

# Hospital Management System

## Documentation

### **Overview:**

The Hospital Management System is designed to manage hospital staff, patient records, prescriptions, and administrative functions. It follows OOP principles such as Encapsulation, Inheritance, Abstraction, and Composition while implementing SOLID principles and the Factory Design Pattern.

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### **1. Classes Overview:**

#### **1.1 Person Class:**

The Person class is a base class representing a general individual in the hospital system.

#### **Attributes:**

id (int): Unique identifier.

name (str): Full name.

birth\_year (int): Year of birth.

gender (str): Male or Female.

phone\_number (str): Contact number.

nationality (str): Nationality of the person.

#### **Methods:**

calculate\_age(): Returns the current age based on birth\_year.

display\_info(): Prints person details.

#### **1.2 Employee (Abstract Class):**

Inherits from Person.

Common attributes for employees (salary, department, etc.).

Includes abstract method perform\_duties().

### **1.3 Doctor Class:**

Inherits from Employee.

Additional attributes: specialization (str).

#### **Methods:**

perform\_duties(), diagnose\_patient().

### **1.4 Nurse Class:**

Inherits from Employee.

Additional attributes: unit (str), specialty (str).

**Methods:** assist\_doctor(), check\_vitals().

### **1.5 Patient Class:**

Inherits from Person.

Additional attributes: medical\_history (list).

### **1.6 DataEntry Class:**

Inherits from Employee.

#### **Methods:**

add\_record(), delete\_record().

### **1.7 Manager Class:**

Inherits from Employee.

**Methods:** perform\_duties().

### **1.8 Prescription & PrescriptionFactory:**

**Prescription Class:** Handles medication prescriptions.

**PrescriptionFactory Class:** Factory pattern for creating prescriptions.

### **1.9 HospitalDatabase (Singleton Pattern):**

Ensures only one instance of the hospital database is created.

## **2. Database Integration**

Each class has a corresponding database table, and constructors automatically store data.

## **3. System Operations**

Doctors diagnose patients.

Nurses assist doctors & check vitals.

Data Entry Staff manage records.

Managers oversee operations.

Prescriptions are issued via the PrescriptionFactory.

## **4. Testing & Validation**

### **4.1 Pytest Test Cases:**

- ☒ **Test: Person Class**
- ☒ **Test: DataEntry Class**
- ☒ **Test: Nurse Class**
- ☒ **Test: Prescription & Factory**
- ☒ **Test: Singleton Pattern in HospitalDatabase**

## **5. Deployment & DevOps**

- Version Control: Managed via GitHub.
- Automated Tests: Pytest is integrated into GitHub Actions.
- Dockerization: (Pending Implementation)

## **6.UML design for the hospital mangement system**

### **Conclusion**

This documentation outlines the Hospital Management System, covering class architecture, database design, system functionalities, and testing strategies. Future improvements include Dockerization and further automation.

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