<div align="center">**Internship Final Report**</div>

Student Name: B S SNEGHA PRIYAA
University: Vellore Institute of Technology
Major: Software engineering
Internship Duration: December 1st, 2024 - December 31st, 2024
Company: ShadowFox
Domain: Java Development
Coordinator: Mr. Aakash

Objectives:

My primary objectives for this internship were to:

1. **Develop a deep understanding of Java development methodologies and best practices.**
2. **Gain hands-on experience in designing and building console-based and GUI applications using Java.**
3. **Enhance my skills in using Java tools and technologies, including core syntax, data structures, databases like SQLite, and API integration.**

Tasks and Responsibilities

During my internship, I was involved in the following key tasks, aligned with the beginner and intermediate levels from the task list. I completed two beginner tasks and two intermediate tasks, focusing on practical implementation and data management.

Beginner level :

project 1: calculator:

Developed a console-based calculator supporting basic arithmetic operations (addition, subtraction, multiplication, division) for multiple inputs, scientific calculations (square root, power, factorial, log10, natural log, trigonometry), quadratic equation solving, permutations/combinations, matrix operations (addition, subtraction, multiplication), binary/decimal conversions, and unit conversions (Celsius/Fahrenheit).The respective outputs are attached below.

DemoVideo:

Output:

=========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 1
How many numbers? 3
Enter number 1: 2
Enter number 2: 5
Enter number 3: 6
1.Add 2.Subtract 3.Multiply 4.Divide
1
Addition Result: 13.0

=========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

1
Enter number: 9
3.0

=========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

2
Base: 2
Exponent: 3
8.0

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1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

3
Enter number: 5
Factorial: 120

=========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver

4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

4
Enter number: 10
1.0

============ HERE YOU GO A CALCULATOR FOR ALL OPERATIONS .
ENJOY , LET THE NUMBERS DO THE MAGIC!============
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

5
Enter number: 1
0.0

============ HERE YOU GO A CALCULATOR FOR ALL OPERATIONS .
ENJOY , LET THE NUMBERS DO THE MAGIC!============
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2

6
Angle (degrees): 30
sin: 0.49999999999999994
cos: 0.8660254037844387
tan: 0.5773502691896257

=========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS .
ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 3
Enter a, b, c: 2 4 6
Complex roots.

=========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS .
ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 3
Enter a, b, c: 1 -5 6
Roots: 3.0, 2.0

=========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS .
ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 4
Enter n: 2
Enter r: 2
nPr: 2

nCr: 1

========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS .
ENJOY , LET THE NUMBERS DO THE MAGIC!==========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 5
Enter rows and columns: 2
2
Enter Matrix A:
1 1
1 1
Enter Matrix B:
2 2
2 2
Matrix Addition:
3 3
3 3
Matrix Subtraction:
-1 -1
-1 -1
Matrix Multiplication:
4 4
4 4

========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS .
ENJOY , LET THE NUMBERS DO THE MAGIC!==========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 6
1. Binary to Decimal
2. Decimal to Binary
1
Binary: 101
5

========== HERE YOU GO A CALCULATOR FOR ALL OPERATIONS .
ENJOY , LET THE NUMBERS DO THE MAGIC!==========

1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 7
1. Celsius to Fahrenheit
2. Fahrenheit to Celsius
1

17
62.6

```
=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 1
How many numbers? 3
Enter number 1: 2
Enter number 2: 5
Enter number 3: 6
1.Add   2.Subtract   3.Multiply   4.Divide
1
Addition Result: 13.0

=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

1
Enter number: 9
3.0
```

```
PS D:\EnhancedCalculator> java EnhancedCalculator
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

2
Base: 2
Exponent: 3
8.0

=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

3
Enter number: 5
Factorial: 120
```

```
PS D:\EnhancedCalculator> java EnhancedCalculator
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

4
Enter number: 10
1.0

=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

5
Enter number: 1
0.0
```

```
=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS .
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 2
1. Square Root
2. Power
3. Factorial
4. Log10
5. Natural Log
6. Trigonometry

6
Angle (degrees): 30
sin: 0.49999999999999994
cos: 0.8660254037844387
tan: 0.5773502691896257

=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS
```

```
PS D:\EnhancedCalculator> java EnhancedCalculator
=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 3
Enter a, b, c: 2 4 6
Complex roots.

=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 3
Enter a, b, c: 1 -5 6
Roots: 3.0, 2.0
```

```
PS D:\EnhancedCalculator> java EnhancedCalculator
=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 4
Enter n: 2
Enter r: 2
nPr: 2
nCr: 1
```

```
PS D:\EnhancedCalculator> java EnhancedCalculator
=========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!===========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 5
Enter rows and columns: 2
2
Enter Matrix A:
1 1
1 1
Enter Matrix B:
2 2
2 2
Matrix Addition:
3 3
3 3
Matrix Subtraction:
-1 -1
-1 -1
Matrix Multiplication:
4 4
4 4
```

```
PS D:\EnhancedCalculator> java EnhancedCalculator
========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!==========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 6
1. Binary to Decimal
2. Decimal to Binary
1
Binary: 101
5

========== HERE YOU GO A  CALCULATOR FOR ALL OPERATIONS . ENJOY , LET THE NUMBERS DO THE MAGIC!==========
1. Basic Arithmetic (Multiple Inputs)
2. Scientific Calculations
3. Quadratic Equation Solver
4. Permutation & Combination
5. Matrix Calculations
6. Binary ? Decimal Conversion
7. Unit Conversions
8. Exit
Choose an option: 7
1. Celsius to Fahrenheit
2. Fahrenheit to Celsius
1

17
62.6
```

project 2: contact management system:

Created a command-line system to manage contacts with CRUD operations: add, view, search, update, and delete. Stored data in memory using ArrayList, with validation for phone (10 digits) and email formats.The respective screenshots are attached below.

DemoVideo:

https://drive.google.com/file/d/1csusZYRdLFSLP2pvdElZzsTH6YP6vpMa/view?usp=sharing

Output:

@Snegha-basshan ➜ /workspaces/ShadowFox (main) $ java ContactManager.java

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 1
Enter Name: snegha priyaa
Enter Phone (10 digits): 9432570121
Enter Email: sneha@gmail.com
Contact Added Successfully!

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 2

--- Contact List ---
Name: snegha priyaa | Phone: 9432570121 | Email: sneha@gmail.com

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 3
Enter name/phone/email to search: snegha priyaa
Name: snegha priyaa | Phone: 9432570121 | Email: sneha@gmail.com

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 1
Enter Name: priya
Enter Phone (10 digits): 8670412895
Enter Email: priya@gmail.com
Contact Added Successfully!

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 1
Enter Name: kishore
Enter Phone (10 digits): 9845614327
Enter Email: kishore@gmail.com
Contact Added Successfully!

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 2

--- Contact List ---
Name: snegha priyaa | Phone: 9432570121 | Email: sneha@gmail.com
Name: priya | Phone: 8670412895 | Email: priya@gmail.com
Name: kishore | Phone: 9845614327 | Email: kishore@gmail.com

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 5
Enter name/phone/email to delete: kishore
Contact Deleted Successfully!

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 2

--- Contact List ---
Name: snegha priyaa | Phone: 9432570121 | Email: sneha@gmail.com
Name: priya | Phone: 8670412895 | Email: priya@gmail.com

1. Add 2. View 3. Search 4. Update 5. Delete 6. Exit
Choose Option: 6
Exiting...
@Snegha-basshan ➜ /workspaces/ShadowFox (main) $

```
● @Snegha-basshan ➜ /workspaces/ShadowFox (main) $ java ContactManager.java

 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 1
Enter Name: snegha priyaa
Enter Phone (10 digits): 9432570121
Enter Email: sneha@gmail.com
Contact Added Successfully!
```

```
 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 2

 --- Contact List ---
 Name: snegha priyaa | Phone: 9432570121 | Email: sneha@gmail.com
```

```
 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 3
Enter name/phone/email to search: snegha priyaa
Name: snegha priyaa | Phone: 9432570121 | Email: sneha@gmail.com
```

```
 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 1
Enter Name: priya
Enter Phone (10 digits): 8670412895
Enter Email: priya@gmail.com
Contact Added Successfully!
```

```
 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 1
Enter Name: kishore
Enter Phone (10 digits): 9845614327
Enter Email: kishore@gmail.com
Contact Added Successfully!

 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 2
```

```
 --- Contact List ---
 Name: snegha priyaa | Phone: 9432570121 | Email: sneha@gmail.com
 Name: priya | Phone: 8670412895 | Email: priya@gmail.com
 Name: kishore | Phone: 9845614327 | Email: kishore@gmail.com

 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 5
Enter name/phone/email to delete: kishore
Contact Deleted Successfully!
```

```
 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 2

 --- Contact List ---
 Name: snegha priyaa | Phone: 9432570121 | Email: sneha@gmail.com
 Name: priya | Phone: 8670412895 | Email: priya@gmail.com

 1. Add  2. View  3. Search  4. Update  5. Delete  6. Exit
Choose Option: 6
Exiting...
```

Intermediate level :

Project 2: inventory management system

Built an inventory system with a basic GUI using JavaFX/Swing for adding, updating, and deleting items. Focused on user interface design and event handling for intuitive interactions.included visualization features for sales and forecasting.

DemoVideo :

https://drive.google.com/file/d/1mMiUypkpTVxcLyyBamG-o_duAPPwfbaG/view?usp=sharing

Output:

Advanced Inventory Management System

Search product...

ID	Name	Quantity	Price ▲	
101	laptop	10	550000.0	

ID

Name

Quantity

Price

Add

Update

Delete

Forecast Demand

Inventory Management System

Search product...

ID	Name	Quantity	Price	
101	laptop	20	500000.0	
102	keyboard	20		
103	mouse	1		

Forecast

Message ⓘ

Next 7 days demand: 343

OK

103

mouse

50

1000.0

Add

Update

Delete

Sales Qty

Sales Qty

Make Sale

Forecast

Inventory Management System

Search product...

ID	Name	Quantity	Price
101	laptop	20	100000.0
102	keyboard	10	5000.0
103	mouse	5	1000.0

Forecast

Message

Next 7 days demand: 315

OK

103	mouse
5	1000.0

Add   Update   Delete

Sales Qty   Sales Qty   Make Sale

Forecast

Sales Forecast - mouse

Sales Trend

Quantity Sold

2026-01-03   Next 7 days

Date

Actual Sales   Forecast
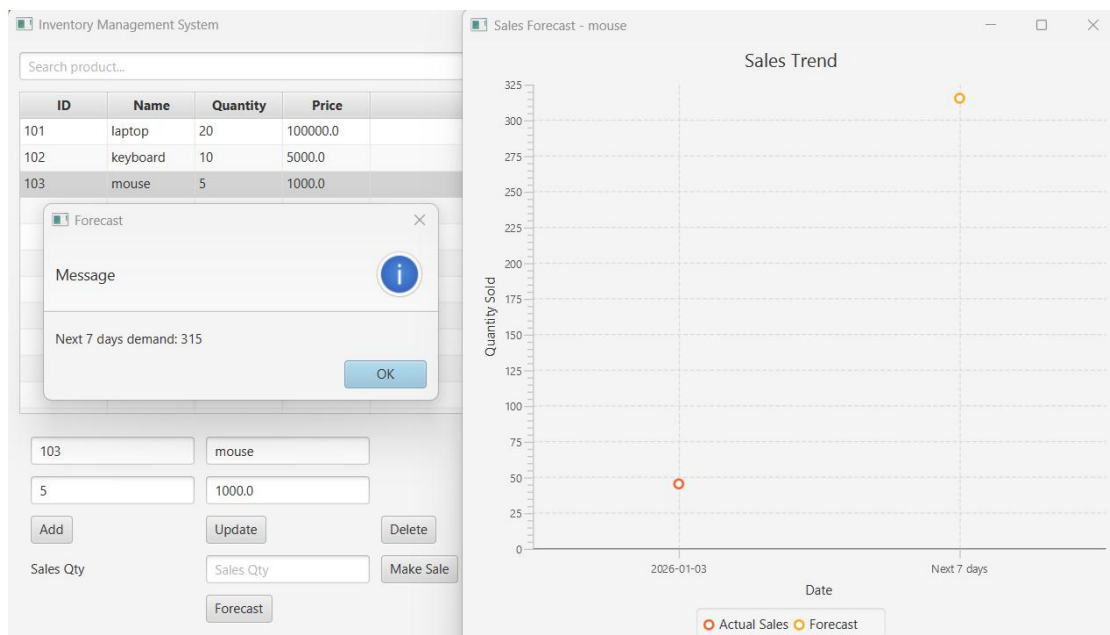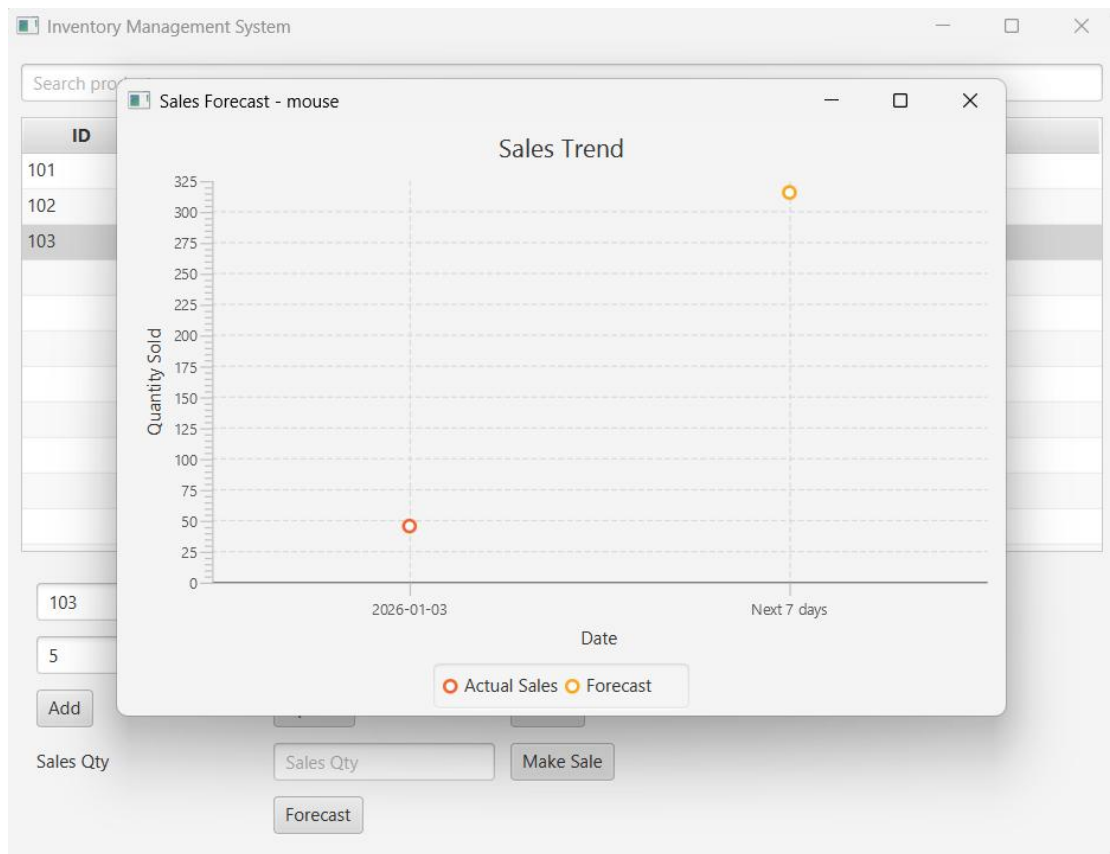
Project 3: Library management system :

Enhanced a console-based library system with user accounts, book additions (via ISBN API fetch from Open Library or manual entry), viewing/searching books, borrowing/returning, and recommendations (popular books and genre-based). Integrated SQLite for persistent storage and an external API for book detail

DB_VISUALIZATION:

https://drive.google.com/file/d/1jxmPjISe-m3f7MSA4RV2dRH0Hq24aiG_/view?usp=sharing

OUTPUT VIDEO:

https://drive.google.com/file/d/1vv-Yw-PPP6WoPFaOHo6x1W0cCeArQt9M/view?usp=sharing

Output:

```
=== Library System ===
1. Register
2. Login
3. Exit
Choose: 1
Enter username: snegha priyaa
Enter password: Snegha@12
Registration successful!

=== Library System ===
1. Register
2. Login
3. Exit
Choose: 2
Enter username: snegha priyaa
Enter password: Snegha@12
Login successful!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780141439518
Fetched from API: Pride and Prejudice by Jane Austen
```

Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 2

--- All Books ---
ID: 1 | Pride and Prejudice by Jane Austen (2003) | Genre: Fiction, Romance, Historical, Regency | Available

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780547928227
Fetched from API: The Hobbit by J.R.R. Tolkien
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780061120084
Fetched from API: To Kill a Mockingbird by F Scott. Fitgerald
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book

5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780385472579
Fetched from API: Zen speaks by Zhizhong Cai
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780140328721
Fetched from API: Fantastic Mr. Fox by Roald Dahl
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry):
Enter title: the mahabarata
Enter author: R.K.Narayan
Enter publish year: 1978
Enter genre: Mythology,Epic
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 3
Search by title/author/genre: R.K.Narayan

ID: 6 | the mahabarata by R.K.Narayan | Genre: Mythology,Epic

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 4

--- All Books ---
ID: 1 | Pride and Prejudice by Jane Austen (2003) | Genre: Fiction, Romance, Historical, Regency | Available
ID: 2 | The Hobbit by J.R.R. Tolkien (2012) | Genre: Arkenstone, Battle of Five Armies, invisibility | Available
ID: 3 | To Kill a Mockingbird by F Scott. Fitgerald (2006) | Genre: fiction, fiction classics, contemporary fiction | Available
ID: 4 | Zen speaks by Zhizhong Cai (1994) | Genre: Caricatures and cartoons, Zen Buddhism, Zen buddhism | Available
ID: 5 | Fantastic Mr. Fox by Roald Dahl (October 1, 1988) | Genre: Animals, Hunger, Open Library Staff Picks | Available
ID: 6 | the mahabarata by R.K.Narayan (1978) | Genre: Mythology,Epic | Available
Enter book ID to borrow: 6
Book borrowed successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 5
Your borrowed books:
Borrow ID: 1 | the mahabarata
Enter borrow ID to return: 1
Book returned successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book

6. Recommendations
7. Logout
Choose: 6

--- Recommendations ---
Most Popular Books:
- the mahabarata (borrowed 1 times)

Books similar to your interests (Mythology,Epic):
- the mahabarata by R.K.Narayan

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose:

```
PS D:\LibrarySystem> java -cp ".;gson-2.13.2.jar;sqlite-jdbc-3.51.1.0.jar" LibrarySystem
=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780141439518
Fetched from API: Pride and Prejudice by Jane Austen
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 2

--- All Books ---
ID: 1 | Pride and Prejudice by Jane Austen (2003) | Genre: Fiction, Romance, Historical, Regency | Available

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780547928227
Fetched from API: The Hobbit by J.R.R. Tolkien
Book added successfully!
```

```
PS D:\LibrarySystem> java -cp ".;gson-2.13.2.jar;sqlite-jdbc-3.51.1.0.jar" LibrarySystem
=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780061120084
Fetched from API: To Kill a Mockingbird by F Scott. Fitgerald
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780385472579
Fetched from API: Zen speaks by Zhizhong Cai
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry): 9780140328721
Fetched from API: Fantastic Mr. Fox by Roald Dahl
Book added successfully!
```

```
PS D:\LibrarySystem> java -cp ".;gson-2.13.2.jar;sqlite-jdbc-3.51.1.0.jar" LibrarySystem
=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 1
Enter ISBN (or leave empty for manual entry):
Enter title: the mahabarata
Enter author: R.K.Narayan
Enter publish year: 1978
Enter genre: Mythology,Epic
Book added successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 3
Search by title/author/genre: R.K.Narayan
ID: 6 | the mahabarata by R.K.Narayan | Genre: Mythology,Epic
```

```
PS D:\LibrarySystem> java -cp ".;gson-2.13.2.jar;sqlite-jdbc-3.51.1.0.jar" LibrarySystem
=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 4

--- All Books ---
ID: 1 | Pride and Prejudice by Jane Austen (2003) | Genre: Fiction, Romance, Historical, Regency | Available
ID: 2 | The Hobbit by J.R.R. Tolkien (2012) | Genre: Arkenstone, Battle of Five Armies, invisibility | Available
ID: 3 | To Kill a Mockingbird by F Scott. Fitgerald (2006) | Genre: fiction, fiction classics, contemporary fiction | Available
ID: 4 | Zen speaks by Zhizhong Cai (1994) | Genre: Caricatures and cartoons, Zen Buddhism, Zen buddhism | Available
ID: 5 | Fantastic Mr. Fox by Roald Dahl (October 1, 1988) | Genre: Animals, Hunger, Open Library Staff Picks | Available
ID: 6 | the mahabarata by R.K.Narayan (1978) | Genre: Mythology,Epic | Available
Enter book ID to borrow: 6
Book borrowed successfully!

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 5
Your borrowed books:
Borrow ID: 1 | the mahabarata
Enter borrow ID to return: 1
Book returned successfully!
```
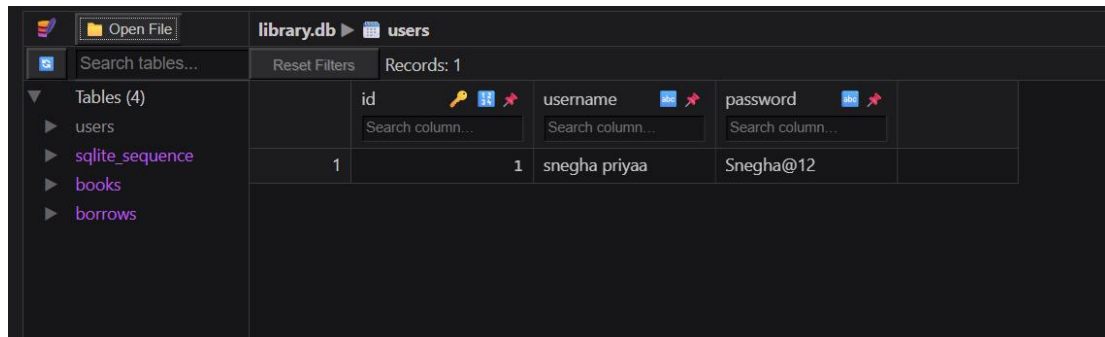
```
=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose: 6

--- Recommendations ---
Most Popular Books:
- the mahabarata (borrowed 1 times)

Books similar to your interests (Mythology,Epic):
- the mahabarata by R.K.Narayan

=== Menu (Logged in) ===
1. Add Book
2. View All Books
3. Search Books
4. Borrow Book
5. Return Book
6. Recommendations
7. Logout
Choose:
```
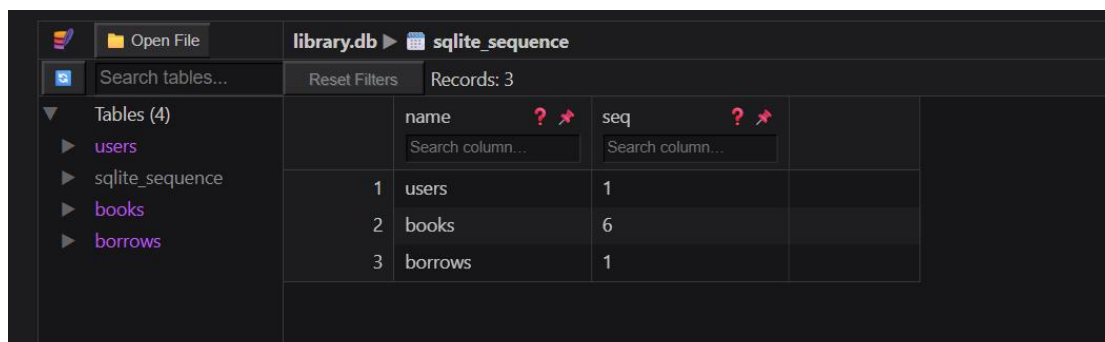

	id	username	password
1	1	snegha priyaa	Snegha@12

library.db ▶ users — Records: 1

	name	seq
1	users	1
2	books	6
3	borrows	1

library.db ▶ sqlite_sequence — Records: 3

Learning Outcomes:

Gained practical experience in Java development tools and techniques, including console applications, GUI frameworks (JavaFX/Swing), database integration with SQLite, API calls (e.g., Open Library), and data structures like ArrayList.

Developed a deep understanding of the Java application lifecycle, from planning and coding to testing and deployment, with emphasis on modular design and persistence.

Enhanced my ability to troubleshoot and solve complex issues, such as handling API responses, database transactions, and user input validation to improve application reliability.

Challenges and Solutions

Fetching book details from the Open Library API sometimes failed due to network issues or invalid ISBNs. I addressed this by implementing fallback manual entry and robust error handling

Conclusion:

The internship experience at ShadowFox offered me invaluable practical exposure in Java development. Working on developing both console-based and graphical user interface applications, along with incorporating database systems and external APIs, combined with tackling practical challenges, has greatly improved my technical abilities and deepened my understanding. This opportunity has further solidified my

passion for a career in software engineering and equipped me with the confidence to face future professional hurdles and possibilities in the industry.

<u>Acknowledgments</u>

I express my tremendous gratitude for shadowfox on giving me this opportunity, where I learned a lot of new stuffs , I like to thank my mentor and coordinator r, Mr. Aakash S, for clarifying all the doubts throughout my internship.This opportunity helped in growing my technical and interpersonal skills.