



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment 5

Student Name: Archit Kaushal
Branch: CSE
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UID: 23BCS10313
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1. Aim:

To design and implement Java programs using autoboxing, serialization, file handling, and efficient data processing and management.

- To apply Wrapper classes, object serialization, and Java I/O concepts in solving real-world problems.

◆ **Part A – Easy Level:**

- To create a Java program that calculates the sum of a list of integers using autoboxing and unboxing.
- To parse strings into wrapper objects and demonstrate automatic conversion between primitives and objects.

◆ **Part B – Medium Level:**

- To create a Java program that serializes and deserializes a `Student` object using Java I/O streams.
- To handle exceptions like `FileNotFoundException`, `IOException`, and `ClassNotFoundException` during file operations.

◆ **Part C – Hard Level:**

- To create a menu-based Java program for storing and displaying employee details using file handling.
- To implement console-driven interaction for adding, displaying, and managing employee records in a file.

2. Objective:

- ✓ To understand the concept of autoboxing and unboxing using Java Wrapper classes.
- ✓ To implement object serialization and deserialization for persistent storage of objects.
- ✓ To practice Java file handling using readers, writers, and object streams.
- ✓ To apply exception handling for robust execution of file I/O operations.



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3. JAVA script and output:

EASY-LEVEL PROBLEM

```
package exp.pkg5;

import java.util.*;

public class Exp5 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter numbers (comma separated): ");
        String input = sc.nextLine();
        String[] arr = input.split(",");
        ArrayList<Integer> list = new ArrayList<>();
        for (String s : arr) {
            list.add(Integer.parseInt(s.trim()));
        }
        int sum = 0;
        for (int num : list) {
            sum += num;
        }
        System.out.println("Sum of numbers = " + sum);
    }
}
```

OUTPUT:



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```
run:
Enter numbers (comma separated): 22,45,67,9
Sum of numbers = 143
BUILD SUCCESSFUL (total time: 10 seconds)
```

Figure 1: Easy Level

MEDIUM LEVEL PROBLEM:

```
package exp.pkg5;
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 class Exp5 {
    public static void main(String[] args) {
        try {
            Student s1 = new Student(101, "Akshara", 9.1);
```



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```
ObjectOutputStream oos = new ObjectOutputStream(new
FileOutputStream("student.dat"));
oos.writeObject(s1);
oos.close();
System.out.println("Student serialized successfully!");
ObjectInputStream ois = new ObjectInputStream(new FileInputStream("student.dat"));
Student s2 = (Student) ois.readObject();
ois.close();
System.out.println("Student deserialized:");
System.out.println("ID: " + s2.id);
System.out.println("Name: " + s2.name);
System.out.println("GPA: " + s2.gpa);
} catch (FileNotFoundException e) {
    System.out.println("File not found.");
} catch (IOException e) {
    System.out.println("IO Exception: " + e.getMessage());
} catch (ClassNotFoundException e) {
    System.out.println("Class not found.");
}
}
```

}**OUTPUT:**

```
Student serialized successfully!
Student deserialized:
ID: 101
Name: Akshara
GPA: 9.1
BUILD SUCCESSFUL (total time: 0 seconds)
```

Figure 2: Medium Level



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HARD LEVEL PROBLEM

```
package exp.pkg5;

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

public class Exp5 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        while (true) {
            System.out.println("Menu:\n1. Add Employee\n2. Display All\n3. Exit");
            System.out.print("Enter choice: ");
            int choice = sc.nextInt();
            sc.nextLine();
            if (choice == 1) {
                try {
                    BufferedWriter bw = new BufferedWriter(new FileWriter("employees.txt", true));
                    System.out.print("Name: ");
                    String name = sc.nextLine();
                    System.out.print("ID: ");
                    int id = sc.nextInt();
                    sc.nextLine();
                    System.out.print("Designation: ");
                }
            }
        }
    }
}
```



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```
String desig = sc.nextLine();
System.out.print("Salary: ");
double sal = sc.nextDouble();
sc.nextLine();
bw.write(name + "," + id + "," + desig + "," + sal);
bw.newLine();
bw.close();
System.out.println("Employee added successfully!");
} catch (IOException e) {
    System.out.println("Error writing to file.");
}
} else if (choice == 2) {
try {
    BufferedReader br = new BufferedReader(new FileReader("employees.txt"));
    String line;
    System.out.println("Employee Records:");
    while ((line = br.readLine()) != null) {
        String[] data = line.split(",");
        System.out.println("Name: " + data[0] + ", ID: " + data[1] + ", Designation: " +
data[2] + ", Salary: " + data[3]);
    }
    br.close();
} catch (IOException e) {
    System.out.println("Error reading file.");
}
} else if (choice == 3) {
System.out.println("Exiting...");
```



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```
        break;  
    } else {  
        System.out.println("Invalid choice.");  
    }  
}  
}  
}
```

OUTPUT:

```
Menu:  
1. Add Employee  
2. Display All  
3. Exit  
Enter choice: 1  
Name: Akshara  
ID: 11410  
Designation: Software Engineer  
Salary: 39000  
Employee added successfully!  
Menu:  
1. Add Employee  
2. Display All  
3. Exit  
Enter choice: 2  
Employee Records:  
Name: Akshara, ID: 11410, Designation: Software Engineer, Salary: 39000.0  
Menu:  
1. Add Employee  
2. Display All  
3. Exit  
Enter choice: 3  
Exiting...  
BUILD SUCCESSFUL (total time: 30 seconds)
```