

Lab Report 3

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 24, 2024

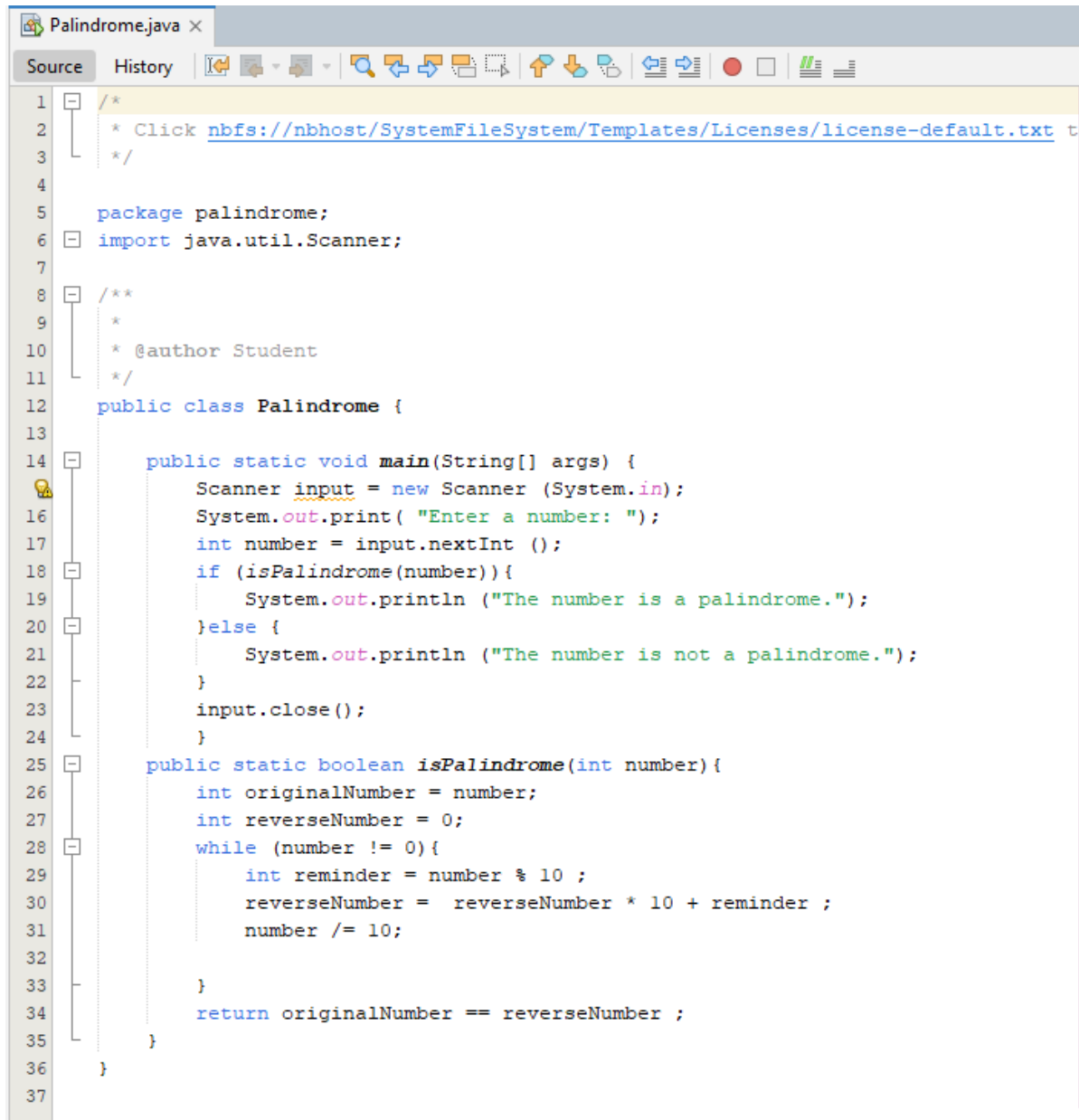
Problem 01

Task Description:

As a Java programming student, I need to create a program that checks if a given number is a palindrome. The program should prompt the user to enter a number, determine if it is a palindrome, and display the result. The program should use the Scanner class for user input.

Code Screenshot:

Input:

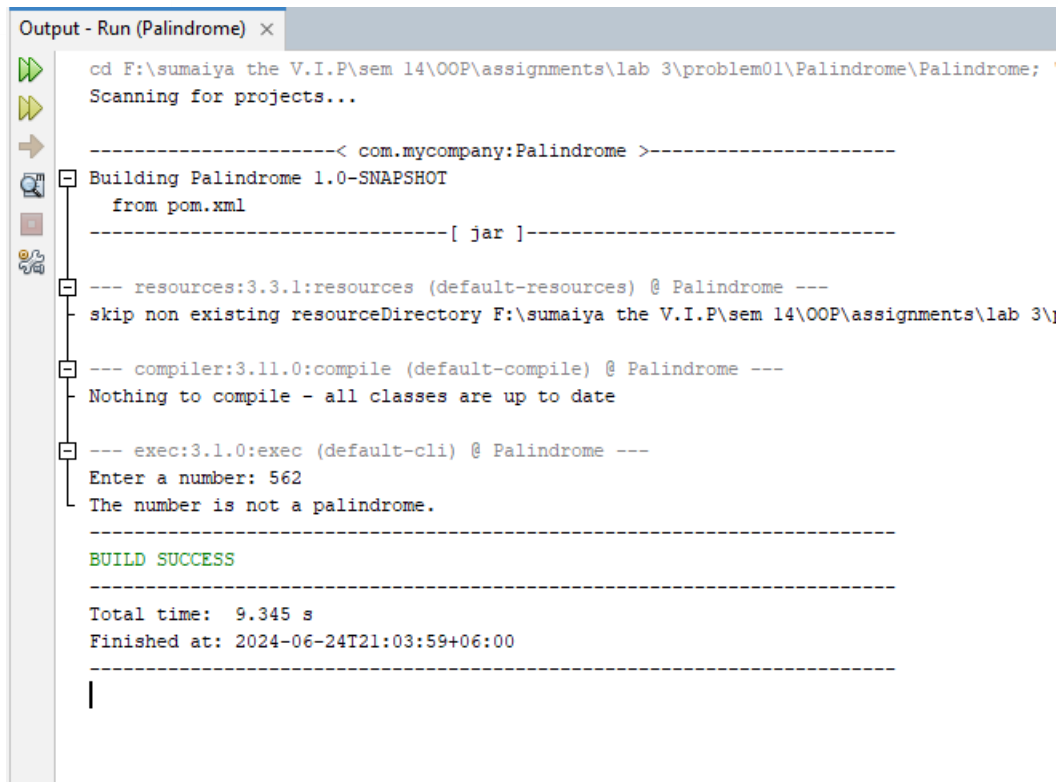


```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to
3   */
4
5  package palindrome;
6  import java.util.Scanner;
7
8  /**
9   *
10  * @author Student
11  */
12  public class Palindrome {
13
14      public static void main(String[] args) {
15          Scanner input = new Scanner (System.in);
16          System.out.print( "Enter a number: ");
17          int number = input.nextInt ();
18          if (isPalindrome(number)){
19              System.out.println ("The number is a palindrome.");
20          }else {
21              System.out.println ("The number is not a palindrome.");
22          }
23          input.close();
24      }
25
26      public static boolean isPalindrome(int number){
27          int originalNumber = number;
28          int reverseNumber = 0;
29          while (number != 0){
30              int reminder = number % 10 ;
31              reverseNumber = reverseNumber * 10 + reminder ;
32              number /= 10;
33          }
34          return originalNumber == reverseNumber ;
35      }
36  }
37

```

Output:



```
Output - Run (Palindrome) x
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 3\problem01\Palindrome\Palindrome;
Scanning for projects...

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

--- resources:3.3.1:resources (default-resources) @ Palindrome ---
skip non existing resourceDirectory F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 3\

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

--- exec:3.1.0:exec (default-cli) @ Palindrome ---
Enter a number: 562
The number is not a palindrome.

BUILD SUCCESS

Total time: 9.345 s
Finished at: 2024-06-24T21:03:59+06:00
|
```

Problem 02

Task Description:

For my Java programming course assignment, I need to create an application that reverses a string entered by the user. The program should prompt the user for input, implement a method to reverse the string, and display the reversed string. I will use the Scanner class to capture user input.

Code Screenshot:

Input:

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```

Userinput.java x
Source History
1  /**
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/licen
3   */
4
5   package userinput;
6   import java.util.Scanner;
7   /**
8    *
9    * @author Student
10   */
11   public class Userinput {
12
13       public static void main(String[] args) {
14           Scanner scanner = new Scanner (System.in);
15           System.out.print("Enter a string: ");
16           String input = scanner.nextLine();
17
18           String reversed = reverseString (input);
19           System.out.println ("Reversed string: " + reversed );
20       }
21       public static String reverseString (String input){
22           StringBuilder reversed = new StringBuilder();
23           for (int i = input.length() - 1 ; i>=0 ; i--){
24               reversed.append(input.charAt (i));
25           }
26           return reversed.toString();
27       }
28   }

```

Output:

```

Output - Run (Userinput) x
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 3\problem02\Userinput\Userinput;
Scanning for projects...

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

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

--- compiler:3.11.0:compile (default-compile) @ Userinput ---
Changes detected - recompiling the module! :input tree
Compiling 1 source file with javac [debug target 21] to target\classes

--- exec:3.1.0:exec (default-cli) @ Userinput ---
Enter a string: sumaiya
Reversed string: ayiamus

BUILD SUCCESS

Total time: 10.708 s
Finished at: 2024-06-24T21:36:20+06:00

```

Problem 03

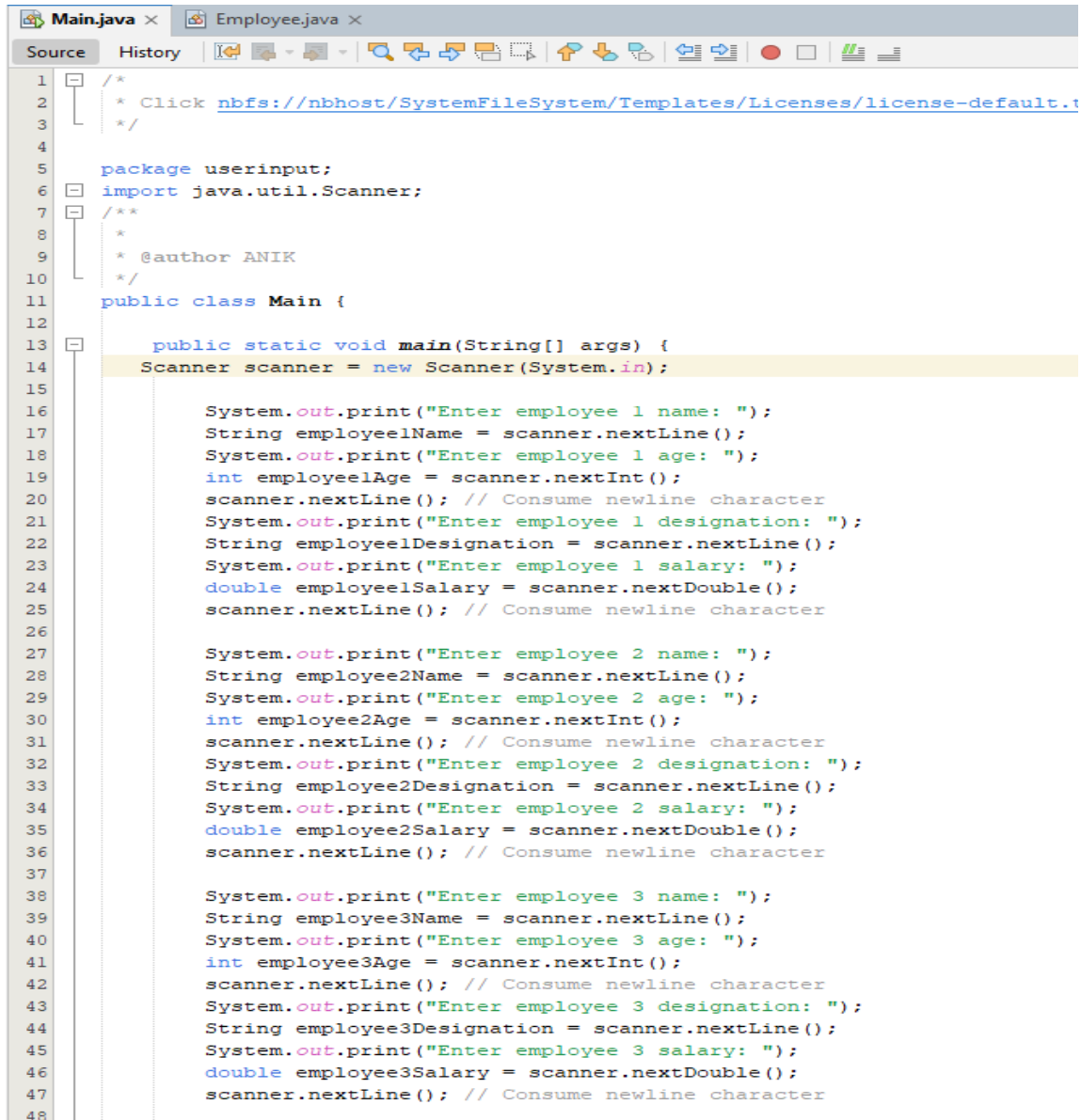
for lab02 practice problem01

Task Description

As an experienced Java developer, I need to create a program that manages employee information, including their name, age, job title, and salary. The program should also display the total number of employees. I want to use the Scanner class to take user input for the employee details.

Code Screenshot

Input



```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to view and
3   * modify the template code.
4   */
5
6  package userinput;
7  import java.util.Scanner;
8
9  /**
10   *
11   * @author ANIK
12   */
13  public class Main {
14
15      public static void main(String[] args) {
16          Scanner scanner = new Scanner(System.in);
17
18          System.out.print("Enter employee 1 name: ");
19          String employee1Name = scanner.nextLine();
20          System.out.print("Enter employee 1 age: ");
21          int employee1Age = scanner.nextInt();
22          scanner.nextLine(); // Consume newline character
23          System.out.print("Enter employee 1 designation: ");
24          String employee1Designation = scanner.nextLine();
25          System.out.print("Enter employee 1 salary: ");
26          double employee1Salary = scanner.nextDouble();
27          scanner.nextLine(); // Consume newline character
28
29          System.out.print("Enter employee 2 name: ");
30          String employee2Name = scanner.nextLine();
31          System.out.print("Enter employee 2 age: ");
32          int employee2Age = scanner.nextInt();
33          scanner.nextLine(); // Consume newline character
34          System.out.print("Enter employee 2 designation: ");
35          String employee2Designation = scanner.nextLine();
36          System.out.print("Enter employee 2 salary: ");
37          double employee2Salary = scanner.nextDouble();
38          scanner.nextLine(); // Consume newline character
39
40          System.out.print("Enter employee 3 name: ");
41          String employee3Name = scanner.nextLine();
42          System.out.print("Enter employee 3 age: ");
43          int employee3Age = scanner.nextInt();
44          scanner.nextLine(); // Consume newline character
45          System.out.print("Enter employee 3 designation: ");
46          String employee3Designation = scanner.nextLine();
47          System.out.print("Enter employee 3 salary: ");
48          double employee3Salary = scanner.nextDouble();
49          scanner.nextLine(); // Consume newline character
50
51          // Display total count
52          System.out.println("Total number of employees: 3");
53      }
54  }

```

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```
49 // Create the employee objects
50 Employee employee1 = new Employee(employee1Name, employee1Age, employee1Designation, employee1Salary);
51 Employee employee2 = new Employee(employee2Name, employee2Age, employee2Designation, employee2Salary);
52 Employee employee3 = new Employee(employee3Name, employee3Age, employee3Designation, employee3Salary);
53
54 // Display employee details
55 employee1.displayEmployeeDetails();
56 System.out.println();
57 employee2.displayEmployeeDetails();
58 System.out.println();
59 employee3.displayEmployeeDetails();
60 System.out.println();
61
62 // Display the total number of employees
63 Employee.displayTotalEmployees();
64 }
65 }
```

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```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
3   * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
4   */
5  package userinput;
6  import java.util.Scanner;
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 }

```

Output:

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```

Output - Run (Main) x
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 3\problem03\for lab02 practice proble
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 3\p

--- compiler:3.11.0:compile (default-compile) @ Main ---
Changes detected - recompiling the module! :source
Compiling 2 source files with javac [debug target 21] to target\classes

--- exec:3.1.0:exec (default-cli) @ Main ---
Enter employee 1 name: sumaiya
Enter employee 1 age: 4
Enter employee 1 designation: 7
Enter employee 1 salary: 5
Enter employee 2 name: rida
Enter employee 2 age: 5
Enter employee 2 designation: 4
Enter employee 2 salary: 7
Enter employee 3 name: g
Enter employee 3 age: 9
Enter employee 3 designation: 9
Enter employee 3 salary: 9
Name: sumaiya
Age: 4
Designation: 7
Salary: $5.0
Company Name: Acme Inc.
Company Address: 123 Main St, Anytown USA

Name: rida
Age: 5
Designation: 4
Salary: $7.0
Company Name: Acme Inc.
Company Address: 123 Main St, Anytown USA

Name: g
Age: 9
Designation: 9
Salary: $9.0
Company Name: Acme Inc.
Company Address: 123 Main St, Anytown USA

Total number of employees: 3

BUILD SUCCESS
  
```

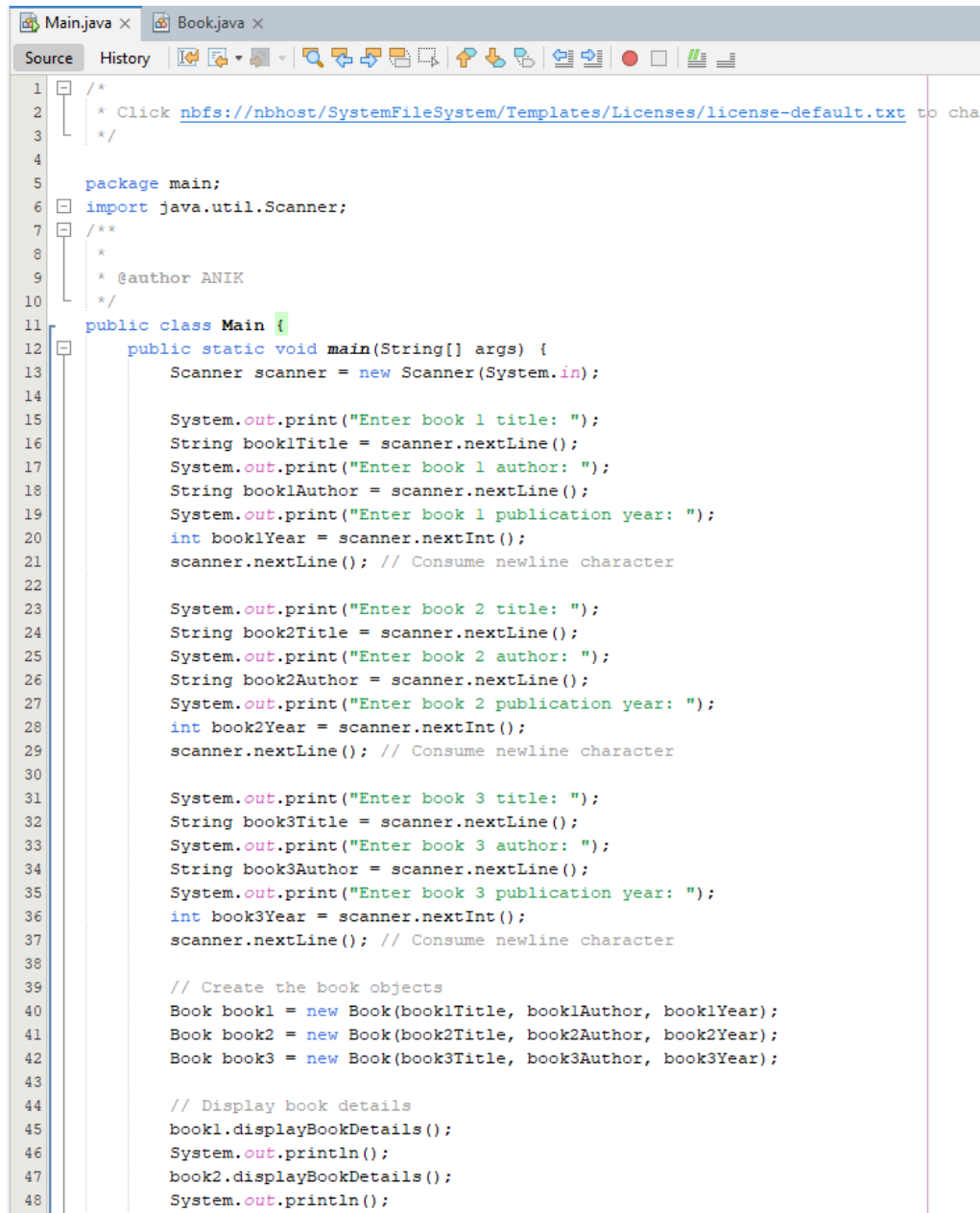
for lab02 practice problem02:

Task Deacription:

As a Java programming student, I need to create an application that allows users to input details for three books, including the title, author, and publication year. The program should then display the details of each book and the total number of books entered.

Code Screenshot:

Input:



```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to cha
3   */
4
5  package main;
6  import java.util.Scanner;
7
8  /**
9   * @author ANIK
10  */
11 public class Main {
12     public static void main(String[] args) {
13         Scanner scanner = new Scanner(System.in);
14
15         System.out.print("Enter book 1 title: ");
16         String book1Title = scanner.nextLine();
17         System.out.print("Enter book 1 author: ");
18         String book1Author = scanner.nextLine();
19         System.out.print("Enter book 1 publication year: ");
20         int book1Year = scanner.nextInt();
21         scanner.nextLine(); // Consume newline character
22
23         System.out.print("Enter book 2 title: ");
24         String book2Title = scanner.nextLine();
25         System.out.print("Enter book 2 author: ");
26         String book2Author = scanner.nextLine();
27         System.out.print("Enter book 2 publication year: ");
28         int book2Year = scanner.nextInt();
29         scanner.nextLine(); // Consume newline character
30
31         System.out.print("Enter book 3 title: ");
32         String book3Title = scanner.nextLine();
33         System.out.print("Enter book 3 author: ");
34         String book3Author = scanner.nextLine();
35         System.out.print("Enter book 3 publication year: ");
36         int book3Year = scanner.nextInt();
37         scanner.nextLine(); // Consume newline character
38
39         // Create the book objects
40         Book book1 = new Book(book1Title, book1Author, book1Year);
41         Book book2 = new Book(book2Title, book2Author, book2Year);
42         Book book3 = new Book(book3Title, book3Author, book3Year);
43
44         // Display book details
45         book1.displayBookDetails();
46         System.out.println();
47         book2.displayBookDetails();
48         System.out.println();

```

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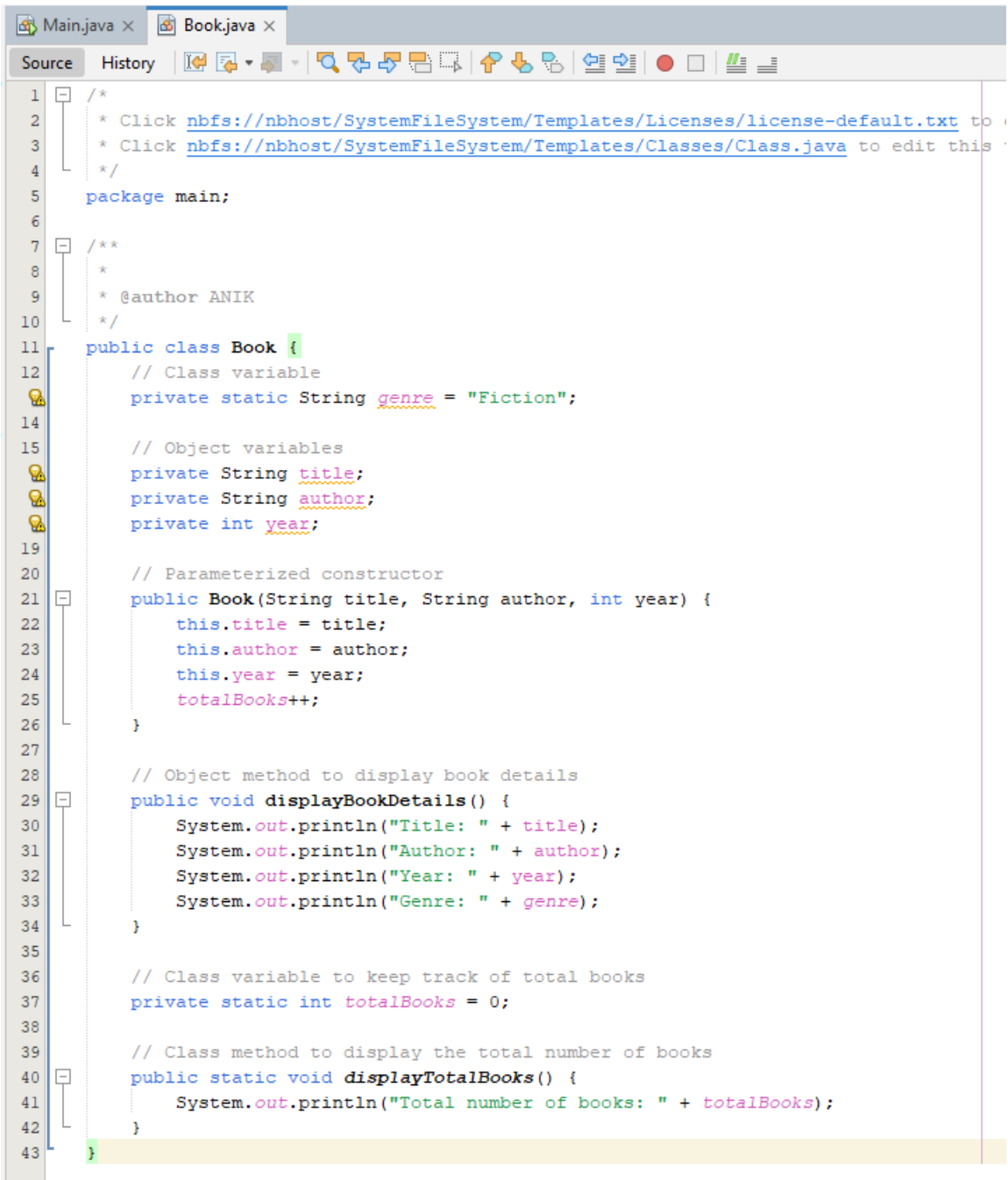
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```

49     book3.displayBookDetails();
50     System.out.println();
51
52     // Display the total number of books
53     Book.displayTotalBooks();
54 }
55 }

```

Book.java



```

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 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) x
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 3\problem03\for lab02 practice problem
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 3\prc

--- compiler:3.11.0:compile (default-compile) @ Main ---
Changes detected - recompiling the module! :source
Compiling 2 source files with javac [debug target 21] to target\classes

--- exec:3.1.0:exec (default-cli) @ Main ---
Enter book 1 title: the vampire diaries
Enter book 1 author: unknown
Enter book 1 publication year: 1903
Enter book 2 title: harry potter
Enter book 2 author: me
Enter book 2 publication year: 1905
Enter book 3 title: the life of depressed girl
Enter book 3 author: dead
Enter book 3 publication year: 2005
Title: the vampire diaries
Author: unknown
Year: 1903
Genre: Fiction

Title: harry potter
Author: me
Year: 1905
Genre: Fiction

Title: the life of depressed girl
Author: dead
Year: 2005
Genre: Fiction

Total number of books: 3

BUILD SUCCESS

Total time: 08:31 min
Finished at: 2024-06-24T22:08:32+06:00
|

```

for lab02 practice problem03

Task Description :

As a Java programming student, I need to create an application that allows users to input details for three students, including their ID, name, major, and GPA. The program should then display the details of each student and the total number of students entered.

Code Screenshot:

Input:

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```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change
3   */
4
5  package main;
6  import java.util.Scanner;
7  /**
8   *
9   * @author ANIK
10  */
11 public class Main {
12     public static void main(String[] args) {
13         Scanner scanner = new Scanner(System.in);
14
15         System.out.print("Enter student 1 ID: ");
16         int student1Id = scanner.nextInt();
17         scanner.nextLine(); // Consume newline character
18         System.out.print("Enter student 1 name: ");
19         String student1Name = scanner.nextLine();
20         System.out.print("Enter student 1 major: ");
21         String student1Major = scanner.nextLine();
22         System.out.print("Enter student 1 GPA: ");
23         double student1Gpa = scanner.nextDouble();
24         scanner.nextLine(); // Consume newline character
25
26         System.out.print("Enter student 2 ID: ");
27         int student2Id = scanner.nextInt();
28         scanner.nextLine(); // Consume newline character
29         System.out.print("Enter student 2 name: ");
30         String student2Name = scanner.nextLine();
31         System.out.print("Enter student 2 major: ");
32         String student2Major = scanner.nextLine();
33         System.out.print("Enter student 2 GPA: ");
34         double student2Gpa = scanner.nextDouble();
35         scanner.nextLine(); // Consume newline character
36
37         System.out.print("Enter student 3 ID: ");
38         int student3Id = scanner.nextInt();
39         scanner.nextLine(); // Consume newline character
40         System.out.print("Enter student 3 name: ");
41         String student3Name = scanner.nextLine();
42         System.out.print("Enter student 3 major: ");
43         String student3Major = scanner.nextLine();
44         System.out.print("Enter student 3 GPA: ");
45         double student3Gpa = scanner.nextDouble();
46         scanner.nextLine(); // Consume newline character
47     }

```

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```
48 // Create the student objects
49 Student student1 = new Student(student1Id, student1Name, student1Major, student1Gpa);
50 Student student2 = new Student(student2Id, student2Name, student2Major, student2Gpa);
51 Student student3 = new Student(student3Id, student3Name, student3Major, student3Gpa);
52
53 // Display student details
54 student1.displayStudentDetails();
55 System.out.println();
56 student2.displayStudentDetails();
57 System.out.println();
58 student3.displayStudentDetails();
59 System.out.println();
60
61 // Display the total number of students
62 Student.displayTotalStudents();
63
64 }
```

Student.java

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```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change th:
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) x
cd F:\sumaiya the V.I.P\sem 14\OOP\assignments\lab 3\problem03\for lab02 practice problem03\Main; "JAVA_
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 3\problem03\for lab0

--- compiler:3.11.0:compile (default-compile) @ Main ---
Changes detected - recompiling the module! :source
Compiling 2 source files with javac [debug target 21] to target\classes

--- exec:3.1.0:exec (default-cli) @ Main ---
Enter student 1 ID: 201014071
Enter student 1 name: sumaiya
Enter student 1 major: cse
Enter student 1 GPA: 1.00
Enter student 2 ID: 201013071
Enter student 2 name: azmee
Enter student 2 major: bba
Enter student 2 GPA: 4.00
Enter student 3 ID: 201014048
Enter student 3 name: asfeeq
Enter student 3 major: cse
Enter student 3 GPA: 4.00
Student ID: 201014071
Name: sumaiya
Department: cse
CGPA: 1.0
University: University of Technology

Student ID: 201013071
Name: azmee
Department: bba
CGPA: 4.0
University: University of Technology

Student ID: 201014048
Name: asfeeq
Department: cse
CGPA: 4.0
University: University of Technology

Total number of students: 3

BUILD SUCCESS

Total time: 01:36 min
Finished at: 2024-06-24T22:19:56+06:00

```