Introduction to Problem Solving and Programming

Course Code:CSE1021

Project File

On

Hostel Hygiene & Health Monitoring System

Slot: A11+A12+A13

By

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1. INTRODUCTION

Hostel hygiene is directly related to students' health and living standards. Poor water, food, sanitation, and mosquito control can spread diseases such as jaundice, typhoid, and dengue. Students often face hygiene issues but lack a proper system to report complaints systematically.

This project proposes a console-based Python application that allows hostel residents to report hygiene-related problems, view previous complaints, and perform basic risk analytics to identify high-risk categories.

In today's hostel environment, students often share the same water facility, dining hall, washrooms, and living spaces. While hostel life encourages friendships and learning, it also exposes students to hygiene-related risks that can spread quickly among a large community. A single case of poor water quality or unclean washrooms can lead to diseases such as jaundice, food poisoning, fungal infections, or mosquito-borne illnesses.

Surprisingly, the biggest issue is not just hygiene problems, but the lack of a proper system to report them. Students either ignore small issues or report them verbally, which often gets delayed or forgotten. There is no structured platform to store complaints, analyze them, or identify potential health threats early.

To address this gap, the Hostel Hygiene & Health Monitoring System has been developed as a simple yet smart Python application that records hygiene complaints and highlights risk levels through analytics. This system acts like a digital voice for hostel residents, helping them report problems and stay informed about emerging health risks within the hostel.

2.PROBLEM STATEMENT

Hostel students lack an efficient mechanism to report and track hygiene problems. Manual processes delay response and increase health risks. There is no analytics system to monitor potential disease outbreaks caused by water, food, washrooms, or mosquitoes.

Therefore, a system is needed that:

Records hygiene complaints.

Displays reported issues.

Provides analytics to highlight health risks when complaints increase.

3.FUNCTIONAL REQUIREMENTS

Requirement ID	Description
FR1	The system shall allow users to report hygiene complaints.
FR2	The system shall store complaint category and description.
FR3	The system shall display all reported complaints.
FR4	The system shall analyze complaints and highlight risks.

FR5	The system shall generate warnings if complaints exceed limits.
FR6	The system shall allow exiting from the application.

4.NON-FUNCTIONAL REQUIREMENTS

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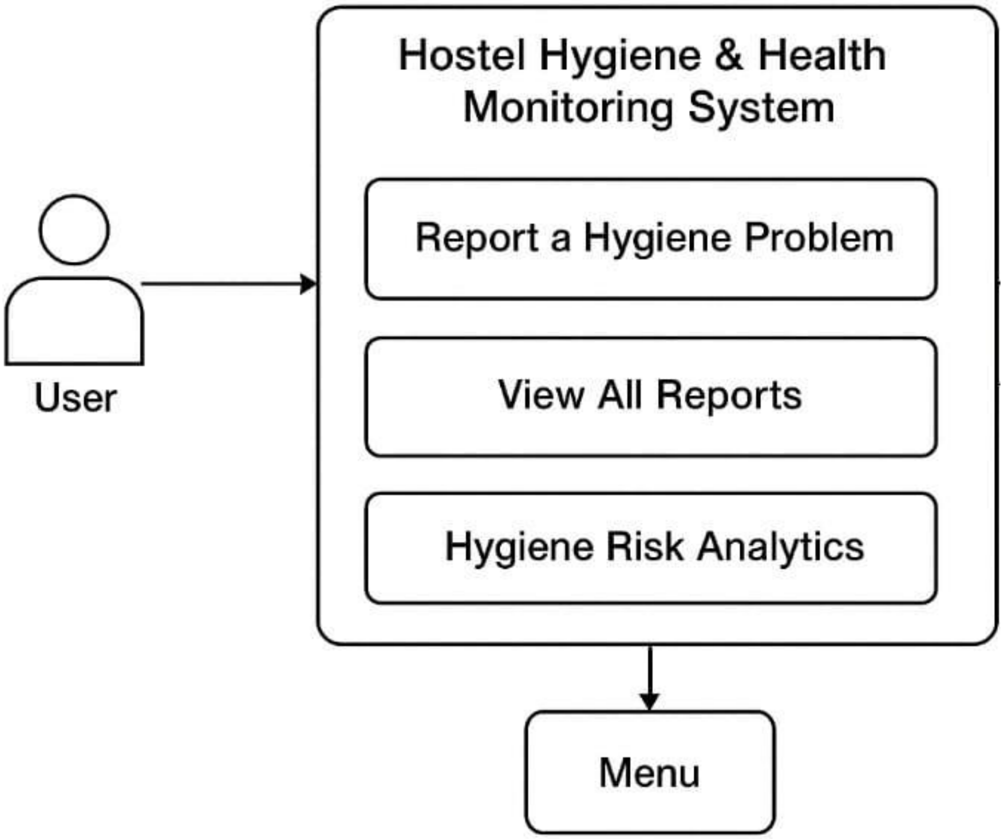
Category	Description
Performance	Instant analytics for available complaints.
Reliability	Data structure maintains proper complaint storage.
Usability	Easy to use console-based interface.
Scalability	Can be extended to database, mobile app.
Security	Only valid users can access in future versions.
Maintainability	Code is modular with separate functions.

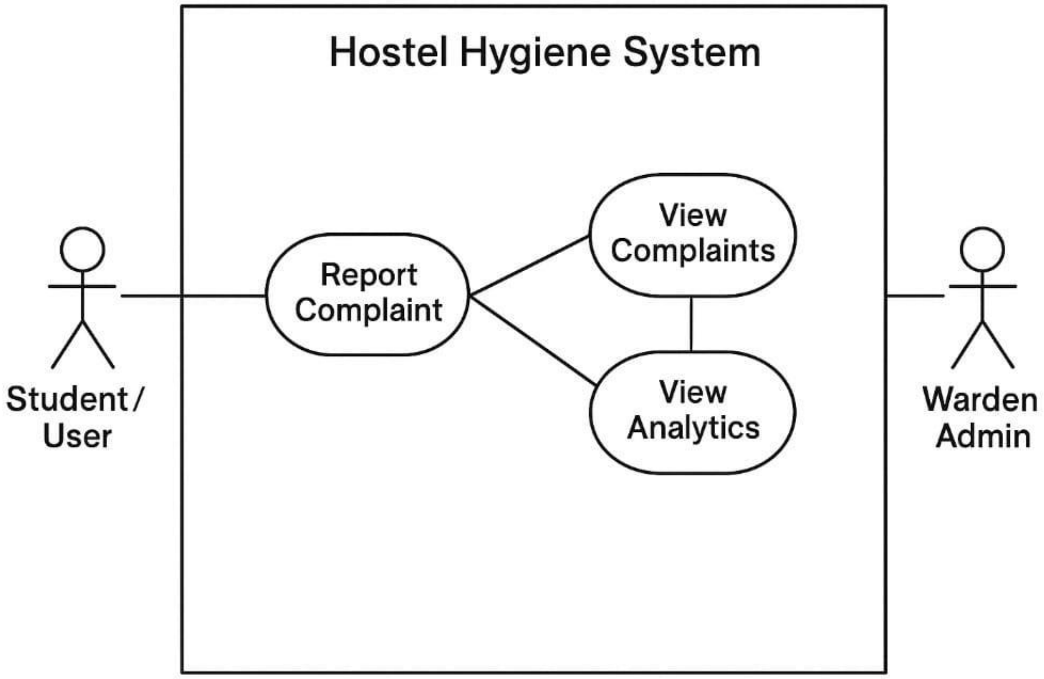
5.SYSTEM ARCHITECTURE

System Architecture Diagram

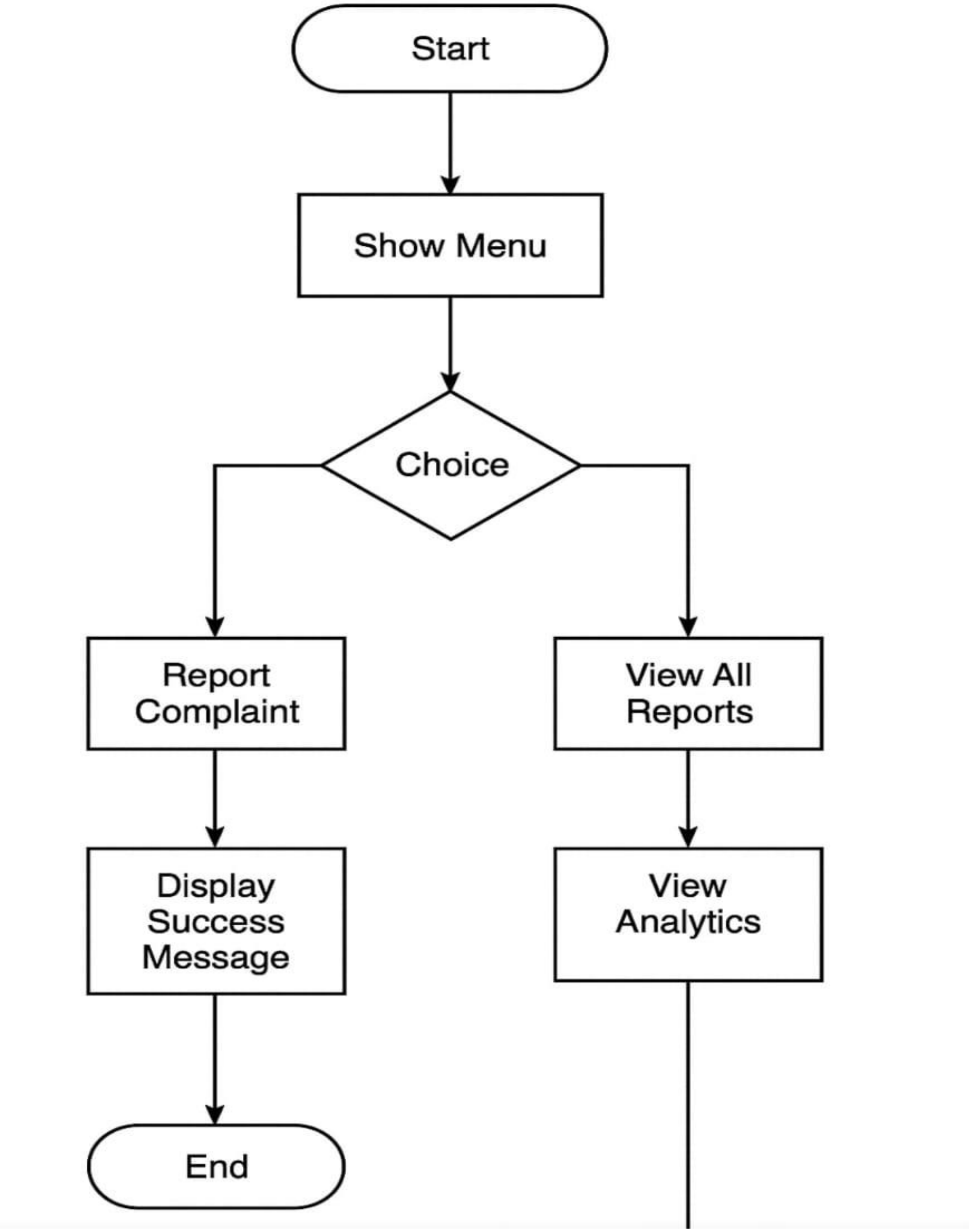


6.DESIGN DIAGRAMS

1)USE CASE DIAGRAM;

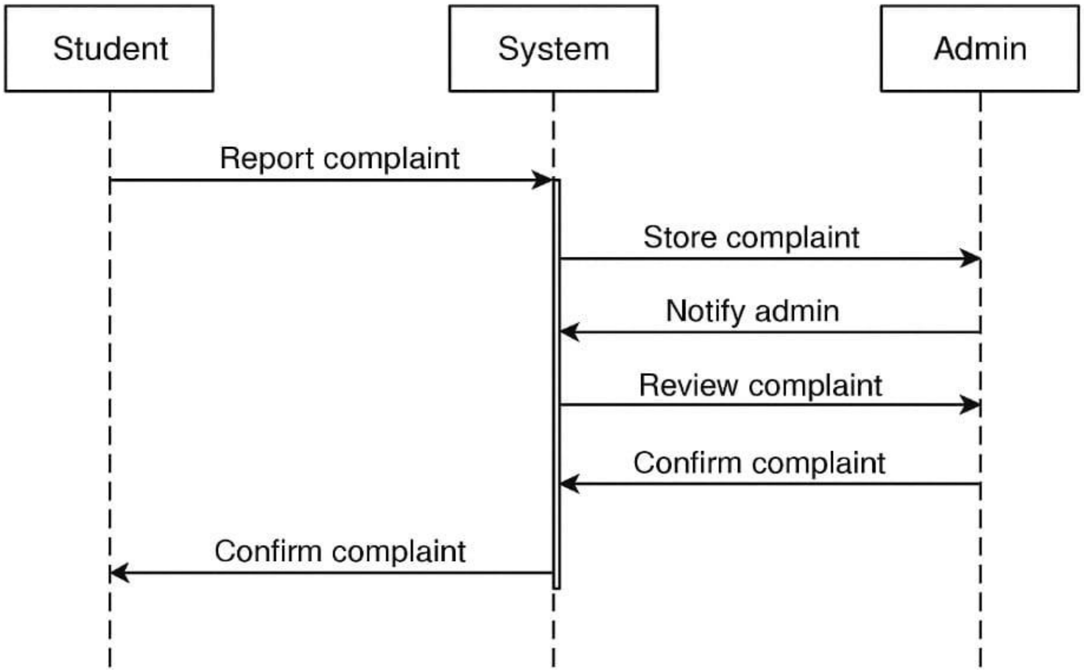


2)WORKFLOW DIAGRAM:



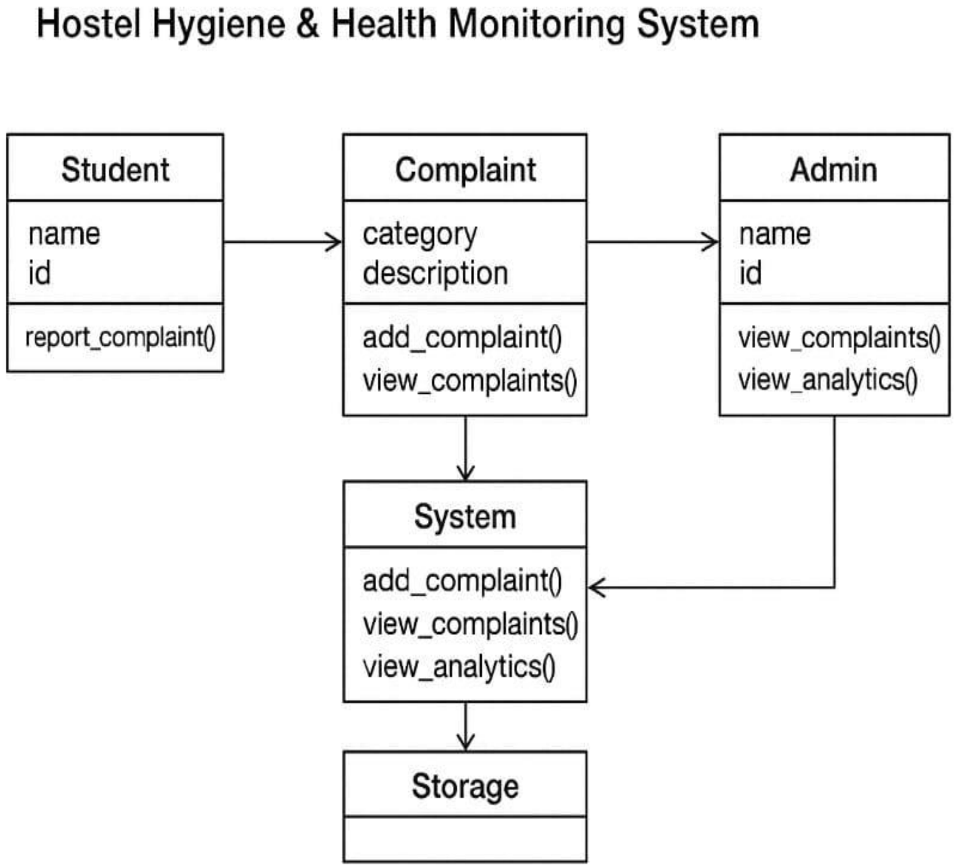
3)SEQUNCE DIAGRAM

ACTORS: USER, SYSTEM:



Report Hygiene Problem

4)**CLASS/COMPONENT DIAGRAM:**



8. DESIGN DECISIONS & RATIONALE

1) Python chosen for simplicity and fast prototyping.

2) List Data Structure used for quick storage (no DB required for small system).

3) Modular Functions improve readability and maintenance.

4) Console UI instead of GUI to reduce development overhead

9. IMPLEMENTATION DETAILS

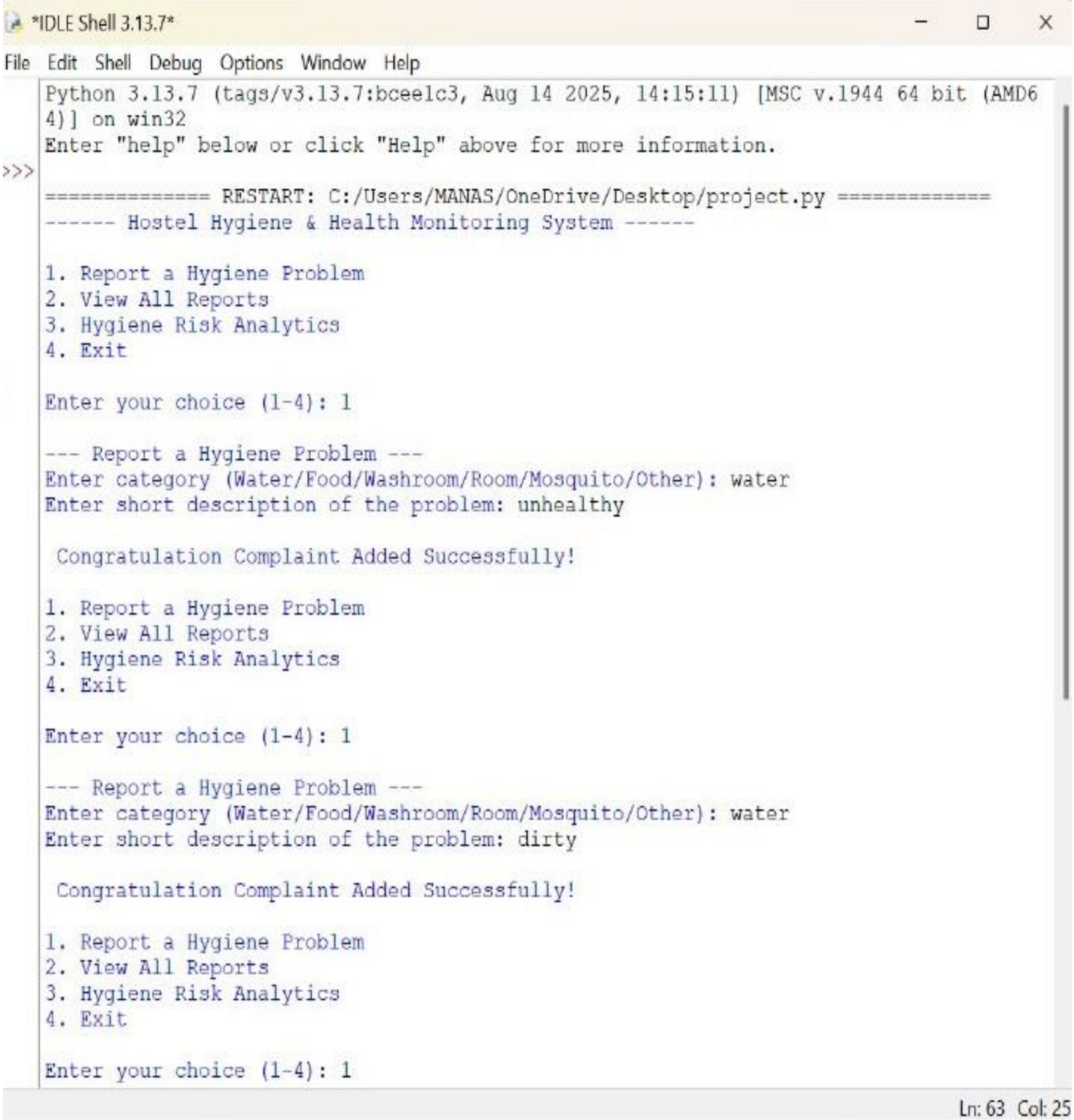
1)Language Used: Python 3

2)Techniques: Functions, loops, dictionaries, lists

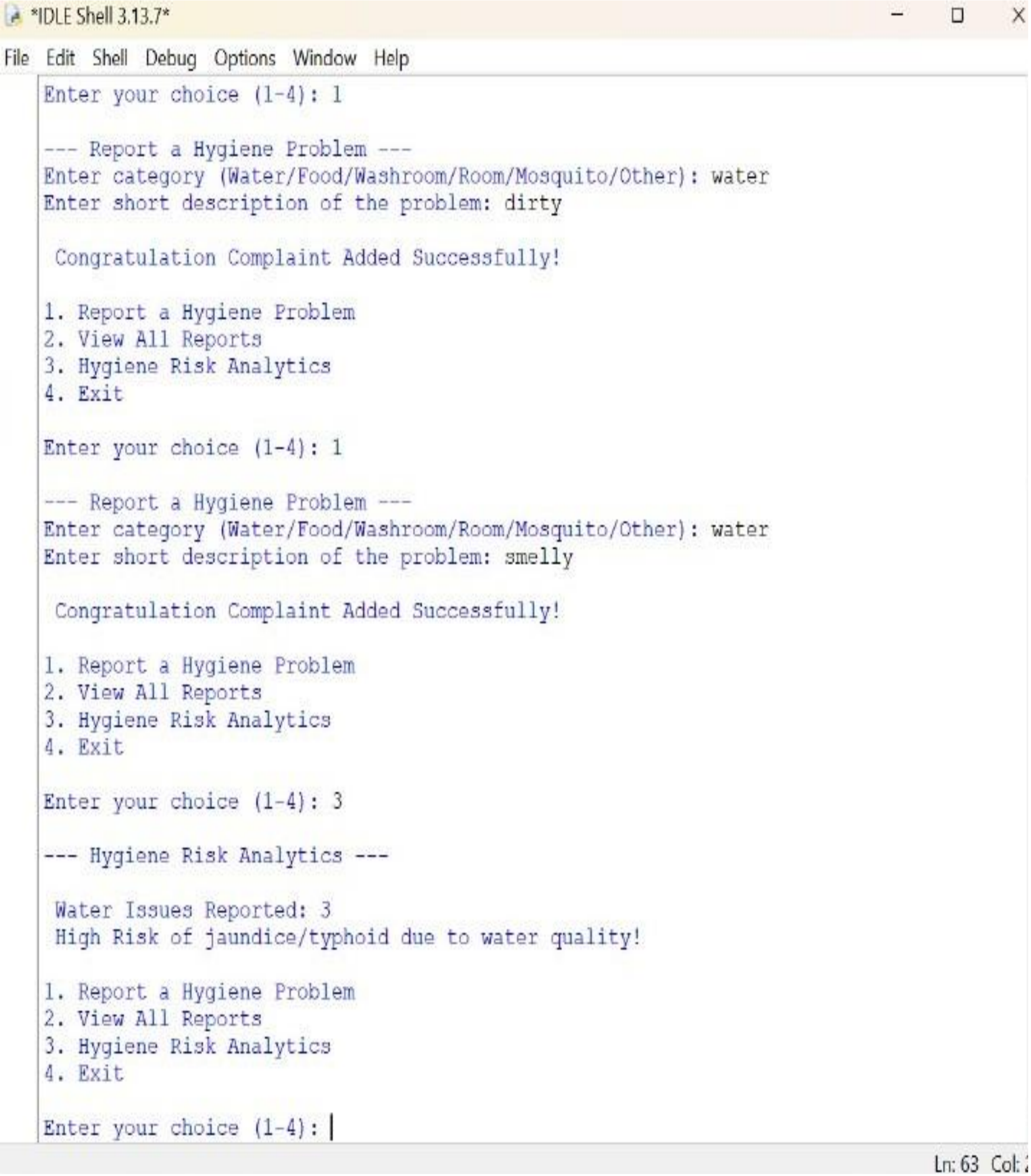
3)Modules Used: None (fully custom logic)

4)Structure: User menu loop Separate functions for reporting, viewing, analytics

10. SCREENSHOTS / RESULTS



```
Python 3.13.7 (tags/v3.13.7:bceelc3, Aug 14 2025, 14:15:11) [MSC v.1944 64 bit (AMD6
4)] on win32
Enter "help" below or click "Help" above for more information.
>>>
============== RESTART: C:/Users/MANAS/OneDrive/Desktop/project.py =============
------ Hostel Hygiene & Health Monitoring System ------

1. Report a Hygiene Problem
2. View All Reports
3. Hygiene Risk Analytics
4. Exit

Enter your choice (1-4): 1

--- Report a Hygiene Problem ---
Enter category (Water/Food/Washroom/Room/Mosquito/Other): water
Enter short description of the problem: unhealthy

 Congratulation Complaint Added Successfully!

1. Report a Hygiene Problem
2. View All Reports
3. Hygiene Risk Analytics
4. Exit

Enter your choice (1-4): 1

--- Report a Hygiene Problem ---
Enter category (Water/Food/Washroom/Room/Mosquito/Other): water
Enter short description of the problem: dirty

 Congratulation Complaint Added Successfully!

1. Report a Hygiene Problem
2. View All Reports
3. Hygiene Risk Analytics
4. Exit

Enter your choice (1-4): 1
```



```
Enter your choice (1-4): 1

--- Report a Hygiene Problem ---
Enter category (Water/Food/Washroom/Room/Mosquito/Other): water
Enter short description of the problem: dirty

 Congratulation Complaint Added Successfully!

1. Report a Hygiene Problem
2. View All Reports
3. Hygiene Risk Analytics
4. Exit

Enter your choice (1-4): 1

--- Report a Hygiene Problem ---
Enter category (Water/Food/Washroom/Room/Mosquito/Other): water
Enter short description of the problem: smelly

 Congratulation Complaint Added Successfully!

1. Report a Hygiene Problem
2. View All Reports
3. Hygiene Risk Analytics
4. Exit

Enter your choice (1-4): 3

--- Hygiene Risk Analytics ---

 Water Issues Reported: 3
 High Risk of jaundice/typhoid due to water quality!

1. Report a Hygiene Problem
2. View All Reports
3. Hygiene Risk Analytics
4. Exit

Enter your choice (1-4): 
```

11. Testing Approach

Test Case	**Input**	**Expected Output**
TC1	Choice = 1	Ask user for complaint details
TC2	Choice=2	Display stored complaints
TC3	Choice = 3 (No data)	Show “No data available”
TC4	Category = water, 3 times	Show high-risk warning
TC5	Invalid choice	Show “Invalid Choice”

12. Challenges Faced

During the development of the Hostel Hygiene & Health Monitoring System, I faced many challenges:

1)Managing data globally:

I struggled to correctly place the complaints list. Initially, I put it inside the loop by mistake, which caused the data to reset every time. Later, I learned that global data should be declared outside the loop.

2)Organizing functions in the right order:

At first, I wrote the functions after the main loop. This caused errors because Python executes from top to bottom, and functions must be defined before they are called.

3)Implementing the analytics logic:

Creating health warnings based on the number of complaints was difficult. I had to think logically about how to count complaints and when to show risk alerts like typhoid, dengue, etc.

4)Maintaining user-friendly menu navigation:

I faced issues making the menu loop work without crashing or exiting unexpectedly. After debugging, I learned how to properly use loops and conditional choices.

5)Following software engineering documentation:

Preparing diagrams (Use Case, Workflow, Sequence, ER diagram) and writing structured documentation was time-consuming, but it helped me understand how real-world software projects are documented.

13. LEARNING AND KEY TAKEAWAYS

1) Importance of modular programming.

2) Role of analytics in decision-making.

3) How small Python scripts can solve real-life problems.

4) Basic software engineering documentation and diagrams.

14. FUTURE ENHANCEMENTS

1) Add database (SQLite / JSON storage).

2) Admin login & resolution tracking.

3) Mobile Application with QR reporting.

4) Add photo upload & complaint status.

15. REFERENCES

1)Python Official Documentation

2)Software Engineering Principles (Pressman)

3)Hostel Hygiene Guidelines (Govt. of India)

5)CDC Public Health Hygiene Facts