Assignment 5

1. Design and implement a class named `InstanceCounter` to track and count the number of instances created from this class.

Code :-

```java
package project;

public class InstanceCounter {

//static variable
private static int instanceCount;

static {
instanceCount = 0;
System.out.println("Static initializer: Instance count initialized.");
}

// Non-static variable
private int id;

// Constructor increments the instance count when a new object is created
public InstanceCounter() {
instanceCount++;
this.id = instanceCount;
System.out.println("Constructor: Created instance #" + id);
}

// Static method to return the number of instances created
public static int getInstanceCount() {
 return instanceCount;
}

// Getter id
public int getId() {
return id;
}

// Setterr id
public void setId(int id) {
this.id = id;
}

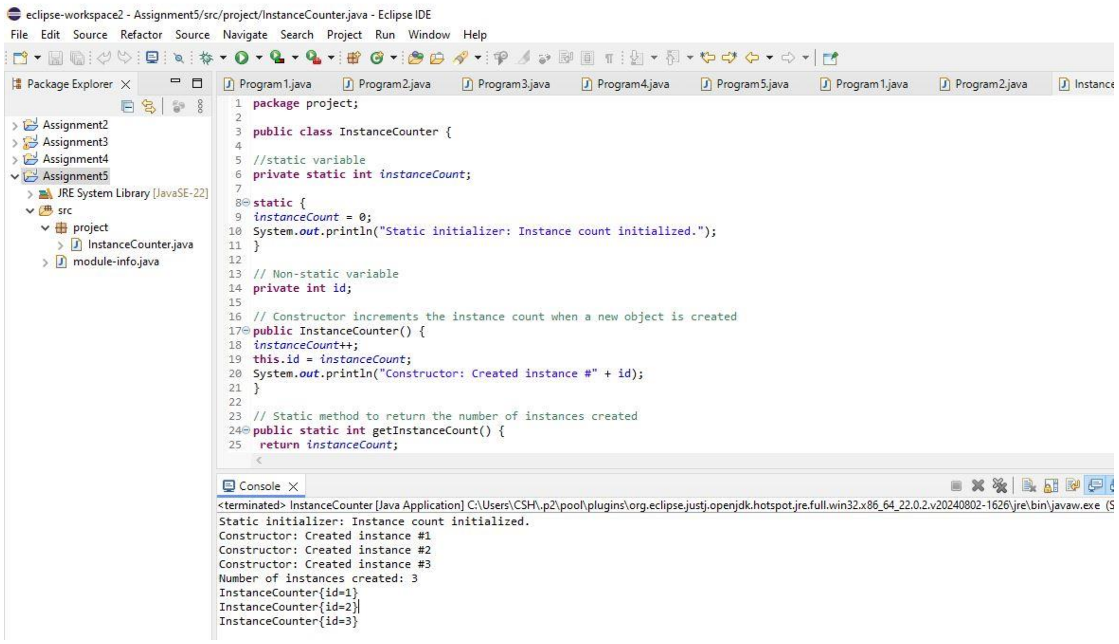
// toString()
public String toString() {
return "InstanceCounter{id=" + id + "}";
}

// Main method
public static void main(String[] args) {
// Create new instances
InstanceCounter obj1 = new InstanceCounter();
InstanceCounter obj2 = new InstanceCounter();
InstanceCounter obj3 = new InstanceCounter();

// Output of instances created
System.out.println("Number of instances created: " +
InstanceCounter.getInstanceCount());

// Display
System.out.println(obj1);
System.out.println(obj2);
System.out.println(obj3);
                 }
             }
```

Output –



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// Constructor increments the instance count when a new object is created
public InstanceCounter() {
instanceCount++;
this.id = instanceCount;
System.out.println("Constructor: Created instance #" + id);
}

// Static method to return the number of instances created
public static int getInstanceCount() {
 return instanceCount;
```

```
<terminated> InstanceCounter [Java Application] C:\Users\CSH\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe
Static initializer: Instance count initialized.
Constructor: Created instance #1
Constructor: Created instance #2
Constructor: Created instance #3
Number of instances created: 3
InstanceCounter{id=1}
InstanceCounter{id=2}
InstanceCounter{id=3}
```

2. Design and implement a class named `Employee` to manage employee data for a company. The class should include fields to keep track of the total number of employees and the total salary expense, as well as individual employee details such as their ID, name, and salary.

   The class should have methods to:

   - Retrieve the total number of employees (`getTotalEmployees()`)
   - Apply a percentage raise to the salary of all employees (`applyRaise(double percentage)`)
   - Calculate the total salary expense, including any raises (`calculateTotalSalaryExpense()`)
   - Update the salary of an individual employee (`updateSalary(double newSalary)`)

Understand the problem statement and use static and non-static fields and methods appropriately. Implement static and non-static initializers, constructors, getter and setter methods, and a `toString()` method to handle the initialization and representation of employee data.

Write a menu-driven program in the `main` method to test the functionalities.

Code :-

```
package project;
import java.util.Scanner;
public class Employee {

// Static fields
private static int totalEmployees = 0;
private static double totalSalaryExpense = 0.0;

// Non-static fields
private int employeeId;
private String name;
private double salary;

static {
System.out.println("Employee management system started...");
 }

// Constructor
public Employee(int employeeId, String name, double salary) {
this.employeeId = employeeId;
this.name = name;
this.salary = salary;
totalEmployees++;
totalSalaryExpense += salary;
 }

// Getters and Setters
public int getEmployeeId() {
return employeeId;
}

public void setEmployeeId(int employeeId) {
this.employeeId = employeeId;
}

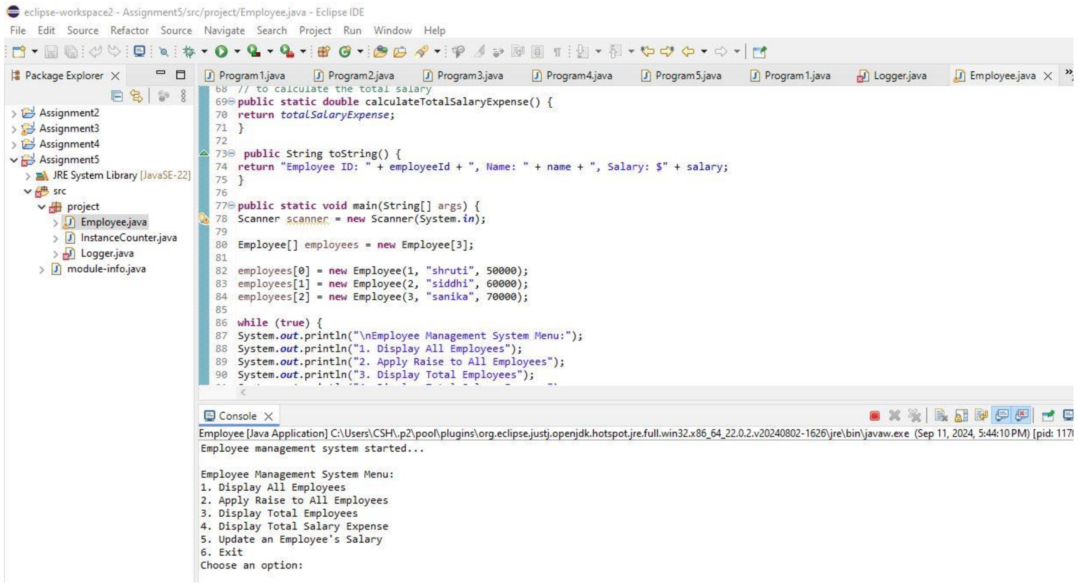
public String getName() {
return name;
}

public void setName(String name) {
this.name = name;
}

public double getSalary() {
return salary;
}
```

```java
public void setSalary(double salary) {

totalSalaryExpense -= this.salary;  // Subtract current salary
this.salary = salary;
totalSalaryExpense += salary;  // Add new salary
}

// Static method
public static int getTotalEmployees() {
return totalEmployees;
}


public static void applyRaise(Employee[] employees, double percentage) {
for (Employee emp : employees) {
double newSalary = emp.salary + (emp.salary * percentage / 100);
emp.setSalary(newSalary);  // Update the employee's salary
}
}

// to calculate the total salary
public static double calculateTotalSalaryExpense() {
return totalSalaryExpense;
}

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

public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);

Employee[] employees = new Employee[3];

employees[0] = new Employee(1, "shruti", 50000);
employees[1] = new Employee(2, "siddhi", 60000);
employees[2] = new Employee(3, "sanika", 70000);

while (true) {
System.out.println("\nEmployee Management System Menu:");
System.out.println("1. Display All Employees");
System.out.println("2. Apply Raise to All Employees");
System.out.println("3. Display Total Employees");
System.out.println("4. Display Total Salary Expense");
System.out.println("5. Update an Employee's Salary");
System.out.println("6. Exit");
System.out.print("Choose an option: ");
int choice = scanner.nextInt();


      }
}

}
```

Output



```java
// to calculate the total salary
public static double calculateTotalSalaryExpense() {
return totalSalaryExpense;
}

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

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

Employee [Java Application] C:\Users\CSH\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe (Sep 11, 2024, 5:44:10 PM) [pid: 117

```
Employee management system started...

Employee Management System Menu:
1. Display All Employees
2. Apply Raise to All Employees
3. Display Total Employees
4. Display Total Salary Expense
5. Update an Employee's Salary
6. Exit
Choose an option:
```