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**Project Based Learning in Java**

**Experiment 8**

**23CSP-304**

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## Experiment 8: Object Serialization and Deserialization in Java

### Aim

To create a Java program that serializes and deserializes a **Student** object containing id, name, and GPA, using object streams and proper exception handling.

### Objectives

- Implement **serialization** and **deserialization** using Java I/O streams.
- Understand how objects are converted into a byte stream and reconstructed.
- Handle exceptions like **FileNotFoundException**, **IOException**, and **ClassNotFoundException**.
- Demonstrate file operations using **ObjectOutputStream** and **ObjectInputStream**.
- Strengthen understanding of persistent object storage in Java.

### Code Implementation

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

```
// Step 1: Define a Student class implementing Serializable
class Student implements Serializable {
    private static final long serialVersionUID = 1L;
```

```
    private int id;
    private String name;
    private double gpa;
```

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

```
    public int getId() { return id; }
    public String getName() { return name; }
    public double getGpa() { return gpa; }
```

```
@Override
    public String toString() {
        return "ID: " + id + "\nName: " + name + "\nGPA: " + gpa;
    }
}
```

```
public class SerializationDemo {
    public static void main(String[] args) {
```

```
        String fileName = "student.ser";
        // Step 2: Create a Student object
        Student student = new Student(101, "Alice", 9.1);
```



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```
// Step 3: Serialize the object
try (ObjectOutputStream oos = new ObjectOutputStream(new
FileOutputStream(fileName))) {
oos.writeObject(student);
System.out.println("Student serialized successfully!");
} catch (FileNotFoundException e) {
System.out.println("Error: File not found!");
} catch (IOException e) {
System.out.println("Error: Unable to serialize object!");
e.printStackTrace();
}
```

```
// Step 4: Deserialize the object
try (ObjectInputStream ois = new ObjectInputStream(new
FileInputStream(fileName))) {
Student deserializedStudent = (Student) ois.readObject();
System.out.println("\nStudent deserialized:");
System.out.println(deserializedStudent);
} catch (FileNotFoundException e) {
System.out.println("Error: File not found!");
} catch (IOException e) {
System.out.println("Error: Unable to deserialize object!");
e.printStackTrace();
} catch (ClassNotFoundException e) {
System.out.println("Error: Class not found!");
}}}
```

## Output

```
Student serialized successfully!
```

```
Student deserialized:
```

```
ID: 101
```

```
Name: Alice
```

```
GPA: 9.1
```

## Learning Outcomes

- Learned how to **serialize and deserialize** Java objects.
- Understood how to use **Object streams** (ObjectOutputStream and ObjectInputStream).
- Implemented **exception handling** for file operations.
- Gained insight into **object persistence and data recovery** in Java.
- Practiced writing robust Java programs that interact with the filesystem.