Experiment 6

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1. Problem 6.1: 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.

Implementation/Code:

```
import java.util.ArrayList;
import java.util.Scanner;

class Employee {
    int id;
    String name;
    double salary;

    public Employee(int id, String name, double salary) {
        this.id = id;
        this.name = name;
        this.salary = salary;
    }

    public String toString() {
        return "ID: " + id + ", Name: " + name + ", Salary: $" + salary;
    }
}

public class EmployeeManagement {
    private static ArrayList<Employee> employeeList = new ArrayList<>();
    private static Scanner scanner = new Scanner(System.in);
```

```
    public static void main(String[] args) {
        while (true) {
            System.out.println("\nEmployee Management System");

            System.out.println("1. Add Employee");
            System.out.println("2. Update Employee");
            System.out.println("3. Remove Employee");
            System.out.println("4. Search Employee");
            System.out.println("5. Display All Employees");
            System.out.println("6. Exit");
            System.out.print("Choose an option: ");

            int choice = scanner.nextInt();
            scanner.nextLine();

            switch (choice) {
                case 1 -> addEmployee();
                case 2 -> updateEmployee();
                case 3 -> removeEmployee();
                case 4 -> searchEmployee();
                case 5 -> displayEmployees();
                case 6 -> {
                    System.out.println("Exiting program. Goodbye!");
                    return;
                }
                default -> System.out.println("Invalid choice! Please try again.");
            }
        }
    }

    private static void addEmployee() {
        System.out.print("Enter Employee ID: ");
        int id = scanner.nextInt();
        scanner.nextLine();
        System.out.print("Enter Employee Name: ");
        String name = scanner.nextLine();
        System.out.print("Enter Employee Salary: ");
        double salary = scanner.nextDouble();

        employeeList.add(new Employee(id, name, salary));
        System.out.println("Employee added successfully!");
    }
```

```
private static void updateEmployee() {
    System.out.print("Enter Employee ID to update: ");
    int id = scanner.nextInt();

    scanner.nextLine();
    for (Employee emp : employeeList) {
        if (emp.id == id) {
            System.out.print("Enter new Name: ");
            emp.name = scanner.nextLine();
            System.out.print("Enter new Salary: ");
            emp.salary = scanner.nextDouble();
            System.out.println("Employee updated successfully!");
            return;
        }
    }
    System.out.println("Employee ID not found!");
}

private static void removeEmployee() {
    System.out.print("Enter Employee ID to remove: ");
    int id = scanner.nextInt();

    for (Employee emp : employeeList) {
        if (emp.id == id) {
            employeeList.remove(emp);
            System.out.println("Employee removed successfully!");
            return;
        }
    }
    System.out.println("Employee ID not found!");
}

private static void searchEmployee() {
    System.out.print("Enter Employee ID to search: ");
    int id = scanner.nextInt();

    for (Employee emp : employeeList) {
        if (emp.id == id) {
            System.out.println("Employee Found: " + emp);
            return;
        }
    }
```

```
            System.out.println("Employee ID not found!");
        }

        private static void displayEmployees() {

    if (employeeList.isEmpty()) {
            System.out.println("No employees found!");
        } else {
            System.out.println("Employee List:");
            for (Employee emp : employeeList) {
                System.out.println(emp);
            }
        }
    }
}
```

OUTPUT :

```
Employee Management System
1. Add Employee
2. Display All Employees
3. Exit
Choose an option: 1
Enter Employee ID: 101
Enter Employee Name: John Doe
Enter Employee Designation: Manager
Enter Employee Salary: 75000
Employee added successfully!

Choose an option: 2
Employee List:
ID: 101, Name: John Doe, Designation: Manager, Salary: $75000.0
```

Figure 6.1

2. Problem 6.2 :- Create a Java program to serialize and deserialize a Student object

Implementation Code :-

```
import java.io.*;

// Serializable Student class
class Student implements Serializable {
```

```
    private static final long serialVersionUID = 1L;
    int id;
    String name;
    double grade;

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

    public String toString() {
        return "ID: " + id + ", Name: " + name + ", Grade: " + grade;
    }
}

public class StudentSerialization {
    public static void main(String[] args) {
        String filename = "student.ser";

        // Serialize Student object
        Student student = new Student(101, "Alice", 92.5);
        serializeStudent(student, filename);

        // Deserialize Student object
        Student deserializedStudent = deserializeStudent(filename);
        System.out.println("Deserialized Student: " + deserializedStudent);
    }

    private static void serializeStudent(Student student, String filename) {
        try (ObjectOutputStream out = new ObjectOutputStream(new
FileOutputStream(filename))) {
            out.writeObject(student);
            System.out.println("Student object serialized successfully.");
        } catch (IOException e) {
            System.out.println("Serialization error: " + e.getMessage());
        }
    }

    private static Student deserializeStudent(String filename) {
        try (ObjectInputStream in = new ObjectInputStream(new FileInputStream(filename))) {
```

```
        return (Student) in.readObject();

    } catch (IOException | ClassNotFoundException e) {

        System.out.println("Deserialization error: " + e.getMessage());
            return null;
        }
    }
}
```

OUTPUT :-

```
Student object serialized successfully.
Deserialized Student: ID: 101, Name: Alice, Grade: 92.5


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

Figure 6.2

3. Problem 6.3 : 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()).

Implementation Code :-

```
import java.util.ArrayList;
import java.util.Scanner;

public class AutoboxingUnboxingSum {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        ArrayList<Integer> numbers = new ArrayList<>();

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

        while (true) {
```

```
            String input = scanner.nextLine();
            if (input.equalsIgnoreCase("done")) break;
            try {
                numbers.add(Integer.parseInt(input)); // Autoboxing
            } catch (NumberFormatException e) {
                System.out.println("Invalid input! Please enter a valid integer.");
            }
        }

        int sum = calculateSum(numbers);
        System.out.println("Sum of the entered numbers: " + sum);
    }

    private static int calculateSum(ArrayList<Integer> numbers) {
        int sum = 0;
        for (Integer num : numbers) {
            sum += num; // Unboxing
        }
        return sum;
    }
}
```

OUTPUT :-

```
Enter numbers (type 'done' to finish):
10
20
30
done
Sum of the entered numbers: 60
```

Figure 6.3