Clinic Inventory System	
Final Project	
Course Code: CPE 201L	**Program:** BSCPE
Course Title: Data Structures and Algorithms	**Date Performed:** 11/08/2025
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Leader: Aquino, Jester J. **Members:** Caasi, Karl Elpedes, Glen Monoy, Justin Rhey Tan, Charles	**Instructor:** Engr. Maria Rizette Sayo

1. Objective(s):

The main goal of this project is to design and develop an efficient system that accurately manages and monitors the clinic's medical supplies, equipment, and resources.

This is accomplished by two major objectives:

- To efficiently manage and organize clinic inventory to ensure fast storage, retrieval, and updating of medical supply records.
- To automate and optimize the inventory process minimizing human errors, improving accuracy, and providing real-time information for better decision-making and resource management.

2. Intended Learning Outcomes (ILOs):

- Understand the concept and importance of using arrays in managing and organizing clinic inventory data such as medicines, equipment, and supplies.
- Apply basic data structure principles, particularly arrays, to store, retrieve, and update inventory records efficiently.
- Adding a simple script to handle inventory transactions like adding, deleting, and searching.
- Strengthen skills in Python programming and system design through the practical use of arrays.
- Analyze the efficiency and accuracy of the system in managing real-world clinic operations.

3. Discussion:

The Clinic Inventory System is designed to help our medical facilities manage their supplies, medicines, and equipment efficiently. In many clinics, manual inventory tracking often leads to errors, misplaced items, and inaccurate stock levels. Through the use of a computerized system, managing inventory becomes more organized, accurate, and time-saving.

This system allows users to record essential information such as item names, quantities, expiration dates, and categories. It also provides basic functions like adding new items, updating existing records, searching for specific items, and deleting outdated entries. By automating these processes, the system minimizes human error and improves record accuracy.

Moreover, this project enhances students' understanding of how data can be structured, stored, and managed within a system. It demonstrates how programming and logical organization can be applied to solve real-world problems in the healthcare setting. The Clinic Inventory System not only promotes efficiency in operations but also ensures that clinics maintain adequate supplies to provide continuous and effective patient care.

4. Materials and Equipments:

1. PyCharm
   - Is an Integrated Development Environment (IDE) for python.
2. Google Colab
   - It allows users to write and execute Python in browser
3. Desktop/laptop
   - Use for
4. Microsoft Word

- Use for writing the details and explanation of the python codes

5. Desktop/laptop

- Use for making the tasks needed

6. Windows 10/11

- Use to run necessary programs for python programming

5. Procedure:

Step 1: Start the application (cursor).

Step 2: Get the tools ready by importing all tools needed to build the program

Step 3: Make it look nice by sets the color theme and appearance

Step 4: Create an empty storage boxes like two empty list to store data (example medicine and equipment)

Step 5: Add a New medicine like adding new product to your inventory list

Step 6: Insert Medicine at the Beginning

Instead of adding at the end, you can add at position 0 (the very beginning)

all other medicines get pushed down

Step 7: Remove Medicine by ID

Step 8: Update Existing Medicine

Program loads the medicines data into the input fields

Step 9: Search by name

Step 10: Find by ID

Program goes through the list one by one

Check if ID matches

Returns the medicine when found

Step 11: Sort Medicines

Programs rearranges the medicine list alphabetically

Table refreshes to show sorted order

Step 12: Create Tabs

Create two tabs Medicine and Equipment

Step 13: Adding Input fields

Step 14: Highlighting Low Stock

Program checks each medicine in the table

If packs less than or total_qty less than 5 makes row Red

If expiring within 30 days make row yellow

Step 16: Activity Log

Every action is logged with a timestamp

Step 17: Real time clock

Clock in top right corner updates every second

Step 14: End (If no refresh is triggered, the app becomes idle and waits for user input, which restarts the loop at Step 9).

6. Algorithm

1. Start the program
2. Initialize `Medicine[]` and `Equipment[]` arrays
3. If “Medicines” is chosen
4. Display Options

-Add New

-Update

-Remove

-Search/Filter

-Sort

SS-View

5. If Add:

- Input item details
- Add item to array

6. If Update:

- Input item name
- Search in array
- Update details if found

7. If Delete:

- Input item name
- Search in array
- Remove item if found

8. If Search:

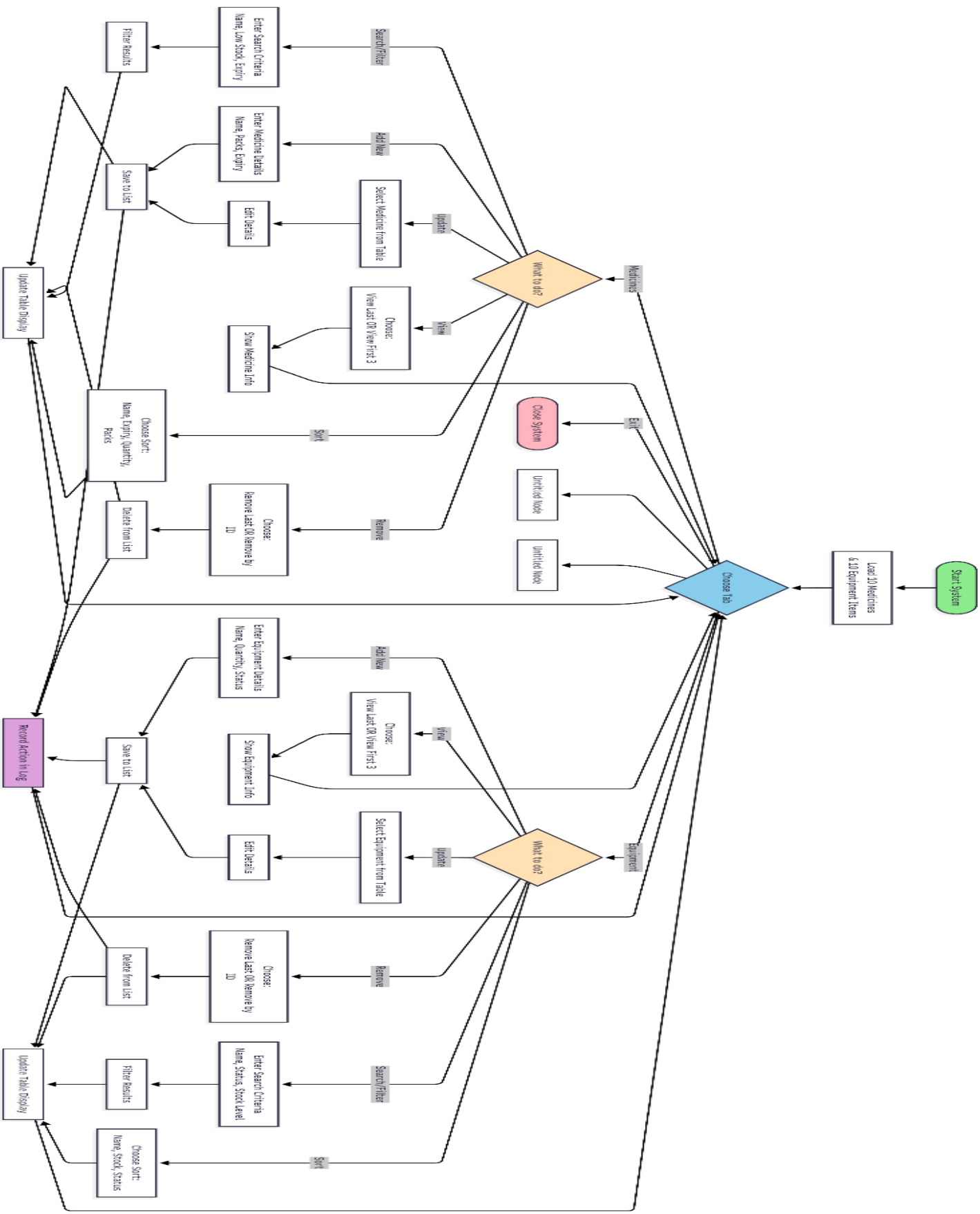
- Input item name
- Search in array
- Display details if found

9. If Display:

- Show all items in arrays

10. Reset to exit
11. End

7. FlowChart


Start System
Load 10 Medicines & 10 Equipment Items
Choose Tab
Medicines
Equipment
Close System
Unfilled Node
Unfilled Node
Exit
What to do?
Add New
Update
View
Search/Filter
Sort
Remove
Enter Medicine Details Name, Packs, Expiry
Select Medicine from Table
Edit Details
Choose: View Last OR View First 3
Show Medicine Info
Enter Search Criteria Name, Low Stock, Expiry
Choose Sort: Name, Expiry, Quantity, Packs
Choose: Remove Last OR Remove by ID
Filter Results
Save to List
Delete from List
Update Table Display
What to do?
Add New
Update
View
Search/Filter
Sort
Remove
Enter Equipment Details Name, Quantity, Status
Select Equipment from Table
Edit Details
Choose: View Last OR View First 3
Show Equipment Info
Enter Search Criteria Name, Status, Stock Level
Choose Sort: Name, Stock, Status
Choose: Remove Last OR Remove by ID
Filter Results
Save to List
Delete from List
Update Table Display
Record Action in Log

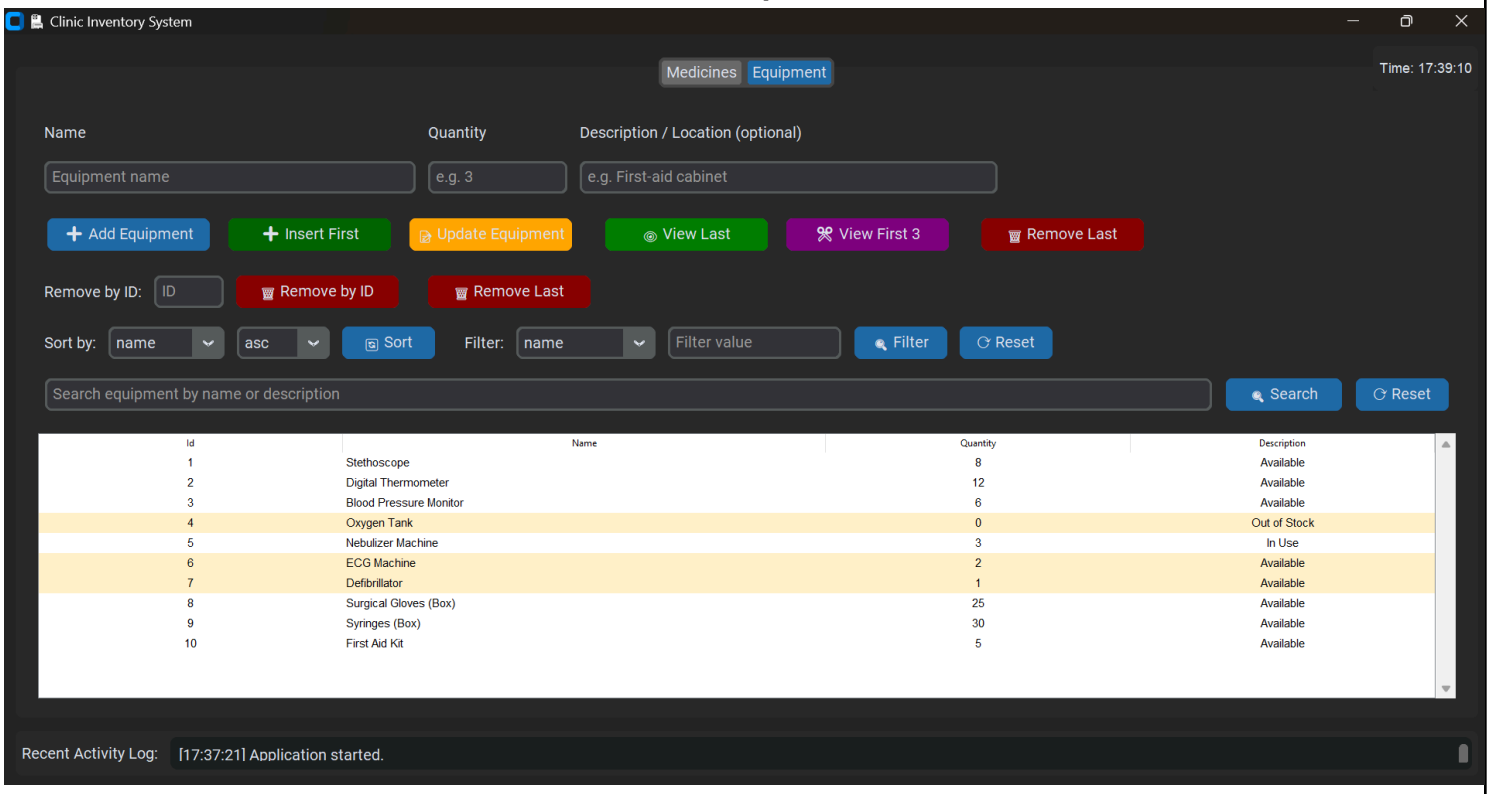
8. Pseudocode

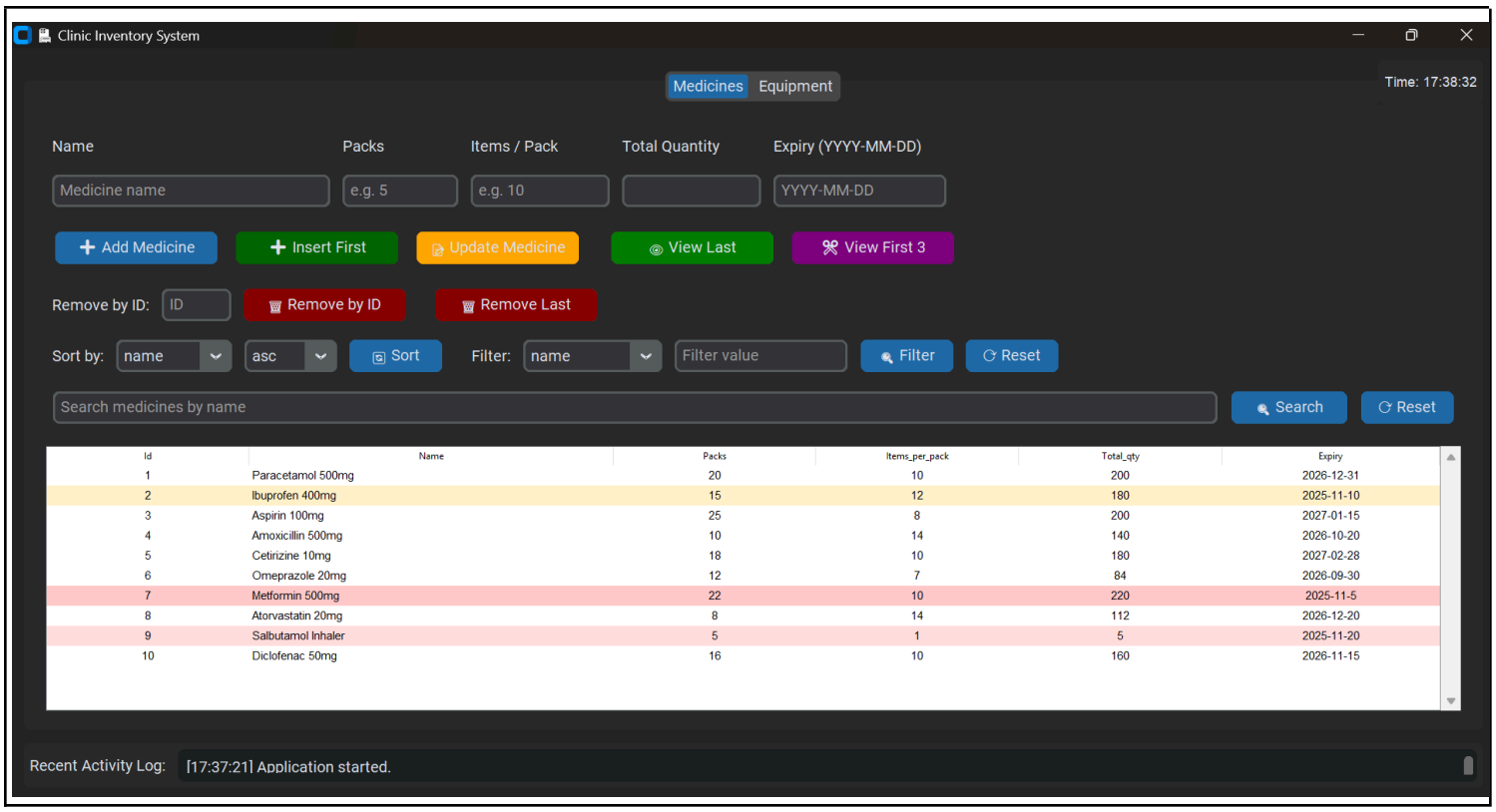
```
BEGIN
    Initialize system
    Input tabChoice  // Medicines, Equipment, or Exit

    IF tabChoice = Medicines THEN
        Input medChoice  // Add, Update, Remove, Search/Filter, Sort, View, or Back

        IF medChoice = Add THEN
            Input name, packs, expiry
            Add (name, packs, expiry) to MedicineList
            UpdateTableDisplay()

        ELSE IF medChoice = Update THEN
            Input selectedMedicine
            Input newName, newPacks, newExpiry
            Update selectedMedicine with (newName, newPacks, newExpiry)
            UpdateTableDisplay()

        ELSE IF medChoice = Remove THEN
            Input removeChoice  // Remove by ID or Remove Last
            IF removeChoice = Remove by ID THEN
                Input medicineID
                Delete medicine with ID = medicineID from MedicineList
            ELSE
                Remove last item from MedicineList
            ENDIF
            UpdateTableDisplay()

        ELSE IF medChoice = Search/Filter THEN
            Input criteria  // Name, Low Stock, Expiry
            Filter MedicineList using criteria
            UpdateTableDisplay()

        ELSE IF medChoice = Sort THEN
            Input sortChoice  // Name, Expiry, Quantity, Packs
            Sort MedicineList by sortChoice
            UpdateTableDisplay()

        ELSE IF medChoice = View THEN
            Input viewChoice  // View Last or View First 3
            IF viewChoice = View Last THEN
                Show last Medicine item(s)
```

```
        ELSE
            Show first 3 Medicine items
        ENDIF
    ENDIF


ELSE IF tabChoice = Equipment THEN
    Input eqChoice  // Add, Update, Remove, Search/Filter, Sort, View, or Back

    IF eqChoice = Add THEN
        Input name, quantity, status
        Add (name, quantity, status) to EquipmentList
        UpdateTableDisplay()
        RecordActionInLog()

    ELSE IF eqChoice = Update THEN
        Input selectedEquipment
        Input newName, newQuantity, newStatus
        Update selectedEquipment with (newName, newQuantity, newStatus)
        UpdateTableDisplay()
        RecordActionInLog()

    ELSE IF eqChoice = Remove THEN
        Input removeChoice  // Remove by ID or Remove Last
        IF removeChoice = Remove by ID THEN
            Input equipmentID
            Delete equipment with ID = equipmentID from EquipmentList
        ELSE
            Remove last item from EquipmentList
        ENDIF
        UpdateTableDisplay()
        RecordActionInLog()

    ELSE IF eqChoice = Search/Filter THEN
        Input criteria  // Name, Status, Stock Level
        Filter EquipmentList using criteria
        UpdateTableDisplay()
        RecordActionInLog()

    ELSE IF eqChoice = Sort THEN
        Input sortChoice  // Name, Stock, Status
        Sort EquipmentList by sortChoice
        UpdateTableDisplay()
        RecordActionInLog()
```

```
    ELSE IF eqChoice = View THEN
        Input viewChoice  // View Last or View First 3
        IF viewChoice = View Last THEN
            Show last Equipment item(s)
        ELSE
            Show first 3 Equipment items
        ENDIF
    ENDIF


ELSE IF tabChoice = Exit THEN
    Stop system
ENDIF

END
```

9. Output




Clinic Inventory System
Medicines
Equipment
Time: 17:38:32
Name
Packs
Items / Pack
Total Quantity
Expiry (YYYY-MM-DD)
Medicine name
e.g. 5
e.g. 10
YYYY-MM-DD
Add Medicine
Insert First
Update Medicine
View Last
View First 3
Remove by ID:
ID
Remove by ID
Remove Last
Sort by:
name
asc
Sort
Filter:
name
Filter value
Filter
Reset
Search medicines by name
Search
Reset
Id
Name
Packs
Items_per_pack
Total_qty
Expiry
1
Paracetamol 500mg
20
10
200
2026-12-31
2
Ibuprofen 400mg
15
12
180
2025-11-10
3
Aspirin 100mg
25
8
200
2027-01-15
4
Amoxicillin 500mg
10
14
140
2026-10-20
5
Cetirizine 10mg
18
10
180
2027-02-28
6
Omeprazole 20mg
12
7
84
2026-09-30
7
Metformin 500mg
22
10
220
2025-11-5
8
Atorvastatin 20mg
8
14
112
2026-12-20
9
Salbutamol Inhaler
5
1
5
2025-11-20
10
Diclofenac 50mg
16
10
160
2026-11-15
Recent Activity Log:
[17:37:21] Application started.

7. Conclusion:

The Clinic Inventory System provides an organized and efficient way to manage the supplies, medicines, and equipment used in a clinic. It ensures that all inventory records are properly stored, updated, and accessed when needed, helping maintain accuracy and reliability in daily operations.

This project also highlights the importance of technology in modern healthcare operations. By automating inventory tasks, clinics can save time, minimize human error, and focus more on providing quality patient care. Overall, the Clinic Inventory System demonstrates how computer-based solutions can greatly enhance the daily operations of a medical facility.

8. References

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[2] W3Schools. (n.d.). *DSA Arrays*.
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