SRM INSTITUTE OF SCIENCE AND TECHNOLOGY FACULTY OF ENGINEERING AND TECHNOLOGY

SCHOOL OF COMPUTING

DEPARTMENT OF COMPUTATIONAL INTELLIGENCE

21CSC203P ADVANCED PROGRAMMING PRACTICE

Week 9 - Graphical User Interface Based Programming Paradigm

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Functional Programming Paradigm

1.Create a GUI application that simulates a simple library management system.

Requirements:

- **Main Window:**
  - A JFrame with a clear layout (e.g., BorderLayout, GridLayout).
  - A JMenuBar with menus for "File", "Edit", and "Help".
  - A JToolBar containing buttons for common actions (e.g., add book, remove book, search).
  - A JTabbedPane to organize different panels.
- **Book Details Panel:**
  - A JPanel with:
    - JTextFields for book title, author, ISBN, and publication year.
    - JComboBox for genre.
    - JCheckBox for availability.
    - Buttons for "Add Book" and "Update Book".
- **Book List Panel:**
  - A JScrollPane containing a JTable to display a list of books.
  - Columns should include book title, author, ISBN, genre, and availability.
  - A search bar (JTextField) and a search button.
- **Dialog Boxes:**
  - A JDialog for confirming actions (e.g., deleting a book).
  - A JDialog for displaying error messages.

Additional Considerations:

- Use appropriate data structures (e.g., ArrayList, HashMap) to store book information.
- Implement event handling for buttons, menus, and table interaction

Functional Programming Paradigm

2.**Pure Function:** Create a pure function to calculate the area of a circle, given its radius.
Impure Function: Create an impure function to prompt the user for the radius of a circle and print its area.

3. **Pure Function:** Create a pure function to find the maximum value in a list of numbers.
I**mpure Function:** Create an impure function to sort a list of numbers in ascending order.

4. Create a function to manage a list of student records, where each record includes name, age, and grade.
Questions:

1. **Mutable Function:** Create a mutable function to add a new student to the list of records.
2. **Immutable Function:** Create an immutable function to find the average age of all students in the list.

5. **Mutable Function:** Create a mutable function to update the balance of a bank account.
Immutable Function: Create an immutable function to calculate the interest earned on a bank account.

6. **Anonymous Function:** Create an anonymous function to add two numbers and immediately call it with the values 5 and 3.
Anonymous Function : Create an anonymous function to multiply two numbers and assign it to a variable. Call the function with the values 4 and 6 and print the result.

7. **Anonymous Function:** Create an anonymous function to square each element in a list and apply it to the list [1, 2, 3, 4].
Anonymous Function: Create an anonymous function to filter even numbers from a list and apply it to the list [1, 2, 3, 4, 5, 6].

8. **Map:** Create a new list containing the employee names and their corresponding salaries.
Filter: Filter the employees who belong to a specific department.
Reduce: Calculate the average salary for employees in each department.

9. **Map:** Create a new list containing only the names of the students.
Filter: Filter the students who are above a certain age threshold.
Reduce: Calculate the average grade of all students.