

Experiment 4

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Subject: PBL with Java

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Aim: Develop Java programs using core concepts such as data structures, collections, and multithreading to manage and manipulate data.

Objective: Write a Java program to implement an ArrayList that stores employee details (ID, Name, and Salary). Allow users to add, update, remove, and search employees.

Algorithm:

1.) Define Data Structure:

- Create an Employee class/structure with:
 - Integer id
 - String name
 - Double salary

2.) Initialize Data Storage:

- Create an empty list (e.g., ArrayList<Employee>) to hold employee objects.

3.) Main Loop:

- Repeat until the user chooses to exit:
 - 1) Display Menu Options:
 - "1. Add Employee"
 - "2. Update Employee"
 - "3. Remove Employee"
 - "4. Search Employee"
 - "5. Display All Employees"
 - "0. Exit"
 - 2) **Input Choice:**
 - Read the user's menu option (e.g., as an integer).

4.) Process User Choice:

- **If choice is 1 (Add Employee):**
 1. Prompt the user to enter Employee ID.
 2. Prompt the user to enter Employee Name.
 3. Prompt the user to enter Employee Salary.
 4. Create a new Employee object with the provided details.
 5. Add the new employee to the list.
 6. Display a success message.
- **If choice is 2 (Update Employee):**
 1. Prompt the user to enter the Employee ID to update.
 2. Search for the employee in the list using the given ID.
 3. If the employee exists:
 - Prompt the user to enter the new Name.
 - Prompt the user to enter the new Salary.

- Update the employee's name and salary.
- Display a success message.
- 4. **Else:**
 - Display a "not found" message.
- **If choice is 3 (Remove Employee):**
 1. Prompt the user to enter the Employee ID to remove.
 2. Search for the employee in the list using the given ID.
 3. If the employee exists:
 - Remove the employee from the list.
 - Display a success message.
 4. **Else:**
 - Display a "not found" message.
- **If choice is 4 (Search Employee):**
 1. Prompt the user to enter the Employee ID to search.
 2. Search for the employee in the list using the given ID.
 3. If the employee exists:
 - Display the employee's details.
 4. **Else:**
 - Display a "not found" message.
- **If choice is 5 (Display All Employees):**
 1. If the employee list is empty:
 - Display a message indicating no employees to show.
 2. **Else:**
 - Iterate over the list and display each employee's details.
- **If choice is 0 (Exit):**
 - Terminate the program loop.

5.) End Program

Code:

```
import java.util.ArrayList;
import java.util.Scanner;
class Employee {
    private int id;
    private String name;
    private double salary;
    public Employee(int id, String name, double salary) {
        this.id = id;
        this.name = name;
        this.salary = salary;
    }
    public int getId() { return id; }
    public String getName() { return name; }
    public double getSalary() { return salary; }
    public void setName(String name) { this.name = name; }
    public void setSalary(double salary) { this.salary = salary; }
    @Override
    public String toString() {
        return "Employee ID: " + id + ", Name: " + name + ", Salary: " + salary;
    }
}
public class EmployeeManagement {
```



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```
private static ArrayList<Employee> employees = new ArrayList<>();  
private static Scanner scanner = new Scanner(System.in);
```

```
public static void main(String[] args) {  
    int choice;  
    do {  
        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("0. Exit");  
        System.out.print("Enter your choice: ");  
        choice = scanner.nextInt();  
        scanner.nextLine();  
        switch(choice) {  
            case 1: addEmployee(); break;  
            case 2: updateEmployee(); break;  
            case 3: removeEmployee(); break;  
            case 4: searchEmployee(); break;  
            case 5: displayEmployees(); break;  
            case 0: System.out.println("Exiting..."); break;  
            default: System.out.println("Invalid choice. Try again.");  
        }  
    } while(choice != 0);  
}  
  
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();  
    scanner.nextLine();  
    employees.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();  
    Employee emp = findEmployeeById(id);  
    if(emp != null) {  
        System.out.print("Enter new Name: ");  
        String name = scanner.nextLine();  
        System.out.print("Enter new Salary: ");  
        double salary = scanner.nextDouble();  
        scanner.nextLine();  
        emp.setName(name);  
        emp.setSalary(salary);  
        System.out.println("Employee updated successfully.");  
    }  
}
```

```
    } else {
        System.out.println("Employee not found.");
    }
}

private static void removeEmployee() {
    System.out.print("Enter Employee ID to remove: ");
    int id = scanner.nextInt();
    scanner.nextLine();
    Employee emp = findEmployeeById(id);
    if(emp != null) {
        employees.remove(emp);
        System.out.println("Employee removed successfully.");
    } else {
        System.out.println("Employee not found.");
    }
}

private static void searchEmployee() {
    System.out.print("Enter Employee ID to search: ");
    int id = scanner.nextInt();
    scanner.nextLine();
    Employee emp = findEmployeeById(id);
    if(emp != null) {
        System.out.println("Employee found: " + emp);
    } else {
        System.out.println("Employee not found.");
    }
}

private static void displayEmployees() {
    if(employees.isEmpty()) {
        System.out.println("No employees to display.");
    } else {
        System.out.println("Employee List:");
        for(Employee emp : employees) {
            System.out.println(emp);
        }
    }
}

private static Employee findEmployeeById(int id) {
    for(Employee emp : employees) {
        if(emp.getId() == id) {
            return emp;
        }
    }
    return null;
}
}
```

Learning Outcomes:

1. Demonstrate: Apply key concepts to real-world scenarios to showcase understanding.
2. Analyze: Critically evaluate information, identify patterns, and draw meaningful conclusions.



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3. Create: Develop original work, including presentations, reports, or projects, to exhibit comprehension and skills.
4. Communicate: Convey ideas and findings effectively through oral and written communication.
5. Collaborate: Contribute to group projects and exhibit strong teamwork capabilities in a collaborative environment.

Output:

```
Employee Management System
1. Add Employee
2. Update Employee
3. Remove Employee
4. Search Employee
5. Display All Employees
0. Exit
Enter your choice: 5
Employee List:
Employee ID: 17209, Name: Vishwas, Salary: 1500000.0
Employee ID: 17134, Name: Rajat, Salary: 1150000.0
```