
Cairo University - Faculty of Engineering

Computer Engineering Department

Advanced Database Systems

# Project Phase one

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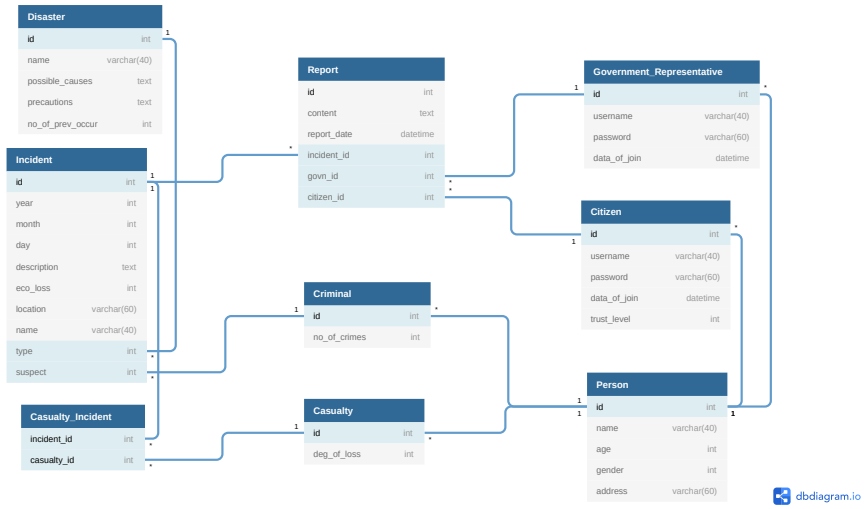


Figure 1: Database Schema

## 1.1 Schema Illustration

The chosen system consists of a database that stores *natural* and *man-made disasters* for creating an *incident report website*. The database consists of 9 relations, which are described as follows :

1. **Disaster Relation :** contains the *names* of the main natural and man-made disasters, for example: *the names of famous hurricanes and floods*, and their *causes* and *precautions*.

2. **Incident Relation :** contains the information of *specific incidents* of the disasters, like their *dates, locations and descriptions*.

3. **Person Relation :** an abstract relation of *all types of persons* that can exist in the database, contains the meta information of any person *(name, age, gender and address)*.

4. **Citizen Relation :** contains information of a citizen, *which is the person that can report an incident on the website*. This information includes *username, password, date of join and trust level of the citizen (used to weight the submitted report)*.

5. **Government Representative Relation :** contains information of a government representative, *which is the person that can review incident reports on the website.* This information includes *username, password and date of join.*

6. **Casualty Relation :** contains the information of a certain casualty in an incident, *which is basically the degree of loss.*

7. **Criminal Relation :** contains the information of a certain criminal that committed an incident, *which is basically the number of crimes committed before.*

8. **Report Relation :** contains the details of a submitted report, *such as its content and date.* Also, it refers to *a specific incident, a specific citizen that submitted the report and a specific government representative that will review the report.*

9. **Casualty_Incident Relation :** this is basically a relation to specify, *which casualties were in a specific incident (M:N relationship).*

## 1.2 Hardware Specifications

- **Operating System :** Ubuntu 20.04
- **CPU :** Intel $i5$ 6600$k$
- **Utilized RAM Capacity :** 10$GB$.
- **Utilized Hard Disk Storage :** 200$GB$ *(Current Database Size: 250MB).*

# 2 ER Diagram

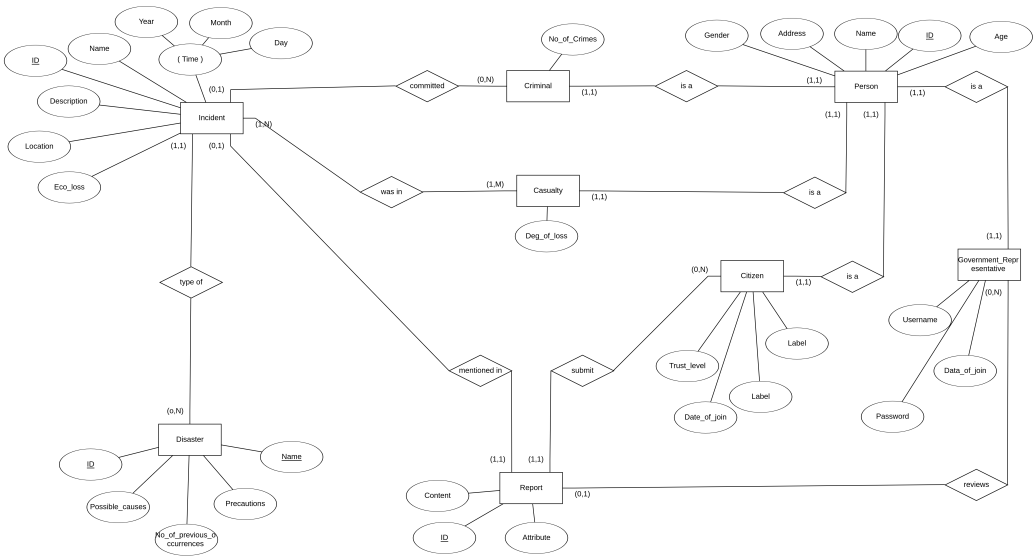


Figure 2: Database ER Diagram

Figure 2 shows the entity relationship *(ER)* diagram of the proposed system. We can see that the proposed system covers most of the database features :

- All relationship cardinalities.
- Single and multiple inheritance.
- Single and composite keys.
- Various relationships between entities.
- Different record sizes for different relations.

# 3 Database Filling Statistics

| Table Name | Row Count | Primary Key | Indexes | FK |
|---|---|---|---|---|
| Disaster | 200000 | id | 2 | 0 |
| Incident | 199998 | id | 3 | 2 |
| Person | 200000 | id | 1 | 0 |
| Citizen | 50000 | id | 1 | 1 |
| Government Representative | 50000 | id | 1 | 1 |
| Casualty | 49999 | id | 1 | 1 |
| Criminal | 50000 | id | 1 | 1 |
| Report | 199997 | id | 4 | 3 |
| Casualty_Incident | 199996 | (incident_id, casualty_id) | 2 | 2 |

Table 1: Database Filling Report Part 1

| Table Name | Identity Column | Max Row Size (Bytes) |
|---|---|---|
| Disaster | YES | 131118 |
| Incident | YES | 65663 |
| Person | YES | 109 |
| Citizen | NO | 116 |
| Government Representative | NO | 112 |
| Casualty | NO | 8 |
| Criminal | NO | 8 |
| Report | YES | 65559 |
| Casualty_Incident | NO | 8 |

Table 2: Database Filling Report Part 2