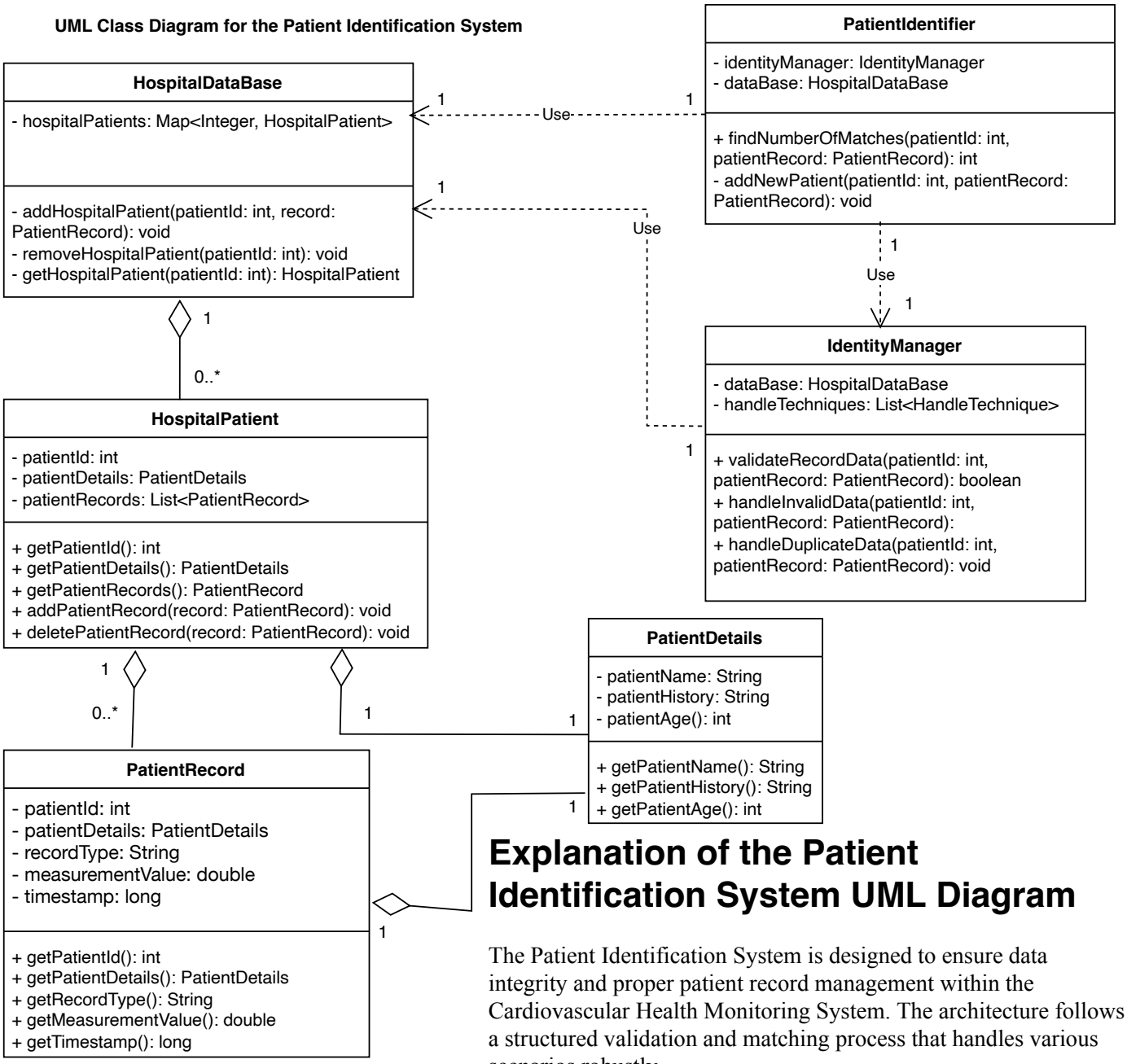

Explanation of the Patient Identification System UML Diagram

The Patient Identification System is designed to ensure data integrity and proper patient record management within the Cardiovascular Health Monitoring System. The architecture follows a structured validation and matching process that handles various scenarios robustly.

When a new patient record arrives, the PatientIdentifier serves as the central coordinator, first delegating validation responsibilities to the IdentityManager. This separation of concerns ensures that data validation logic remains centralized and maintainable. If the IdentityManager determines the record is invalid, it handles the error appropriately—typically by logging detailed error messages containing the problematic record information for administrative review and system debugging. For valid records, the PatientIdentifier queries the HospitalDataBase to determine how many existing patients match the incoming record. This matching process is crucial for maintaining data consistency and preventing duplicate patient entries. The system handles three distinct scenarios based on the match count.

When zero matches are found, the system recognizes this as a new patient registration. The PatientIdentifier invokes its private addNewPatient method to create a new HospitalPatient entry in the database, and adds the PatientRecord to the list of PatientRecord items for the newly created patient.

A single match represents the ideal scenario—the record belongs to an existing patient. The system seamlessly appends the new PatientRecord to the appropriate patient's existing record list (using methods in HospitalDataBase), maintaining chronological patient history.

Multiple matches indicate a data integrity issue requiring sophisticated handling. The IdentityManager resolves these duplicates through intelligent merging strategies, consolidating record lists from duplicate patient entries into a single comprehensive record, then removing redundant entries. This approach preserves valuable patient data while maintaining database consistency and supporting the system's reliability requirements in the critical healthcare environment.