

# Hospital Management System - DSA Project Report

Name: Syeda Hadia Batool

Roll Number: 086

## Step 1: Create Patient Class

We started by creating a Patient class to store essential patient details such as ID, name, age, and disease. This class uses object-oriented principles and sets the foundation for managing patient data efficiently.

## Step 2: Store Patients Using List (Array)

A Python list is used to store all patient objects. This simulates an array, allowing us to easily add, view, and traverse patient records in memory.

## Step 3: Add and View Patients

We implemented functions to add patients to the list and view them. Each patient is displayed using the `__str__` method for clean formatting. This step confirmed our data structure is functional.

## Step 4: Bubble Sort by Age and Name

We applied bubble sort to arrange patients either by age or name. Though not optimal in real-world use, it demonstrates algorithm logic clearly, which is the focus of a DSA-based system.

## Step 5: Binary Search by Name

Binary search was used for fast retrieval of a patient by name. For this, the list must be sorted first. This step shows how algorithm efficiency improves with sorted data.

## Step 6: Add Medical History (Linked List)

We introduced a MedicalRecordNode class and used a singly linked list to manage each patient's growing medical history. This data structure is ideal for dynamic entries, as it allows easy insertion without resizing.

## Step 7: Search and Update Medical History

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We added methods to search patients by ID and append new records to their history. We also implemented a method to print all records. This makes the system more realistic by showing a complete patient journey.

## **Step 8: Menu-Driven Interface**

Finally, we created a user-friendly menu that lets users interact with the system: adding patients, sorting, searching, and updating/viewing history. This brings all features together for smooth demonstration during viva.

## **Conclusion**

This project successfully implements core data structure concepts to build a working Hospital Management System in Python. Each part - arrays, sorting, searching, and linked lists - reflects real-world logic and DSA knowledge. It not only reinforces programming skills but also builds confidence in solving algorithmic problems.