                System.out.println(emp);
            }
        }
        break;
    case 3:
        System.out.println("Exiting...");
        sc.close();
        return;

    default:
        System.out.println("Invalid choice.");
}
}
```



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```
}  
}
```

## OUTPUT:

```
input  
1. Add Employee  
2. Display All  
3. Exit  
Enter choice: 1  
Enter ID: 11  
Enter Name: Diksha  
Enter Designation: Manager  
Enter Salary: 50000  
Employee added.  
  
1. Add Employee  
2. Display All  
3. Exit  
Enter choice: 2  
ID: 11, Name: Diksha, Designation: Manager, Salary: 50000.0  
  
1. Add Employee  
2. Display All  
3. Exit  
Enter choice: 3  
Exiting...  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```