**UNIVERSITY SAFETY MANAGEMENT SYSTEM**

**P2. Database Design and Initial ERD**

Submitted by: Data Diggers

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**A screenshot of a social media post

Description automatically generated**

**Initial ERD of University Safety Management System**

**BACKGROUND**

Safety departments, like the Police Departments, are required to proactively ensure the safety of their subjects and citizens. They need to be prepared for all contingencies and act quickly in case of any mishaps or accidents. This process is impeded if the organization is not structured properly.

A University Safety department, though smaller in scale, is a crucial part of any University to ensure the well being of its community. We aim to provide a way to better organize their records through the use of a Database, to help them cut down on time required for processing and spend more time proactively patrolling, resolving incidents and ensuring the safety of the entire community.

**PROBLEMS ADDRESSED**

* Efficient storage of details about the employees, along with their responsibilities.
* Segregation of employees through the use of super types and subtypes so organization of their data is simpler.
* Detailed shift information, like the timings and the employees that are assigned a particular shift, which is useful to keep track of in the event of any mishaps.
* Data of the units or sub – divisions in the department are stored, that also indicate the duties of each unit which helps for a better understanding of the jobs performed.
* Details about the services provided are stored with the respective departments that provide the service to make querying information about a service easier.
* Stores data about the various enrollments as an associative entity for services to better keep track of the usage statistics which further helps to improve upon any drawbacks.
* Contains data about the entire University Community to supplement the information about any incidents and help resolve them quickly.
* Details about the respective property registrations are stored to keep track of properties, even in the event of loss or theft.
* All incident details, along with their respective reports if needed, are stored and can be retrieved easily if needed in the future.

**ENTITIES**

1. EMPLOYEE
2. CIVILIAN
3. OFFICER
4. STUDENT
5. UNIVERSITY COMMUNITY
6. PROPERTY REGISTRATION
7. UNIT
8. SERVICE
9. SERVICE REGISTRATION
10. INCIDENT
11. REPORT
12. NOTIFICATION
13. SHIFT

**BUSINESS RULES AND ENTITIES DESCRIPTION**

**EMPLOYEE**

In the employee entity all the information related to employees working in the safety department will be stored. Each employee works in only one department and each department can have multiple employees. All the employees are assigned a specific shift. Each employee may or may not have supervisors and each supervisor supervises one or many employees. The EmpSupervisor\_ID is a recursive foreign key. Employee entity has a unary relationship with itself.

PRIMARY KEY: Emp\_ID

FOREIGN KEY: Dept\_ID, EmpSupervisor\_ID

**CIVILIAN**

This is a sub-type of employee entity. These civilians are not sworn officers but they are employees at the department.

**STUDENT**

This is also a sub-type of employee entity and this entity holds the information of students (UC\_ID) who are working in safety department.

**OFFICER**

This is also a sub-type of employee entity and this entity contains the information of sworn police officers with their ranks in it. Officers can directly issue notifications when needed and they may be assigned to incidents.

**UNIVERSITY COMMUNITY**

This entity holds the information of students studying in the university, faculties and staff. University community may enroll for the services and opt for property registrations, but each service enrollment must contain a unique service, ID and date. Each property registration can be mapped to only one member of the university community.

PRIMARY KEY: UC\_ID

**PROPERTY REGISTRATION**

This entity holds the information about the property registrations which help keep track of their devices when stolen or lost. Here properties may include bikes, cycles, laptops, mobiles etc. It can be argued that property registrations can be provided as another service. However, since property registrations are a large part of what the department deals with on a regular basis, we feel it is more appropriate to create a separate entity for it.

PRIMARY KEY: PropertyRegistration\_ID

FOREIGN KEY: UC\_ID

**UNIT**

This entity holds the information of different units or sub-divisions present in the safety department along with their duties. Each unit may provide many services, but each service will be provided by a single unit.

PRIMARY KEY: Unit\_ID

**SERVICE**

This entity holds the information about the services provided by different units in the safety management cell.

PRIMARY KEY: Service\_ID

FOREIGN KEY: Unit\_ID

**SERVICE ENROLLMENT**

This associative entity of UNIVERSITY COMMUNITY and SERVICES holds the information about the student enrollments for a specific service on a particular date, location. The attribute Emp\_ID contained in this entity refers to the ID of the employee in charge of conducting the service.

PRIMARY KEY: UC\_ID, Service\_ID

FOREIGN KEY: UC\_ID, Service\_ID

**INCIDENT**

This entity contains data about the incidents that were reported, the date and time of the incident and also, name of the person who is reporting, if they do not choose to be anonymous. In case the incident is reported by a patrol officer, then it would contain information about the patrol officer. Also, every INCIDENT may not result in a report, but every report must be a unique INCIDENT.

PRIMARY KEY: Incident\_ID

FOREIGN KEY: Emp\_ID

**REPORT**

This is a weak entity of INCIDENT and contains the report information about the incident to file away for future reference or forward to other departments as required. This is a weak entity as not all incidents can be considered important enough to file a report and a report cannot exist without an incident. This entity is connected only to the sub type OFFICER as only officers file reports.

PRIMARY KEY: Report\_ID, Incident\_ID

FOREIGN KEY: INCIDENT\_ID

**NOTIFICATION**

This entity contains the information about the notifications passed, the details of the notification, the time and, if required, the officer who approved the notification. Notifications are of 3 types namely alerts, timely warnings and advisories. Depending on the situation, any type of notification can be issued. This entity is connected to the sub type OFFICER as only the officers have the authority to approve the notification.

PRIMARY KEY: Notification\_ID

FOREIGN KEY: Emp\_ID

**SHIFT**

This entity holds the information about the different shifts the employees must take. It has the shift number, the start time and the end time. Each shift must have one or more employees, but each employee is assigned only one shift.

PRIMARY KEY: Shift\_Number