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**COMSATS UNIVERSITY ISLAMABAD, ABBOTTABAD**

***Design Pattern***

Lab Mid Exam

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***Submitted to:***

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**Lab Mid-Term Exam:**

You are tasked with designing a **Healthcare Management System** for a hospital network. The system manages patient records, schedules, medical services, and third-party integrations (e.g., pharmacy and insurance services).

The system must provide the following functionalities:

1. **Patient Management**:
   * Patients have profiles, including personal details, medical history, and active prescriptions.
   * Different patient profiles (e.g., pediatric, adult, senior) have specific attributes and care guidelines.
2. **Third-Party Integration**:
   * The system must integrate external services like pharmacy APIs (for prescriptions) and insurance APIs (for billing), which have varying interfaces.
3. **Flexible Treatment Plans**:
   * Doctors can prescribe treatment plans dynamically by adding or modifying treatments and procedures (e.g., diagnostics, medications, therapies).
4. **Hospital Resource Scheduling**:
   * Rooms, equipment, and staff must be allocated step-by-step to ensure the smooth operation of procedures.
5. **Service Management**:
   * The system must manage services like billing, notification, and authentication for scalability and reusability.

### **Tasks**

* Identify and justify the design patterns that best suit the system requirements.
* Create a class diagram showing how the identified design patterns integrate into the system. Include relationships, key classes, and pattern implementation.
* Write a code to demonstrate the implementation of identified patterns.

# Task-01

**1. Patient Management** *(Factory Pattern)*

**2. Third-Party Integration (***Adapter Pattern)*

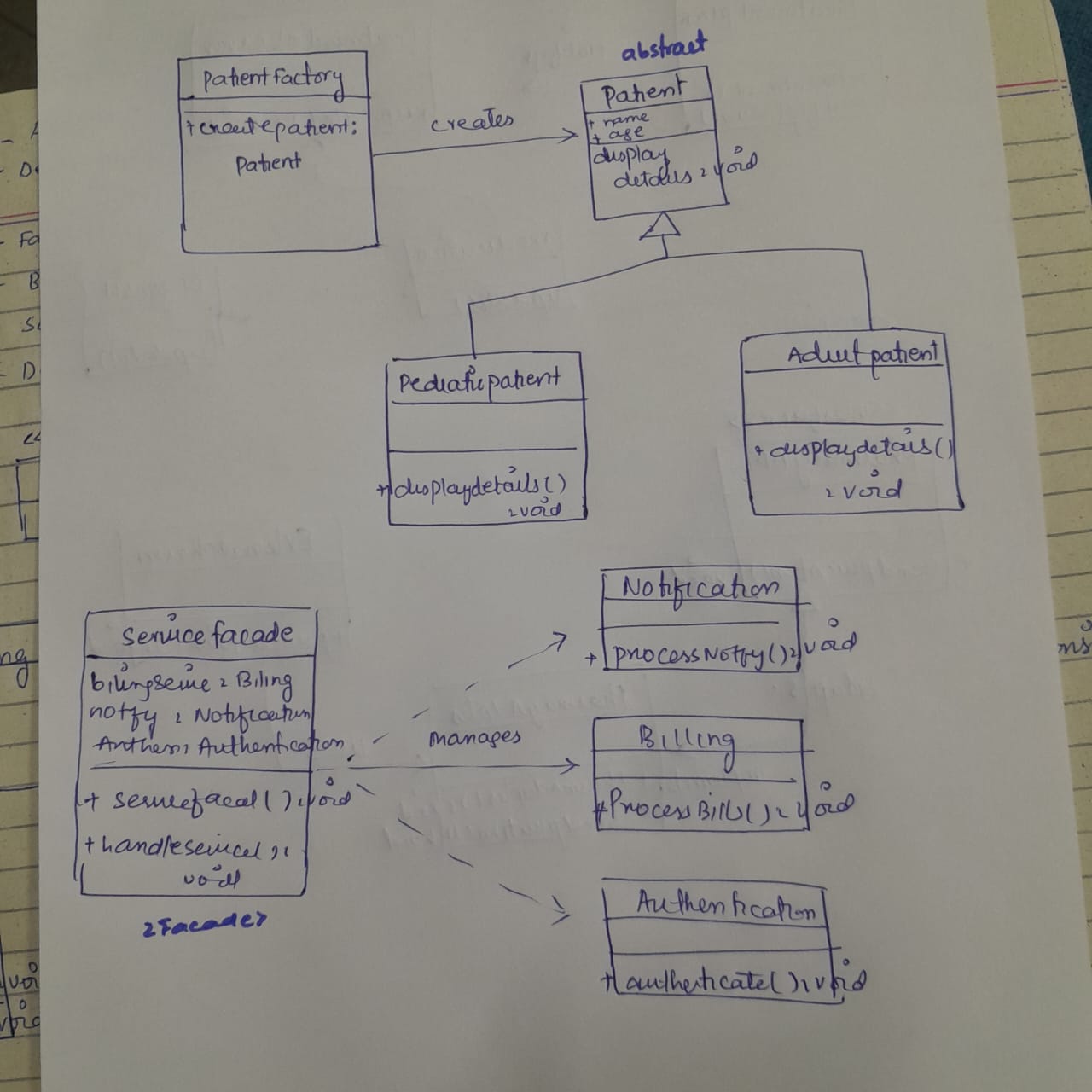
**3. Flexible Treatment Plans** *(Observer Pattern.)*

**4. Hospital Resource Scheduling (***Builder Pattern)*

**5. Service Management (***Facade Pattern)*

# Task-02

## Class diagram:



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