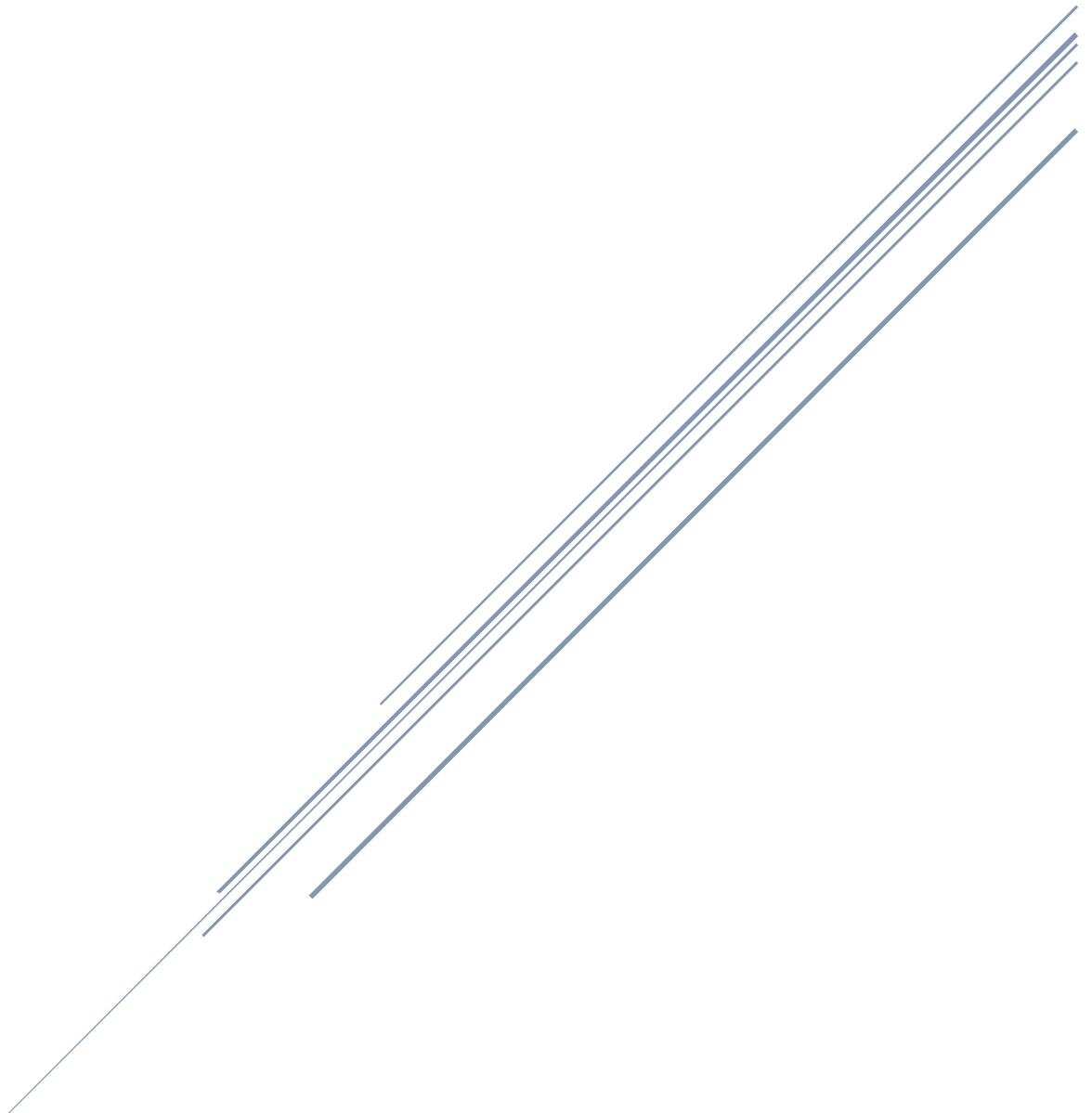


STUDENT HEALTH & FITNESS MONITORING SYSTEM

PROJECT PROPOSAL



Database Management System

Table of Contents

Introduction to the Student Health & Fitness Monitoring System (SHFMS)	2
Problems to Address	2
Functional Requirements (FRs)	3
User Type and Their Roles	4
Scope and Privileges	5
Scope (System Boundaries)	5
Privileges (User Permissions)	5
Entities, Attributes, and Relationships (ERD)	7
Key Relationships for ERD	9
Min and Max Cardinality for SHFMS Relationships	10
ERD	12

Introduction to the Student Health & Fitness Monitoring System (SHFMS)

The **Student Health & Fitness Monitoring System (SHFMS)** is a comprehensive, digital framework designed to systematically collect, store, analyze, and manage the health and physical fitness data of students within an educational institution. It moves beyond traditional paper-based records and disparate data sources to create a unified, proactive platform for promoting student well-being.

Problems to Address

The SHFMS aims to solve several common issues in student welfare and physical education management:

- **Lack of Centralized Health Records:** Student health information (medical history, fitness assessment results, injury reports) is often scattered, making it hard for staff (nurses, coaches) to access a **complete, timely profile** for a student.
- **Ineffective Fitness Tracking:** Manual methods (paper records, spreadsheets) for logging physical activities and fitness test results are **prone to error, difficult to analyze**, and do not provide students with immediate, actionable feedback.
- **Delayed Intervention:** Health or fitness concerns (e.g., poor BMI, low activity levels) often go unnoticed until they become serious, leading to **delayed or reactive** health interventions.
- **Generic Health Programs:** Programs are often one-size-fits-all, failing to address the **diverse, personalized** health and fitness needs of individual students.

Functional Requirements (FRs)

Functional requirements define what the system *must do*.

- **User Authentication and Authorization:** The system **must** allow different user types (Student, Nurse, Coach, Admin) to log in securely and access features based on their defined roles and privileges.
- **Health Profile Management:** The system **must** allow the Student or Nurse to **record and update** demographic details, medical history, allergies, and emergency contact information.
- **Fitness Data Logging:** The system **must** allow students or coaches to **input and track** various fitness metrics, such as steps taken, duration/type of exercise, and results from standardized fitness tests (e.g., BMI, endurance run time).
- **Goal Setting and Tracking:** The system **must** allow students to **set and monitor** personalized health and fitness goals (e.g., weight loss, daily steps target) and view their progress.
- **Alerts and Notifications:** The system **must automatically generate alerts** for the Nurse/Coach when a student's data falls outside healthy parameters or when an annual check-up/assessment is due.
- **Reporting and Analytics:** The system **must** provide Nurse/Coach users with **visual reports and dashboards** to analyze individual and aggregate student health and fitness trends.

User Type and Their Roles

User Type	User Role	Description
Student	Primary Role	The individual being monitored. Interacts with the system to view their data and log activities.
Coach/Trainer	Assessor/Advisor	Manages fitness assessments, logs exercise data, and provides fitness advice/plans.
School Nurse/Doctor	Health Care Provide	Manages medical records, inputs clinical health data (vitals, check-ups), and handles medical alerts.
Administrator	System Manager	Oversees the entire system, manages user accounts, and configures system settings/parameters.

Scope and Privileges

Scope (System Boundaries)

The **Scope** defines what the system will and will not cover.

- **In Scope:**

1. **Data Collection and Storage:** Centralized, secure storage of student health and fitness data.
2. **Monitoring and Reporting:** Automated tracking, visualization, and generation of reports on key health metrics.
3. **Personalized Recommendations:** Simple automated suggestions based on data (e.g., "Increase water intake").
4. **Internal Communication:** Messaging/alert system between students, coaches, and nurses.

- **Out of Scope:**

1. **Direct Telemedicine:** The system will **not** provide live video consultation with external doctors.
2. **External Integration (e.g., public health authorities):** Data sharing with external health agencies is **not** included initially.
3. **Billing/Payment Processing:** No financial transactions are handled (e.g., for gym membership fees).

Privileges (User Permissions)

Privileges define the specific actions a user role is permitted to perform.

- **Student:**

1. **Read:** Own **Health Profile, Fitness Logs, Goal** progress, and basic **Alerts**.
2. **Create/Update:** New **Fitness Logs, Goals**, and non-clinical self-reported data (e.g., sleep, water intake).

- **Coach/Trainer:**
 1. **Read:** Student **Fitness Logs, Goals**, non-clinical parts of **Health Profile** for assigned students.
 2. **Create/Update:** Student **Fitness Assessments** and **Training Plans**.
 3. **Analyze:** Aggregate fitness trends across a group of students.
- **School Nurse/Doctor:**
 1. **Read/Update:** All student **Health Profile** and clinical data (vitals, prescriptions).
 2. **Create/Update:** **Medical Records** and **Appointments**.
 3. **Generate:** Clinical health reports and alerts.
- **Administrator:**
 1. **Read/Update/Delete:** All **User Accounts** and their roles/privileges.
 2. **Configure:** System parameters, fitness test standards, and alert thresholds.
 3. **Access:** Full system audit logs and data backups.

Entities, Attributes, and Relationships (ERD)

No	Entity	Key Attribute	Other Attributes	PK/FK	Relationship
1	Student	Student ID	FirstName, LastName, DateOfBirth, Gender, EmergencyContactPhone, FK_UserID	PK: StudentID	1:M with HealthProfile, FitnessLog, Goal, Appointment
2	User	User ID	Username, PasswordHash, Role (Student, Nurse, Coach, Admin), Email	PK: UserID	1:1 with Student, Coach, Nurse
3	Coach	Coach ID	FirstName, LastName, Certification, ContactPhone, FK_UserID	PK: CoachID	1:M with Student (Advises), TrainingPlan
4	Nurse	Nurse ID	FirstName, LastName, LicenseNumber, FK_UserID	PK: NurseID	1:M with MedicalRecord, Appointment
5	Health Profile	Profile ID	Height, BloodType, Allergies, ChronicConditions, FK_StudentID	PK: ProfileID, FK: StudentID	1:1 with Student
6	Fitness Log	Log ID	ActivityType, DurationMinutes, CaloriesBurned, Distance, LogDate, FK_StudentID	PK: LogID, FK: StudentID	M:1 with Student
7	Medical Record	Record ID	VisitDate, Diagnosis, Prescription, Notes, FK_NurseID, FK_StudentID	PK: RecordID, FKs: NurseID, StudentID	M:1 with Student, Nurse
8	Goal	Goal ID	GoalType (Weight, Steps, RunTime), TargetValue, StartDate, EndDate, IsAchieved, FK_StudentID	PK: GoalID, FK: StudentID	M:1 with Student
9	Appointment	Appointment ID	AppointmentDate, AppointmentTime, Reason, Status, FK_StudentID, FK_NurseID	PK: AppointmentID, FKs: StudentID, NurseID	M:1 with Student, Nurse

10	Training Plan	Plan ID	PlanName, Description, StartDate, EndDate, FK_CoachID	PK: PlanID, FK: CoachID	1:M with Coach, 1:M with PlanDetail
11	CoachFitness Review	Review ID	ReviewDate, ReviewNotes, FK_CoachID, FK_LogID	PK: ReviewID (or Composite PK: FK_CoachID, FK_LogID), FKs: CoachID, LogID	Many to One (Many entries link to One Coach/One Log)
12	Plan Detail	Detail ID	DayOfWeek, ExerciseName, Sets, Reps, FK_PlanID	PK: DetailID, FK: PlanID	M:1 with TrainingPlan

Note: The PlanDetail entity is included to break down the TrainingPlan into specific daily/weekly exercises, often arising from a Many-to-Many relationship between Student and TrainingPlan (though here simplified for space/clarity by linking PlanDetail to a Plan, and the Plan to the Coach/Student).

Key Relationships for ERD

Relationships	Entities Involved	Cardinality	Explanation
Logs	Student and Fitnesslog	1 to Many (1:M)	One Student can have many FitnessLogs recorded over time, but a FitnessLog belongs to only one Student .
Manages	Nurse and MedicalRecord	1 to Many (1:M)	One Nurse can manage many MedicalRecords (and Appointments), but a MedicalRecord is created by only one Nurse .
Has	Student and HealthProfile	1 to One (1:1)	A Student has exactly one current HealthProfile , and a HealthProfile belongs to one Student .
Advises	Coach and Student	1 to Many (1:M)	A Coach can advise many Students , but a Student may be officially assigned to one primary Coach (or M:M, if multiple coaches).
Monitors	Coach and FitnessLog	Many to Many (M:M)	A Coach can monitor the FitnessLogs of many Students , and a FitnessLog might be reviewed by (or associated with a program managed by) multiple Coaches . This typically requires a Junction Table (e.g., CoachFitnessReview).
Utilizes	Goal and TrainingPlan	Many to Many (M:M)	A specific Goal (e.g., "Improve running time") can be supported by one or more TrainingPlans , and a single TrainingPlan can help a student achieve multiple Goals . This also requires a Junction Table (e.g., GoalPlanAssociation).
Submits	Student and MedicalRecord	Many to Many (M:M)	A Student can have multiple MedicalRecords over time, and a MedicalRecord entry might reference multiple related Students (e.g., a shared illness report, though this is less common). Crucially, a MedicalRecord is related to one student and one nurse, but the

			Student-MedicalRecord link itself is M:M over time (one student <i>has</i> many records, many records <i>belong</i> to a student). Since you already defined a 1:M relationship (Student \rightarrow MedicalRecord), let's add one involving a third party.
Relates to	Fitnesslog and Goal	Many to One (M:1)	An individual entry in a FitnessLog (e.g., a 30-minute run) is often tracked against a specific Goal (e.g., "Run 5 miles this week"). Multiple FitnessLogs contribute to one Goal .

Min and Max Cardinality for SHFMS Relationships

Relationship	Entity 1	Cardinality (Min/Max)	Entity 2	Cardinality (Min/Max)	Explanation
Logs	Student	(0,N)	FitnessLog	(1,1)	A Student is <i>not required</i> to have a log yet (0), but can have many (N). A FitnessLog <i>must</i> belong to exactly one Student (1).
Manages	Nurse	(0,N)	MedicalRecord	(1,1)	A Nurse may not have created a record yet (0), but can create many (N). A MedicalRecord <i>must</i> be managed/created by exactly one Nurse (1).
Has	Student	(1,1)	HealthProfile	(1,1)	Mandatory 1:1. A Student <i>must</i> have one profile, and the Profile <i>must</i> belong to one Student.

Advises	Coach	(0,N)	Student	(0,1)	A Coach may advise many Students . A Student may be advised by <i>at most</i> one primary Coach (1) or none (0).
Monitors	Coach	(0,N)	FitnessLog	(0,N)	M:M . Resolved by a junction table. A Coach can monitor many Logs . A Log can be monitored by many Coaches or none yet.
Utilizes	Goal	(0,N)	TrainingPlan	(0,N)	M:M . Resolved by a junction table. A Goal can utilize many Plans or none. A Plan can help achieve many Goals or none.
Submits	Student	(0,N)	MedicalRecord	(1,1)	<i>Using the 1:M constraint defined earlier:</i> A Student can generate many Records . A Record must belong to one Student .
Relates to	FitnessLog	(0,N)	Goal	(0,1)	Many Logs can relate to one Goal (M:1). A Log entry can exist without being tied to a Goal (0). A Goal may not have any Logs related to it yet (0), but many Logs can relate to it (N on the Log side).

ERD

