**DATABASE MANAGEMENT FOR INTERACTIVE MAPS:**

**Entities and Attributes:**

1. **Route Table:**
   * Fields: RouteID (Primary Key), StartLocation, EndLocation, Distance, EstimatedTime, StressLevel
2. **StreetTopology Table:**
   * Fields: TopologyID (Primary Key), TopologyName
3. **Amenity Table:**
   * Fields: AmenityID (Primary Key), AmenityName, Latitude, Longitude, Description
4. **RouteAmenity Table:**
   * Fields: RouteAmenityID (Primary Key), RouteID (Foreign Key), AmenityID (Foreign Key)
5. **LocationHistory Table:**
   * Fields: LocationID (Primary Key), RouteID (Foreign Key), Latitude, Longitude, Timestamp
6. **StreetSafety Table:**
   * Fields: SafetyID (Primary Key), StreetName, SafetyLevel
7. **StreetTopologyPreferences Table:**
   * Fields: PreferenceID (Primary Key), RouteID (Foreign Key), TopologyID (Foreign Key)

**Data Dictionary:**

1. **StreetTopology Table:** Attributes: TopologyID (Primary Key), TopologyName

| **TopologyID** | **TopologyName** |
| --- | --- |
| 1 | Neighborhood Street |
| 2 | Neighborhood Connector |
| 3 | Sub-Urban Connector |
| 4 | Priority/Main |

1. **Amenity Table:** Attributes: AmenityID (Primary Key), AmenityName, Latitude, Longitude, Description

| **AmenityID** | **AmenityName** | **Latitude** | **Longitude** | **Description** |
| --- | --- | --- | --- | --- |
| 1 | Bike Repair Shop | 42.2912 | -85.5871 | Provides bike repair services |
| 2 | Rest Area | 42.2834 | -85.6098 | Rest area with benches and water fountain |
| 3 | Park | 42.2765 | -85.6353 | Green space with recreational facilities |

1. **Route Table:** Attributes: RouteID (Primary Key), StartLocation, EndLocation, Distance, EstimatedTime, StressLevel

| **RouteID** | **StartLocation** | **EndLocation** | **Distance** | **EstimatedTime** | **StressLevel** |
| --- | --- | --- | --- | --- | --- |
| 1 | 42.2912, -85.5871 | 42.2765, -85.6353 | 5 miles | 20 minutes | Low |
| 2 | 42.2834, -85.6098 | 42.2912, -85.5871 | 3 miles | 15 minutes | Moderate |

1. **RouteAmenity Table:** Attributes: RouteAmenityID (Primary Key), RouteID (Foreign Key), AmenityID (Foreign Key)

| **RouteAmenityID** | **RouteID** | **AmenityID** |
| --- | --- | --- |
| 1 | 1 | 1 |
| 2 | 1 | 2 |
| 3 | 2 | 1 |

1. **LocationHistory Table:** Attributes: LocationID (Primary Key), RouteID (Foreign Key), Latitude, Longitude, Timestamp

| **LocationID** | **RouteID** | **Latitude** | **Longitude** | **Timestamp** |
| --- | --- | --- | --- | --- |
| 1 | 1 | 42.2912 | -85.5871 | 2023-10-01 08:00 AM |
| 2 | 1 | 42.2800 | -85.6150 | * + 1. 8:10 AM |

1. **StreetSafety Table:** Attributes: SafetyID (Primary Key), StreetName, SafetyLevel

| **SafetyID** | **StreetName** | **SafetyLevel** |
| --- | --- | --- |
| 1 | Priority/Main | High |
| 2 | Neighborhood Street | Low |

1. **StreetTopologyPreferences Table:** Attributes: PreferenceID (Primary Key), RouteID (Foreign Key), TopologyID (Foreign Key)

| **PreferenceID** | **RouteID** | **TopologyID** |
| --- | --- | --- |
| 1 | 1 | 1 |
| 2 | 1 | 2 |
| 3 | 2 | 3 |

**Relationships:**

* **One-to-Many Relationships:**
  + StreetTopology to Route
  + Route to LocationHistory
  + Route to StreetSafety
  + Route to StreetTopologyPreferences
* **Many-to-Many Relationship:**
  + Amenity to Route (via the RouteAmenity junction table)

**MYSQL Table Creation:**

CREATE DATABASE interactivemaps;

USE interactivemaps;

CREATE TABLE StreetTopology (

TopologyID INT PRIMARY KEY,

TopologyName VARCHAR(255) NOT NULL

);

CREATE TABLE Amenity (

AmenityID INT PRIMARY KEY,

AmenityName VARCHAR(255) NOT NULL,

Latitude DECIMAL(10, 8) NOT NULL,

Longitude DECIMAL(11, 8) NOT NULL,

Description TEXT

);

CREATE TABLE Route (

RouteID INT PRIMARY KEY,

StartLocation VARCHAR(255) NOT NULL,

EndLocation VARCHAR(255) NOT NULL,

Distance VARCHAR(20),

EstimatedTime VARCHAR(20),

StressLevel VARCHAR(20)

);

CREATE TABLE RouteAmenity (

RouteAmenityID INT PRIMARY KEY,

RouteID INT,

AmenityID INT,

FOREIGN KEY (RouteID) REFERENCES Route(RouteID),

FOREIGN KEY (AmenityID) REFERENCES Amenity(AmenityID)

);

CREATE TABLE LocationHistory (

LocationID INT PRIMARY KEY,

RouteID INT,

Latitude DECIMAL(10, 8) NOT NULL,

Longitude DECIMAL(11, 8) NOT NULL,

Timestamp TIMESTAMP,

FOREIGN KEY (RouteID) REFERENCES Route(RouteID)

);

CREATE TABLE StreetSafety (

SafetyID INT PRIMARY KEY,

StreetName VARCHAR(255) NOT NULL,

SafetyLevel VARCHAR(20) NOT NULL,

RouteID INT,

FOREIGN KEY (RouteID) REFERENCES Route(RouteID)

);

CREATE TABLE StreetTopologyPreferences (

PreferenceID INT PRIMARY KEY,

RouteID INT,

TopologyID INT,

FOREIGN KEY (RouteID) REFERENCES Route(RouteID),

FOREIGN KEY (TopologyID) REFERENCES StreetTopology(TopologyID)

);

SHOW TABLES;

A screenshot of a computer

Description automatically generated

SELECT \* FROM amenity;



SELECT \* FROM locationhistory;



SELECT \* FROM route;



SELECT \* FROM routeamenity;



SELECT \* FROM streetsafety;



SELECT \* FROM streettopology;



SELECT \* FROM streettopologypreferences;



**\*\*\* PLEASE NOTE THERE IS A SPELLING ERROR. TOPOLOGY IS CORRECT\*\*\***

Adding 5 Sample records:

CREATE DATABASE interactivemaps;

USE interactivemaps;

CREATE TABLE StreetTopology (

TopologyID INT PRIMARY KEY,

TopologyName VARCHAR(255) NOT NULL

);

CREATE TABLE Amenity (

AmenityID INT PRIMARY KEY,

AmenityName VARCHAR(255) NOT NULL,

Latitude DECIMAL(10, 8) NOT NULL,

Longitude DECIMAL(11, 8) NOT NULL,

Description TEXT

);

CREATE TABLE Route (

RouteID INT PRIMARY KEY,

StartLocation VARCHAR(255) NOT NULL,

EndLocation VARCHAR(255) NOT NULL,

Distance VARCHAR(20),

EstimatedTime VARCHAR(20),

StressLevel VARCHAR(20)

);

CREATE TABLE RouteAmenity (

RouteAmenityID INT PRIMARY KEY,

RouteID INT,

AmenityID INT,

FOREIGN KEY (RouteID) REFERENCES Route(RouteID),

FOREIGN KEY (AmenityID) REFERENCES Amenity(AmenityID)

);

CREATE TABLE LocationHistory (

LocationID INT PRIMARY KEY,

RouteID INT,

Latitude DECIMAL(10, 8) NOT NULL,

Longitude DECIMAL(11, 8) NOT NULL,

Timestamp TIMESTAMP,

FOREIGN KEY (RouteID) REFERENCES Route(RouteID)

);

CREATE TABLE StreetSafety (

SafetyID INT PRIMARY KEY,

StreetName VARCHAR(255) NOT NULL,

SafetyLevel VARCHAR(20) NOT NULL,

RouteID INT,

FOREIGN KEY (RouteID) REFERENCES Route(RouteID)

);

CREATE TABLE StreetTopologyPreferences (

PreferenceID INT PRIMARY KEY,

RouteID INT,

TopologyID INT,

FOREIGN KEY (RouteID) REFERENCES Route(RouteID),

FOREIGN KEY (TopologyID) REFERENCES StreetTopology(TopologyID)

);