

DBMS MINI PROJECT
TOPIC: CRIME DATA ANALYSIS SYSTEM

TEAM MEMBERS:

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ABSTRACT :

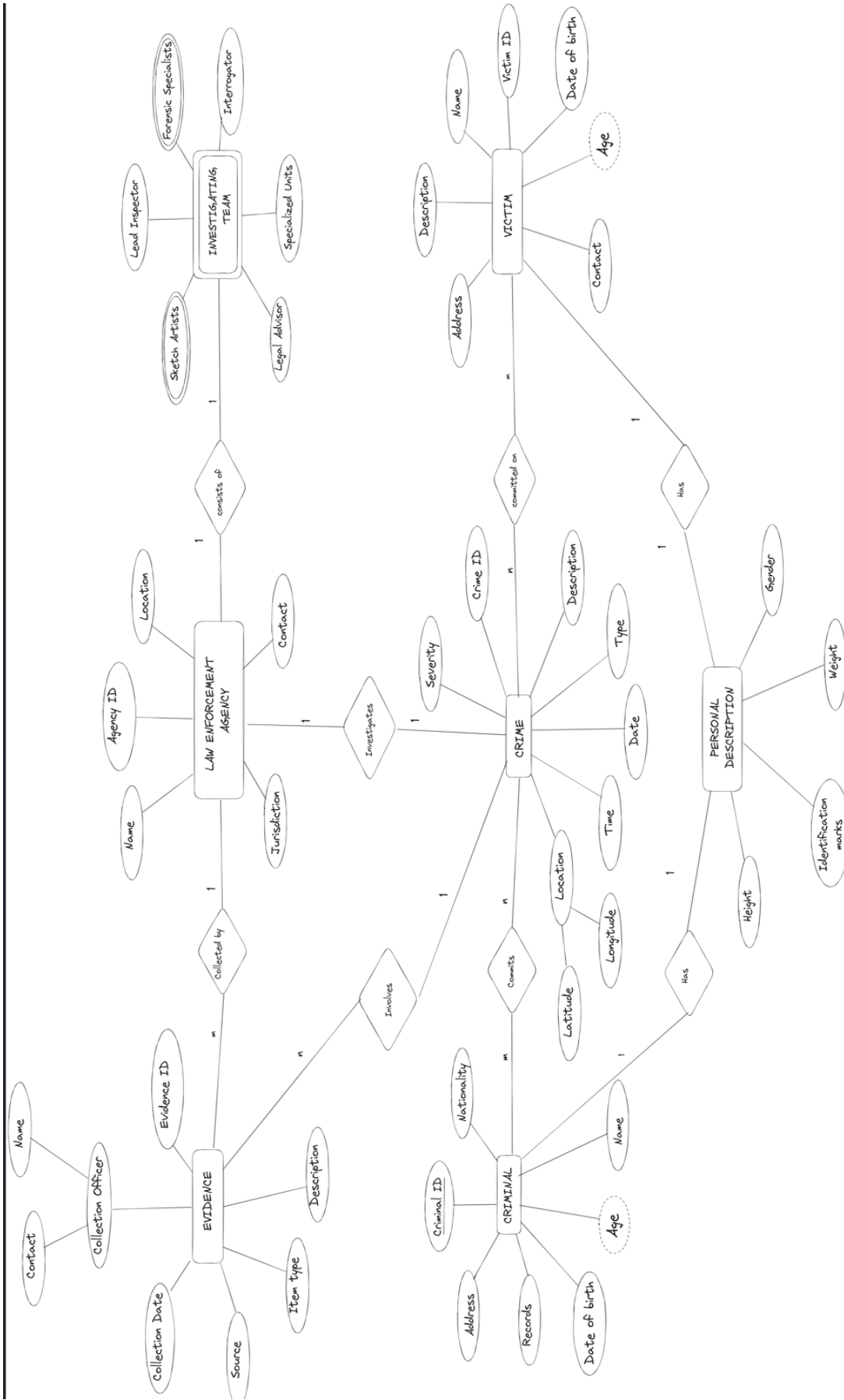
This project is an extensive database and analysis system designed to collect, manage and analyze crime-related information. It serves the purpose of providing law enforcement agencies, researchers and general users with the means to access and analyze crime data effectively.

The database schema accurately models the relationship between 7 entities (crime, criminal, victim, evidence, law enforcement agency, investigating team and personal description) which increases the efficiency of collection, integration and storage of diverse crime data. The interface is user-friendly allowing stakeholders to interact with the data and access analytical insights. We also provide users with tools to visualize crime data trends, hotspots and demographic patterns.

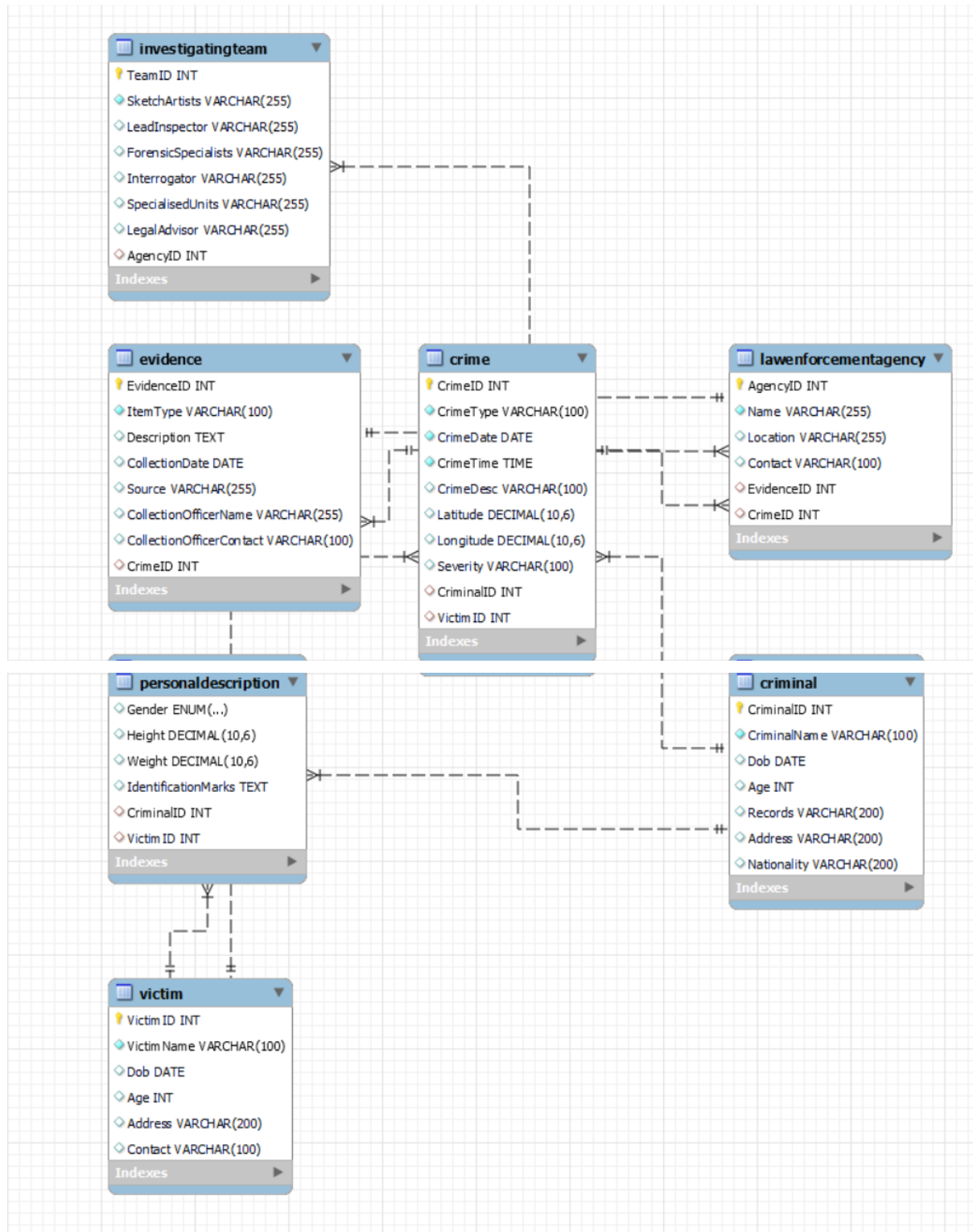
This project provides law enforcement agencies and researchers with the tools and insights necessary to enhance crime prevention, investigation, and policy development. It empowers stakeholders to make data-driven decisions, allocate resources efficiently, and improve public safety.

This project serves as a valuable resource in addressing the complex challenges related to crime analysis and provides a foundation for evidence-based policymaking and law enforcement strategies.

E-R DIAGRAM:



RELATIONAL SCHEMA DIAGRAM:



USER REQUIREMENT SPECIFICATION:

- **Data Collection and Management:** This system allows users to input and store crime data, including details of criminals, victims, law enforcement agencies, crimes, evidence, and locations. Users will be able to update, edit, or delete existing data records.
- **Data Analysis:** Users shall be able to perform complex queries to retrieve specific crime data based on various criteria, such as date, location, crime type, and severity. The system shall provide statistical analysis tools to generate crime reports, including crime rates, trends, and demographic insights. The system shall support geospatial analysis to identify crime hotspots based on location.
- **User Interface:** The system shall have an intuitive and user-friendly web-based interface accessible from modern web browsers. Users shall be able to customize dashboard views, save queries, and export reports.
- **Security:** The system shall implement user authentication and authorization mechanisms to ensure data security. Sensitive information, such as victim identities, shall be anonymized or obfuscated to protect privacy.
- **Scalability:** The system shall be designed to accommodate future data growth and increased user loads.

Software Requirements:

An operating system which has mysql and python on it can be used for this project.

Extra tools/modules used:

- Database design tool - mysql
- Data analysis tools and modules - Python libraries like Pandas, NumPy and Matplotlib
- Web development framework - Flask to connect Python with the web page

TABLE CREATION:

```
mysql> use crimedb;
Database changed
mysql> show tables;
+-----+
| Tables_in_crimedb |
+-----+
| crime              |
| criminal           |
| evidence           |
| investigatingteam  |
| lawenforcementagency |
| personaldescription |
| victim             |
+-----+
7 rows in set (0.00 sec)
```

```

CREATE TABLE Crime (
    CrimeID INT PRIMARY KEY AUTO_INCREMENT,
    CrimeType VARCHAR(100) NOT NULL,
    CrimeDate DATE NOT NULL,
    CrimeTime TIME NOT NULL,
    CrimeDesc VARCHAR(100),
    Latitude DECIMAL(10, 6),
    Longitude DECIMAL(10, 6),
    Severity VARCHAR(100),
    CriminalID INT,
    VictimID INT,
    FOREIGN KEY (CriminalID) REFERENCES Criminal(CriminalID),
    FOREIGN KEY (VictimID) REFERENCES Victim(VictimID)
);

```

```
mysql> desc crime;
```

Field	Type	Null	Key	Default	Extra
CrimeID	int	NO	PRI	NULL	auto_increment
CrimeType	varchar(100)	NO		NULL	
CrimeDate	date	NO		NULL	
CrimeTime	time	NO		NULL	
CrimeDesc	varchar(100)	YES		NULL	
Latitude	decimal(10,6)	YES		NULL	
Longitude	decimal(10,6)	YES		NULL	
Severity	varchar(100)	YES		NULL	
CriminalID	int	YES	MUL	NULL	
VictimID	int	YES	MUL	NULL	

```
10 rows in set (0.00 sec)
```

```

CREATE TABLE Criminal (
    CriminalID INT PRIMARY KEY AUTO_INCREMENT,
    CriminalName VARCHAR(100) NOT NULL,
    Dob DATE,
    Age INT,
    Records VARCHAR(200),
    Address VARCHAR(200),
    Nationality VARCHAR(200)
);

```

```
mysql> desc criminal;
```

Field	Type	Null	Key	Default	Extra
CriminalID	int	NO	PRI	NULL	auto_increment
CriminalName	varchar(100)	NO		NULL	
Dob	date	YES		NULL	
Age	int	YES		NULL	
Records	varchar(200)	YES		NULL	
Address	varchar(200)	YES		NULL	
Nationality	varchar(200)	YES		NULL	

```
7 rows in set (0.00 sec)
```

```
CREATE TABLE Evidence (  
    EvidenceID INT PRIMARY KEY AUTO_INCREMENT,  
    ItemType VARCHAR(100) NOT NULL,  
    Description TEXT,  
    CollectionDate DATE,  
    Source VARCHAR(255),  
    CollectionOfficerName VARCHAR(255),  
    CollectionOfficerContact VARCHAR(100),  
    CrimeID INT,  
    FOREIGN KEY (CrimeID) REFERENCES Crime(CrimeID)  
);
```

```
mysql> desc evidence;
```

Field	Type	Null	Key	Default	Extra
EvidenceID	int	NO	PRI	NULL	auto_increment
ItemType	varchar(100)	NO		NULL	
Description	text	YES		NULL	
CollectionDate	date	YES		NULL	
Source	varchar(255)	YES		NULL	
CollectionOfficerName	varchar(255)	YES		NULL	
CollectionOfficerContact	varchar(100)	YES		NULL	
CrimeID	int	YES	MUL	NULL	

```
8 rows in set (0.00 sec)
```

```
CREATE TABLE InvestigatingTeam (  
    TeamID INT PRIMARY KEY AUTO_INCREMENT,  
    SketchArtists VARCHAR(255) NOT NULL,  
    LeadInspector VARCHAR(255),  
    ForensicSpecialists VARCHAR(255),  
    Interrogator VARCHAR(255),  
    SpecialisedUnits VARCHAR(255),  
    LegalAdvisor VARCHAR(255),  
    AgencyID INT,  
    FOREIGN KEY (AgencyID) REFERENCES LawEnforcementAgency(AgencyID)  
);
```

```
mysql> desc investigatingteam;
```

Field	Type	Null	Key	Default	Extra
TeamID	int	NO	PRI	NULL	auto_increment
SketchArtists	varchar(255)	NO		NULL	
LeadInspector	varchar(255)	YES		NULL	
ForensicSpecialists	varchar(255)	YES		NULL	
Interrogator	varchar(255)	YES		NULL	
SpecialisedUnits	varchar(255)	YES		NULL	
LegalAdvisor	varchar(255)	YES		NULL	
AgencyID	int	YES	MUL	NULL	

8 rows in set (0.00 sec)

```
CREATE TABLE LawEnforcementAgency (  
    AgencyID INT PRIMARY KEY,  
    Name VARCHAR(255) NOT NULL,  
    Location VARCHAR(255),  
    Contact VARCHAR(100),  
    EvidenceID INT,  
    CrimeID INT,  
    FOREIGN KEY (EvidenceID) REFERENCES Evidence(EvidenceID),  
    FOREIGN KEY (CrimeID) REFERENCES Crime(CrimeID)  
);
```

```
mysql> desc lawenforcementagency;
```

Field	Type	Null	Key	Default	Extra
AgencyID	int	NO	PRI	NULL	
Name	varchar(255)	NO		NULL	
Location	varchar(255)	YES		NULL	
Contact	varchar(100)	YES		NULL	
EvidenceID	int	YES	MUL	NULL	
CrimeID	int	YES	MUL	NULL	

6 rows in set (0.00 sec)

```
CREATE TABLE PersonalDescription (  
    Gender ENUM('Male', 'Female', 'Other'),  
    Height DECIMAL(10, 6),  
    Weight DECIMAL(10, 6),  
    IdentificationMarks TEXT,  
    CriminalID INT,  
    VictimID INT,  
    FOREIGN KEY (CriminalID) REFERENCES Criminal(CriminalID),  
    FOREIGN KEY (VictimID) REFERENCES Victim(VictimID)  
);
```

```
mysql> desc personaldescription;
```

Field	Type	Null	Key	Default	Extra
Gender	enum('Male','Female','Other')	YES		NULL	
Height	decimal(10,6)	YES		NULL	
Weight	decimal(10,6)	YES		NULL	
IdentificationMarks	text	YES		NULL	
CriminalID	int	YES	MUL	NULL	
VictimID	int	YES	MUL	NULL	

6 rows in set (0.00 sec)

```
CREATE TABLE Victim (  
    VictimID INT PRIMARY KEY AUTO_INCREMENT,  
    VictimName VARCHAR(100) NOT NULL,  
    Dob DATE,  
    Age INT,  
    Address VARCHAR(200),  
    Contact VARCHAR(100),  
    UNIQUE (VictimName)  
);
```

```
mysql> desc victim;
```

Field	Type	Null	Key	Default	Extra
VictimID	int	NO	PRI	NULL	auto_increment
VictimName	varchar(100)	NO	UNI	NULL	
Dob	date	YES		NULL	
Age	int	YES		NULL	
Address	varchar(200)	YES		NULL	
Contact	varchar(100)	YES		NULL	

6 rows in set (0.00 sec)

TUPLES:

```
INSERT INTO Criminal (CriminalName, Dob, Age, Records, Address, Nationality)
```

```
VALUES
```

```
( 'Rahul Sharma', '1990-05-15', 31, 'Multiple thefts', '123 Main St, Bangalore', 'Indian'),  
( 'Priya Singh', '1985-12-02', 36, 'Assault and robbery', '456 Oak Ave, Bangalore', 'Indian'),  
( 'Rajesh Kumar', '1982-07-20', 39, 'Burglary', '789 Pine Rd, Bangalore', 'Indian'),  
( 'Amit Patel', '1995-02-10', 26, 'Drug possession', '101 Elm Ln, Bangalore', 'Indian'),  
( 'Neha Verma', '1988-09-28', 33, 'Embezzlement', '202 Cedar St, Bangalore', 'Indian');
```

```
INSERT INTO Victim (VictimName, Dob, Age, Address, Contact)
```

```
VALUES
```

```
( 'Meera Gupta', '1980-03-08', 41, '321 Maple St, Bangalore', '+91 9876543210'),  
( 'Suresh Menon', '1992-06-25', 29, '543 Birch Ave, Bangalore', '+91 9876543211'),  
( 'Geeta Singh', '1999-11-12', 22, '765 Redwood Rd, Bangalore', '+91 9876543212'),  
( 'Sanjay Kapoor', '1975-08-18', 46, '876 Willow Ln, Bangalore', '+91 9876543213'),  
( 'Pooja Sharma', '1991-12-30', 30, '234 Fir Dr, Bangalore', '+91 9876543214');
```



```
INSERT INTO InvestigatingTeam (SketchArtists, LeadInspector, ForensicSpecialists, Interrogator, SpecialisedUnits, LegalAdvisor, AgencyID)
VALUES
('John Doe, Jane Smith', 'Inspector Anderson', 'Dr. Brown, Dr. Patel', 'Officer Garcia', 'Narcotics Unit, Cybercrime Unit', 'Lawyer Johnson', 1),
('Mike White, Lisa Johnson', 'Inspector Wilson', 'Dr. Lee', 'Officer Martinez', 'SWAT Team, K-9 Unit', 'Lawyer Davis', 2),
('Sarah Adams, Chris Baker', 'Inspector Clark', 'Dr. Gupta', 'Officer Miller', 'Financial Crimes Unit', 'Lawyer Williams', 3),
('David Martin, Laura Turner', 'Inspector Harris', 'Dr. Walker', 'Officer Jackson', 'Homicide Unit', 'Lawyer Brown', 4),
('Emily Turner, Mark Wilson', 'Inspector Rodriguez', 'Dr. Patel', 'Officer Davis', 'Cybercrime Unit', 'Lawyer Anderson', 5);
```

```
INSERT INTO Crime (CrimeType, CrimeDate, CrimeTime, CrimeDesc, Latitude, Longitude, Severity, CriminalID, VictimID)
VALUES
('Theft', '2023-08-10', '15:30:00', 'Shoplifting', 12.9716, 77.5946, 'Low', 1, 1),
('Assault', '2023-08-11', '18:45:00', 'Street Fight', 12.9276, 77.6271, 'Medium', 2, 2),
('Burglary', '2023-08-12', '02:15:00', 'Residential Break-in', 12.9352, 77.6245, 'High', 3, 3),
('Drug Possession', '2023-08-13', '20:00:00', 'Possession of Narcotics', 12.9667, 77.5953, 'Medium', 4, 4),
('Embezzlement', '2023-08-14', '10:30:00', 'Financial Fraud', 12.9227, 77.5905, 'High', 5, 5);
```

```
INSERT INTO PersonalDescription (Gender, Height, Weight, IdentificationMarks, CriminalID, VictimID)
VALUES
('Male', 180.0, 75.0, 'Tattoo on right arm', 1, 1),
('Female', 165.0, 55.0, 'Scar on left cheek', 2, 2),
('Male', 175.0, 80.0, 'Missing left index finger', 3, 3),
('Male', 172.0, 70.0, 'Pierced ears', 4, 4),
('Female', 160.0, 60.0, 'Birthmark on neck', 5, 5);
```

```
INSERT INTO Evidence (ItemType, Description, CollectionDate, Source, CollectionOfficerName, CollectionOfficerContact, CrimeID)
VALUES
('Fingerprint', 'Fingerprint on glass window', '2023-08-10', 'Crime Scene', 'Officer Smith', '+91 9876543220', 1),
('Blood Sample', 'Bloodstains on victim's clothing', '2023-08-11', 'Hospital', 'Officer Johnson', '+91 9876543221', 2),
('Tool', 'Lock-picking tools found at crime scene', '2023-08-12', 'Crime Scene', 'Officer Brown', '+91 9876543222', 3),
('Drugs', 'Bag of narcotics seized from suspect', '2023-08-13', 'Crime Scene', 'Officer Wilson', '+91 9876543223', 4),
('Financial Records', 'Embezzlement evidence: fraudulent documents', '2023-08-14', 'Company Office', 'Officer Davis', '+91 9876543224', 5);
```

```
INSERT INTO LawEnforcementAgency (AgencyID, Name, Location, Contact, EvidenceID, CrimeID)
VALUES
(1, 'Bangalore City Police', 'Brigade Road, Bangalore', '+91 80 12345678', 1, 1),
(2, 'Bangalore Metropolitan Police', 'MG Road, Bangalore', '+91 80 23456789', 2, 2),
(3, 'Karnataka State Police', 'Vidhana Soudha, Bangalore', '+91 80 34567890', 3, 3),
(4, 'Central Bureau of Investigation (CBI)', 'Indiranagar, Bangalore', '+91 80 45678901', 4, 4),
(5, 'Enforcement Directorate', 'Richmond Road, Bangalore', '+91 80 56789012', 5, 5);
```

```
mysql> select * from crime;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| CrimeID | CrimeType | CrimeDate | CrimeTime | CrimeDesc | Latitude | Longitude | Severity | CriminalID | VictimID |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | Theft | 2023-08-10 | 15:30:00 | Shoplifting | 12.971600 | 77.594600 | Low | 1 | 1 |
| 2 | Assault | 2023-08-11 | 18:45:00 | Street Fight | 12.927600 | 77.627100 | Medium | 2 | 2 |
| 3 | Burglary | 2023-08-12 | 02:15:00 | Residential Break-in | 12.935200 | 77.624500 | High | 3 | 3 |
| 4 | Drug Possession | 2023-08-13 | 20:00:00 | Possession of Narcotics | 12.966700 | 77.595300 | Medium | 4 | 4 |
| 5 | Embezzlement | 2023-08-14 | 10:30:00 | Financial Fraud | 12.922700 | 77.590500 | High | 5 | 5 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

```
mysql> select * from criminal;
+-----+-----+-----+-----+-----+-----+-----+
| CriminalID | CriminalName | Dob | Age | Records | Address | Nationality |
+-----+-----+-----+-----+-----+-----+-----+
| 1 | Rahul Sharma | 1990-05-15 | 31 | Multiple thefts | 123 Main St, Bangalore | Indian |
| 2 | Priya Singh | 1985-12-02 | 36 | Assault and robbery | 456 Oak Ave, Bangalore | Indian |
| 3 | Rajesh Kumar | 1982-07-20 | 39 | Burglary | 789 Pine Rd, Bangalore | Indian |
| 4 | Amit Patel | 1995-02-10 | 26 | Drug possession | 101 Elm Ln, Bangalore | Indian |
| 5 | Neha Verma | 1988-09-28 | 33 | Embezzlement | 202 Cedar St, Bangalore | Indian |
+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

```
mysql> select * from victim;
```

VictimID	VictimName	Dob	Age	Address	Contact
1	Meera Gupta	1980-03-08	41	321 Maple St, Bangalore	+91 9876543210
2	Suresh Menon	1992-06-25	29	543 Birch Ave, Bangalore	+91 9876543211
3	Geeta Singh	1999-11-12	22	765 Redwood Rd, Bangalore	+91 9876543212
4	Sanjay Kapoor	1975-08-18	46	876 Willow Ln, Bangalore	+91 9876543213
5	Pooja Sharma	1991-12-30	30	234 Fir Dr, Bangalore	+91 9876543214

5 rows in set (0.00 sec)

```
mysql> select * from personaldescription;
```

Gender	Height	Weight	IdentificationMarks	CriminalID	VictimID
Male	180.000000	75.000000	Tattoo on right arm	1	1
Female	165.000000	55.000000	Scar on left cheek	2	2
Male	175.000000	80.000000	Missing left index finger	3	3
Male	172.000000	70.000000	Pierced ears	4	4
Female	160.000000	60.000000	Birthmark on neck	5	5

5 rows in set (0.00 sec)

```
mysql> select * from evidence;
```

EvidenceID	ItemType	Description	CollectionDate	Source	CollectionOfficerName	CollectionOfficerContact	CrimeID
1	Fingerprint	Fingerprint on glass window	2023-08-10	Crime Scene	Officer Smith	+91 9876543220	1
2	Blood Sample	Bloodstains on victim's clothing	2023-08-11	Hospital	Officer Johnson	+91 9876543221	2
3	Tool	Lock-picking tools found at crime scene	2023-08-12	Crime Scene	Officer Brown	+91 9876543222	3
4	Drugs	Bag of narcotics seized from suspect	2023-08-13	Crime Scene	Officer Wilson	+91 9876543223	4
5	Financial Records	Embezzlement evidence: fraudulent documents	2023-08-14	Company Office	Officer Davis	+91 9876543224	5

5 rows in set (0.00 sec)

```
mysql> select * from lawenforcementagency;
```

AgencyID	Name	Location	Contact	EvidenceID	CrimeID
1	Bangalore City Police	Brigade Road, Bangalore	+91 80 12345678	1	1
2	Bangalore Metropolitan Police	MG Road, Bangalore	+91 80 23456789	2	2
3	Karnataka State Police	Vidhana Soudha, Bangalore	+91 80 34567890	3	3
4	Central Bureau of Investigation (CBI)	Indiranagar, Bangalore	+91 80 45678901	4	4
5	Enforcement Directorate	Richmond Road, Bangalore	+91 80 56789012	5	5

5 rows in set (0.00 sec)

```
mysql> select * from investigatingteam;
```

TeamID	SketchArtists	LeadInspector	ForensicSpecialists	Interrogator	SpecialisedUnits	LegalAdvisor	AgencyID
1	John Doe, Jane Smith	Inspector Anderson	Dr. Brown, Dr. Patel	Officer Garcia	Narcotics Unit, Cybercrime Unit	Lawyer Johnson	1
2	Mike White, Lisa Johnson	Inspector Wilson	Dr. Lee	Officer Martinez	SWAT Team, K-9 Unit	Lawyer Davis	2
3	Sarah Adams, Chris Baker	Inspector Clark	Dr. Gupta	Officer Miller	Financial Crimes Unit	Lawyer Williams	3
4	David Martin, Laura Turner	Inspector Harris	Dr. Walker	Officer Jackson	Homicide Unit	Lawyer Brown	4
5	Emily Turner, Mark Wilson	Inspector Rodriguez	Dr. Patel	Officer Davis	Cybercrime Unit	Lawyer Anderson	5

5 rows in set (0.00 sec)

WORK COMPLETED TILL 8/10:

- E-R Diagram
- Relational Schema
- Creation of database
- Creation of tables
- Creation of tuples and relations