

Lab Report 2

Submitted to:

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Department of CSE
Summer'24

Course code: CSE 2104

Course Title: Object Oriented Programming Lab

Section: 01

University of Liberal Arts Bangladesh

June 23, 2024

Problem 01

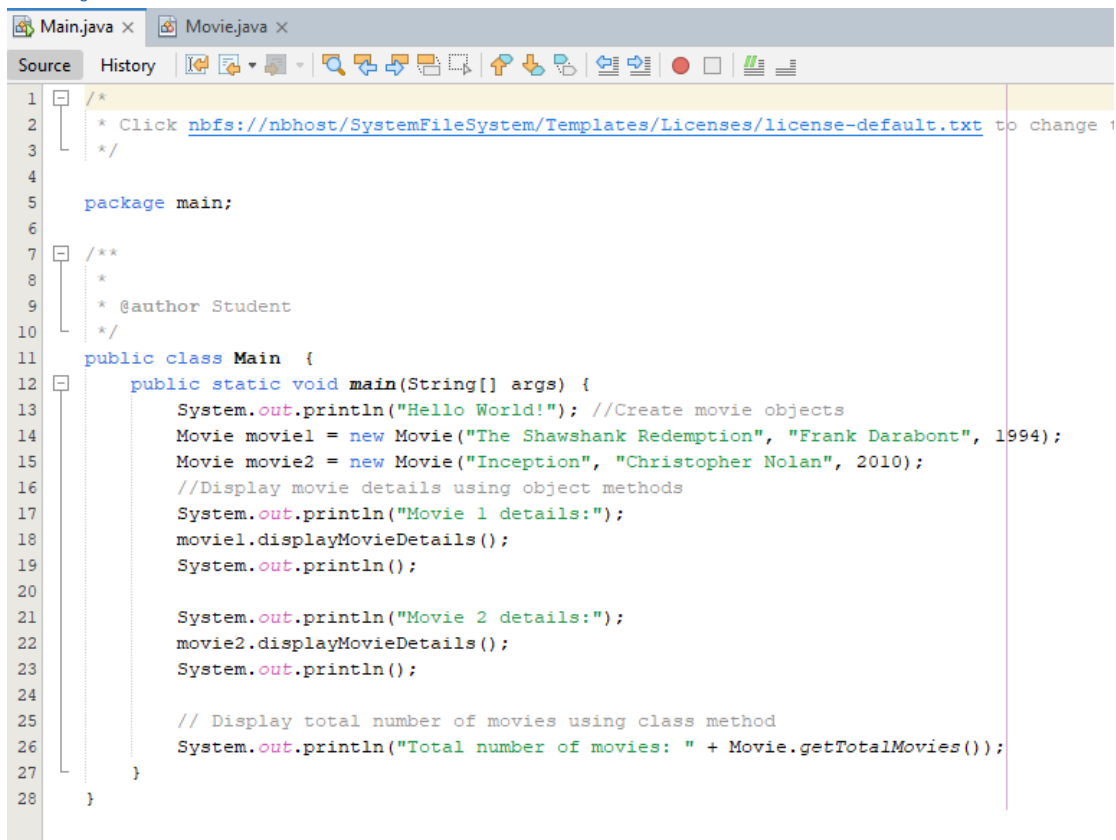
Task Description

Create a Main class and a Movie class to manage movie details. The Main class should create two Movie objects and display their details. The Movie class should have a constructor to initialize movie details and a method to display these details. Additionally, the Movie class should have a class method to count the total number of movies created.

Code Screenshot

Input

Main.java

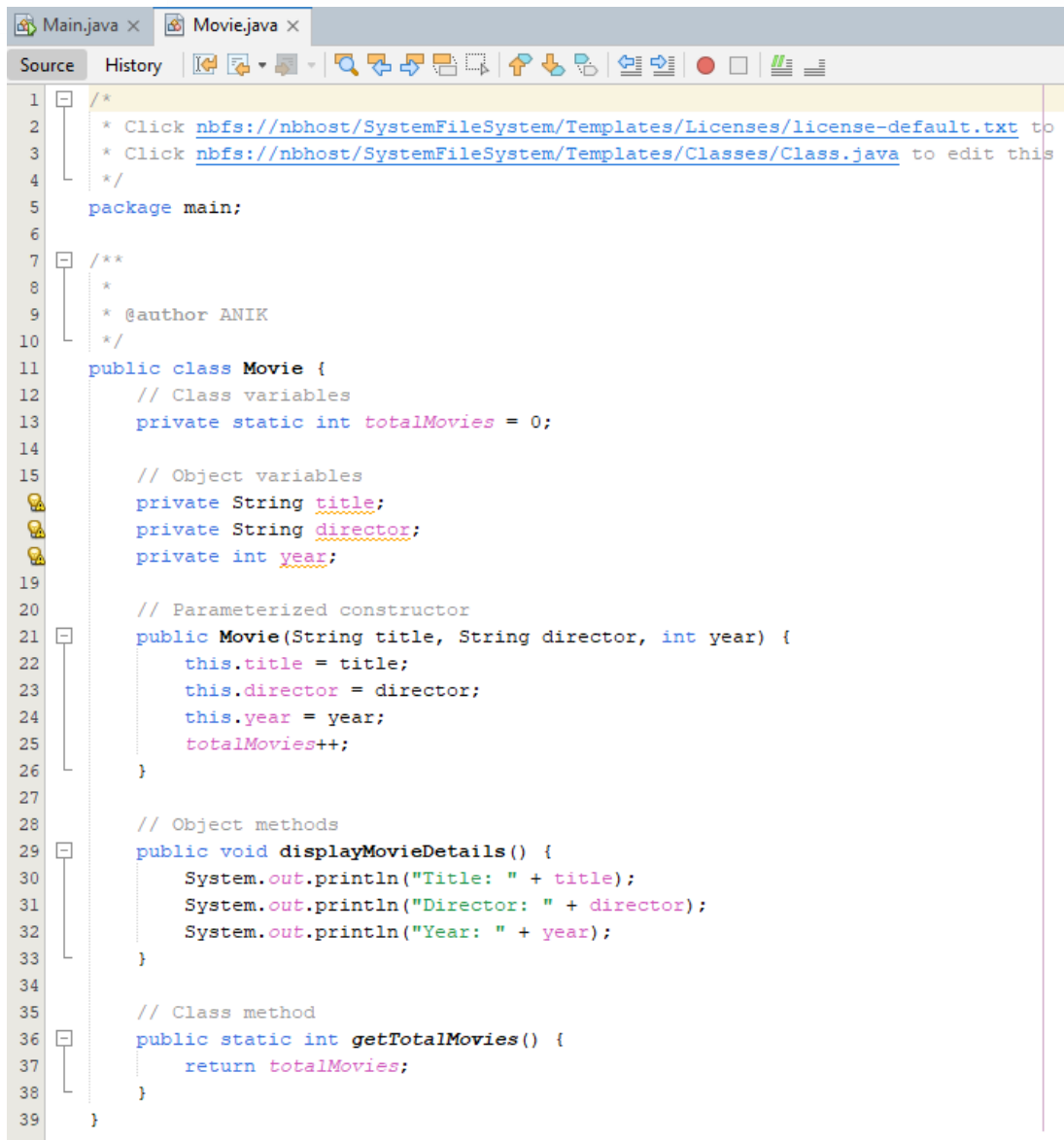


```
1  /*
2  * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change the license of the code.
3  */
4
5  package main;
6
7  /**
8   *
9   * @author Student
10  */
11  public class Main {
12      public static void main(String[] args) {
13          System.out.println("Hello World!"); //Create movie objects
14          Movie movie1 = new Movie("The Shawshank Redemption", "Frank Darabont", 1994);
15          Movie movie2 = new Movie("Inception", "Christopher Nolan", 2010);
16          //Display movie details using object methods
17          System.out.println("Movie 1 details:");
18          movie1.displayMovieDetails();
19          System.out.println();
20
21          System.out.println("Movie 2 details:");
22          movie2.displayMovieDetails();
23          System.out.println();
24
25          // Display total number of movies using class method
26          System.out.println("Total number of movies: " + Movie.getTotalMovies());
27      }
28  }
```

Movie.java

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```
1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to
3   * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this
4   */
5   package main;
6
7   /**
8    *
9    * @author ANIK
10   */
11  public class Movie {
12      // Class variables
13      private static int totalMovies = 0;
14
15      // Object variables
16      private String title;
17      private String director;
18      private int year;
19
20      // Parameterized constructor
21      public Movie(String title, String director, int year) {
22          this.title = title;
23          this.director = director;
24          this.year = year;
25          totalMovies++;
26      }
27
28      // Object methods
29      public void displayMovieDetails() {
30          System.out.println("Title: " + title);
31          System.out.println("Director: " + director);
32          System.out.println("Year: " + year);
33      }
34
35      // Class method
36      public static int getTotalMovies() {
37          return totalMovies;
38      }
39  }
```

Output

```
Output - Run (Main)
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 2\problem_01\Main\Main; "JAVA_HOME=
Scanning for projects...

-----< com.mycompany:Main >-----
Building Main 1.0-SNAPSHOT
from pom.xml
-----[ jar ]-----

--- resources:3.3.1:resources (default-resources) @ Main ---
skip non existing resourceDirectory F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 2\

--- compiler:3.11.0:compile (default-compile) @ Main ---
Nothing to compile - all classes are up to date

--- exec:3.1.0:exec (default-cli) @ Main ---
Hello World!
Movie 1 details:
Title: The Shawshank Redemption
Director: Frank Darabont
Year: 1994

Movie 2 details:
Title: Inception
Director: Christopher Nolan
Year: 2010

Total number of movies: 2

BUILD SUCCESS

Total time: 0.559 s
Finished at: 2024-06-23T22:13:52+06:00
```

Practice problem 01

Task Description :

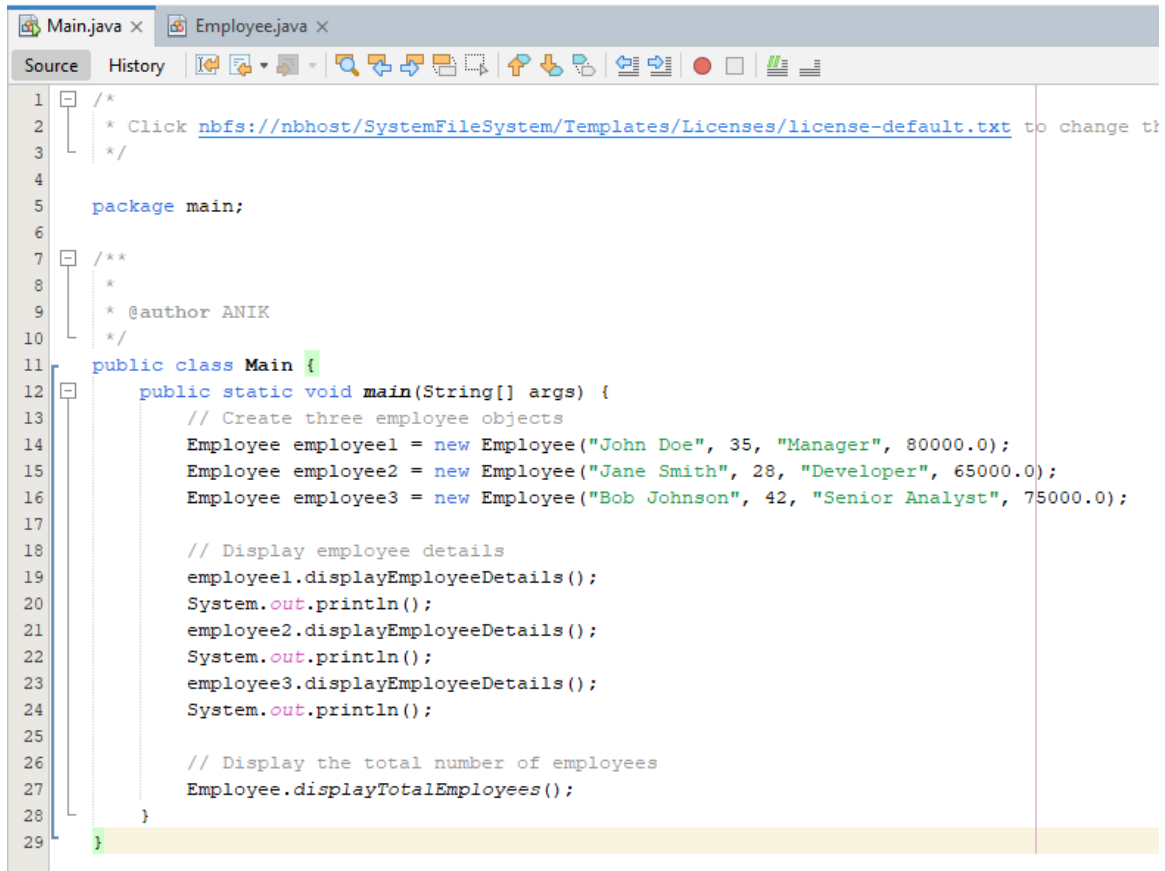
I need to create an Employee class with properties like name, age, designation, and salary. The class should have a constructor to initialize these properties and methods to display employee details and count the total number of employees. Implement this in Java.

Code Screenshot :

Input:

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The screenshot shows an IDE with two tabs: 'Main.java' and 'Employee.java'. The 'Main.java' tab is active, displaying the following code:

```
1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change t!
3   */
4
5  package main;
6
7  /**
8   *
9   * @author ANIK
10  */
11  public class Main {
12      public static void main(String[] args) {
13          // Create three employee objects
14          Employee employee1 = new Employee("John Doe", 35, "Manager", 80000.0);
15          Employee employee2 = new Employee("Jane Smith", 28, "Developer", 65000.0);
16          Employee employee3 = new Employee("Bob Johnson", 42, "Senior Analyst", 75000.0);
17
18          // Display employee details
19          employee1.displayEmployeeDetails();
20          System.out.println();
21          employee2.displayEmployeeDetails();
22          System.out.println();
23          employee3.displayEmployeeDetails();
24          System.out.println();
25
26          // Display the total number of employees
27          Employee.displayTotalEmployees();
28      }
29  }
```

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```

1  /*
2  * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change the
3  * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
4  */
5  package main;
6
7  /**
8   *
9   * @author ANIK
10  */
11  public class Employee {
12      // Class variables
13      private static String companyName = "Acme Inc.";
14      private static String companyAddress = "123 Main St, Anytown USA";
15      private static int totalEmployees = 0;
16
17      // Object variables
18      private String name;
19      private int age;
20      private String designation;
21      private double salary;
22
23      // Parameterized constructor
24      public Employee(String name, int age, String designation, double salary) {
25          this.name = name;
26          this.age = age;
27          this.designation = designation;
28          this.salary = salary;
29          totalEmployees++;
30      }
31
32      // Object method to display employee details
33      public void displayEmployeeDetails() {
34          System.out.println("Name: " + name);
35          System.out.println("Age: " + age);
36          System.out.println("Designation: " + designation);
37          System.out.println("Salary: $" + salary);
38          System.out.println("Company Name: " + companyName);
39          System.out.println("Company Address: " + companyAddress);
40      }
41
42      // Class method to display the total number of employees
43      public static void displayTotalEmployees() {
44          System.out.println("Total number of employees: " + totalEmployees);
45      }
46  }
47

```

Output:

```

Output - Run (Main)
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 2\practice problem 1\Main; "JAVA_HOME=C:\Pro
Scanning for projects...

-----< com.mycompany:Main >-----
Building Main 1.0-SNAPSHOT
from pom.xml
-----[ jar ]-----

--- resources:3.3.1:resources (default-resources) @ Main ---
skip non existing resourceDirectory F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 2\practice p

--- compiler:3.11.0:compile (default-compile) @ Main ---
Nothing to compile - all classes are up to date

--- exec:3.1.0:exec (default-cli) @ Main ---
Name: John Doe
Age: 35
Designation: Manager
Salary: $80000.0
Company Name: Acme Inc.
Company Address: 123 Main St, Anytown USA

Name: Jane Smith
Age: 28
Designation: Developer
Salary: $65000.0
Company Name: Acme Inc.
Company Address: 123 Main St, Anytown USA

Name: Bob Johnson
Age: 42
Designation: Senior Analyst
Salary: $75000.0
Company Name: Acme Inc.
Company Address: 123 Main St, Anytown USA

Total number of employees: 3

BUILD SUCCESS

Total time: 0.558 s
Finished at: 2024-06-23T22:53:17+06:00
|

```

Practice problem 02

Task description :

I need to create a Book class with properties like title, author, and year. The class should have a constructor to initialize these properties and methods to display book details and count the total number of books. Implement this in Java.

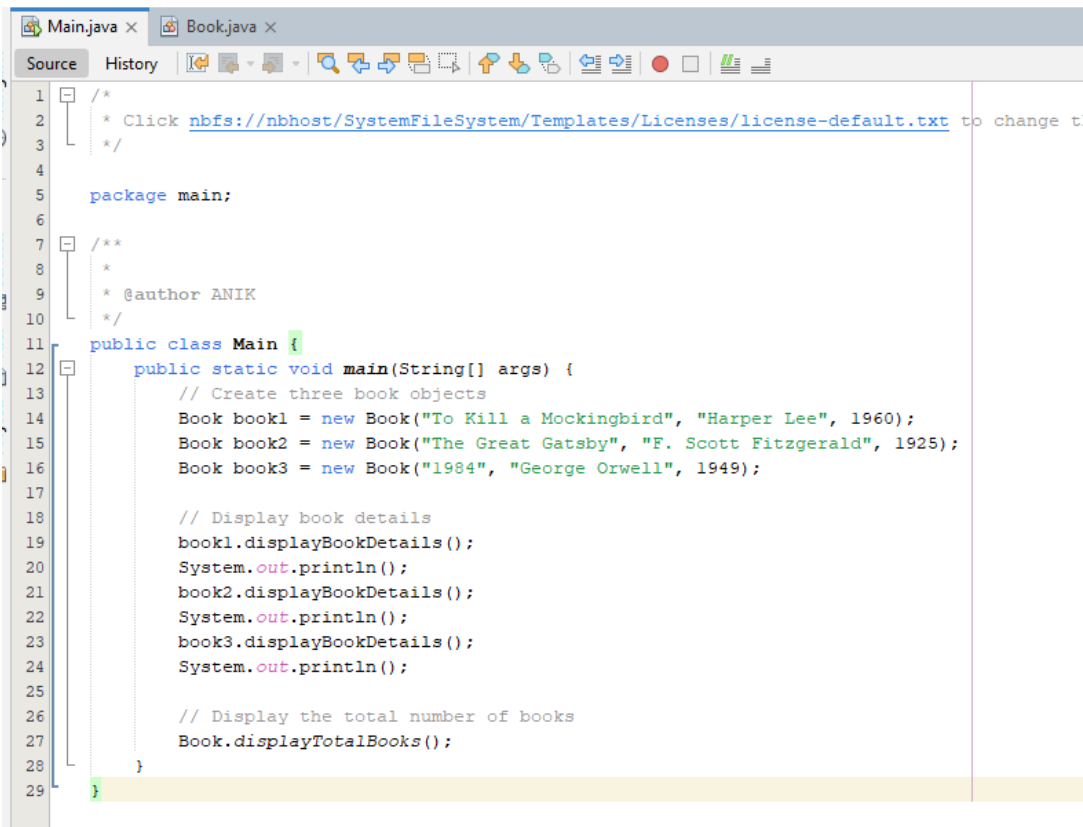
Code Screenshot :

Input:

Main.java

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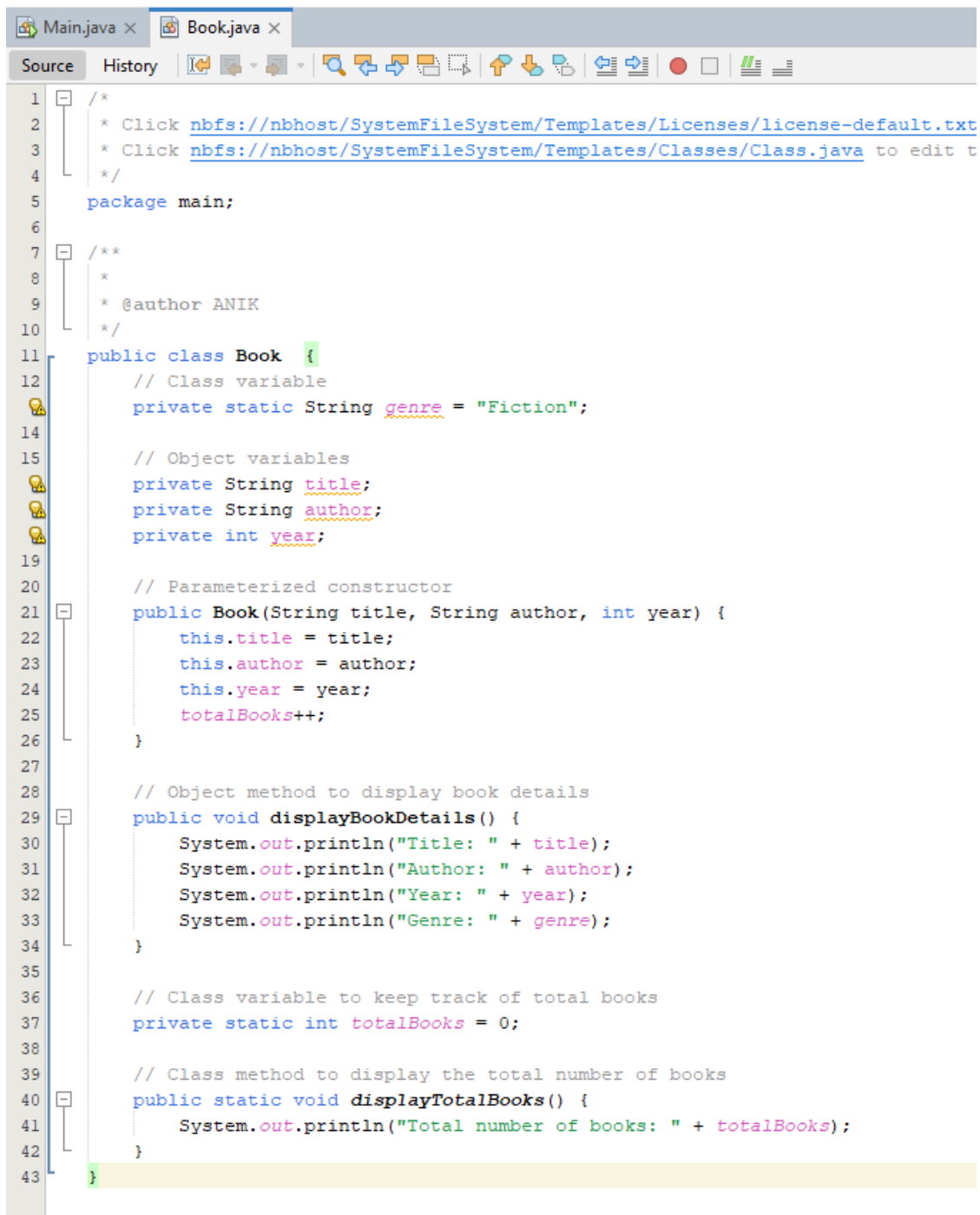
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```
1  /*
2  * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change the license
3  */
4
5  package main;
6
7  /**
8   *
9   * @author ANIK
10  */
11  public class Main {
12      public static void main(String[] args) {
13          // Create three book objects
14          Book book1 = new Book("To Kill a Mockingbird", "Harper Lee", 1960);
15          Book book2 = new Book("The Great Gatsby", "F. Scott Fitzgerald", 1925);
16          Book book3 = new Book("1984", "George Orwell", 1949);
17
18          // Display book details
19          book1.displayBookDetails();
20          System.out.println();
21          book2.displayBookDetails();
22          System.out.println();
23          book3.displayBookDetails();
24          System.out.println();
25
26          // Display the total number of books
27          Book.displayTotalBooks();
28      }
29  }
```


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```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt
3   * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit t
4   */
5   package main;
6
7   /**
8    *
9    * @author ANIK
10   */
11  public class Book {
12      // Class variable
13      private static String genre = "Fiction";
14
15      // Object variables
16      private String title;
17      private String author;
18      private int year;
19
20      // Parameterized constructor
21      public Book(String title, String author, int year) {
22          this.title = title;
23          this.author = author;
24          this.year = year;
25          totalBooks++;
26      }
27
28      // Object method to display book details
29      public void displayBookDetails() {
30          System.out.println("Title: " + title);
31          System.out.println("Author: " + author);
32          System.out.println("Year: " + year);
33          System.out.println("Genre: " + genre);
34      }
35
36      // Class variable to keep track of total books
37      private static int totalBooks = 0;
38
39      // Class method to display the total number of books
40      public static void displayTotalBooks() {
41          System.out.println("Total number of books: " + totalBooks);
42      }
43  }

```

Output:

```

Output - Run (Main)
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 2\practice problem 2\Main; "JAVA_HOME=C:\\P
Scanning for projects...

-----< com.mycompany:Main >-----
Building Main 1.0-SNAPSHOT
from pom.xml
-----[ jar ]-----

--- resources:3.3.1:resources (default-resources) @ Main ---
skip non existing resourceDirectory F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 2\practice

--- compiler:3.11.0:compile (default-compile) @ Main ---
Nothing to compile - all classes are up to date

--- exec:3.1.0:exec (default-cli) @ Main ---
Title: To Kill a Mockingbird
Author: Harper Lee
Year: 1960
Genre: Fiction

Title: The Great Gatsby
Author: F. Scott Fitzgerald
Year: 1925
Genre: Fiction

Title: 1984
Author: George Orwell
Year: 1949
Genre: Fiction

Total number of books: 3

BUILD SUCCESS

Total time: 0.565 s
Finished at: 2024-06-23T23:17:49+06:00
|

```

Practice problem 03

Task description :

I need to create a Student class with properties like id, name, department, and CGPA. The class should have a constructor to initialize these properties and methods to display student details and count the total number of students. Implement this in Java.

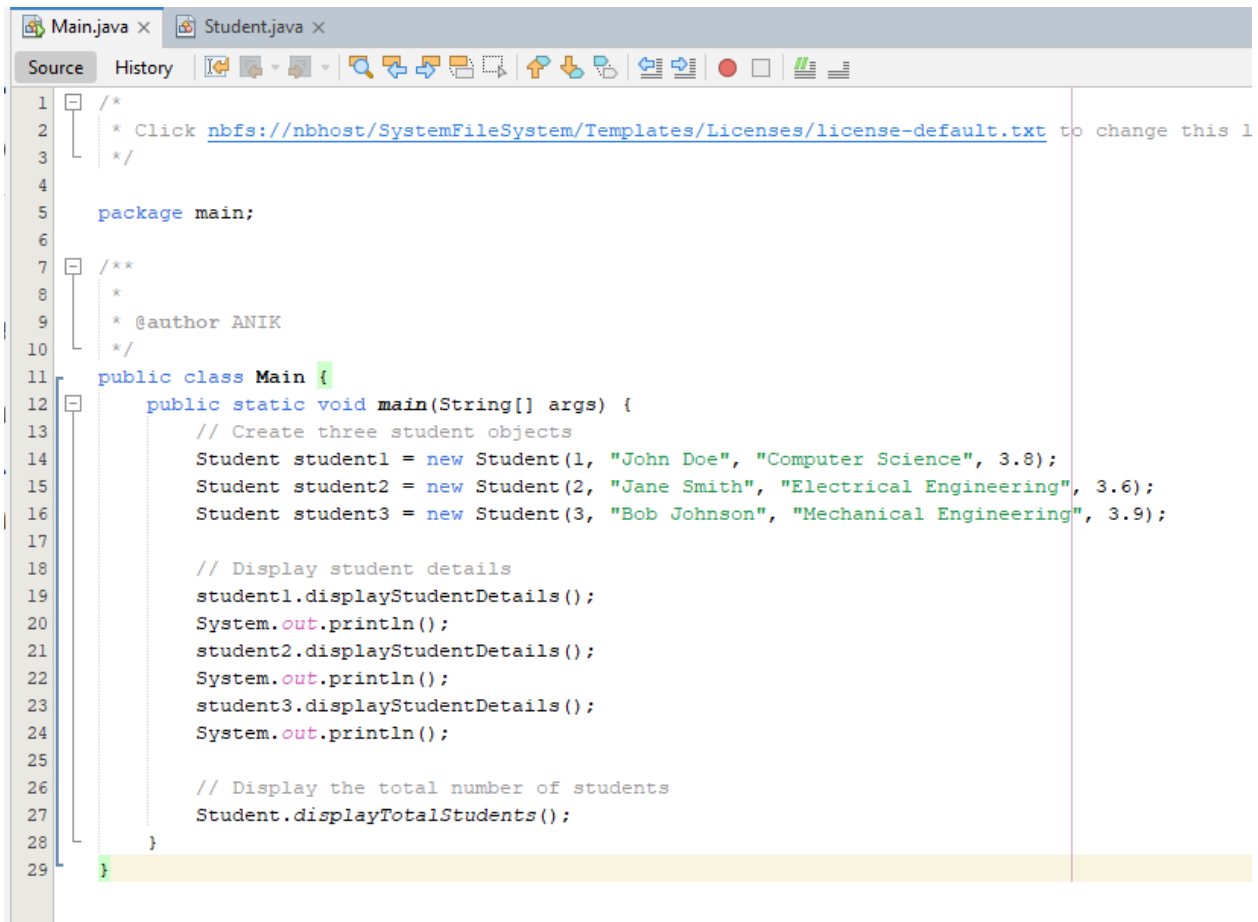
Code Screenshot:

Input:

Main.java

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The screenshot shows an IDE with two tabs: 'Main.java' and 'Student.java'. The 'Main.java' tab is active, displaying the following code:

```
1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this 1
3   */
4
5  package main;
6
7  /**
8   *
9   * @author ANIK
10  */
11 public class Main {
12     public static void main(String[] args) {
13         // Create three student objects
14         Student student1 = new Student(1, "John Doe", "Computer Science", 3.8);
15         Student student2 = new Student(2, "Jane Smith", "Electrical Engineering", 3.6);
16         Student student3 = new Student(3, "Bob Johnson", "Mechanical Engineering", 3.9);
17
18         // Display student details
19         student1.displayStudentDetails();
20         System.out.println();
21         student2.displayStudentDetails();
22         System.out.println();
23         student3.displayStudentDetails();
24         System.out.println();
25
26         // Display the total number of students
27         Student.displayTotalStudents();
28     }
29 }
```

Student.java

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```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change t
3   * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
4   */
5  package main;
6
7  /**
8   *
9   * @author ANIK
10  */
11 public class Student {
12     // Class variable
13     private static String university = "University of Technology";
14
15     // Object variables
16     private int id;
17     private String name;
18     private String department;
19     private double cgpa;
20
21     // Parameterized constructor
22     public Student(int id, String name, String department, double cgpa) {
23         this.id = id;
24         this.name = name;
25         this.department = department;
26         this.cgpa = cgpa;
27         totalStudents++;
28     }
29
30     // Object method to display student details
31     public void displayStudentDetails() {
32         System.out.println("Student ID: " + id);
33         System.out.println("Name: " + name);
34         System.out.println("Department: " + department);
35         System.out.println("CGPA: " + cgpa);
36         System.out.println("University: " + university);
37     }
38
39     // Class variable to keep track of total students
40     private static int totalStudents = 0;
41
42     // Class method to display the total number of students
43     public static void displayTotalStudents() {
44         System.out.println("Total number of students: " + totalStudents);
45     }
46 }

```

Output:

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Output - Run (Main)

```
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 2\practice problem 3\Main; "JAVA_HOME=C:\\Program
Scanning for projects...

-----< com.mycompany:Main >-----
Building Main 1.0-SNAPSHOT
  from pom.xml
-----[ jar ]-----

--- resources:3.3.1:resources (default-resources) @ Main ---
skip non existing resourceDirectory F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 2\practice proble

--- compiler:3.11.0:compile (default-compile) @ Main ---
Nothing to compile - all classes are up to date

--- exec:3.1.0:exec (default-cli) @ Main ---
Student ID: 1
Name: John Doe
Department: Computer Science
CGPA: 3.8
University: University of Technology

Student ID: 2
Name: Jane Smith
Department: Electrical Engineering
CGPA: 3.6
University: University of Technology

Student ID: 3
Name: Bob Johnson
Department: Mechanical Engineering
CGPA: 3.9
University: University of Technology

Total number of students: 3

-----
BUILD SUCCESS
-----

Total time: 0.559 s
Finished at: 2024-06-23T23:25:59+06:00
-----
|
```