Database Design and Development Project

Section 1: Relational Schema and ERD

a. Tables

tourist: stores tourist information.
attraction: stores points of interest along the Wild Atlantic Way.
review: stores tourists feedback.
visit: stores specific attraction visit by tourists.

b. Attributes

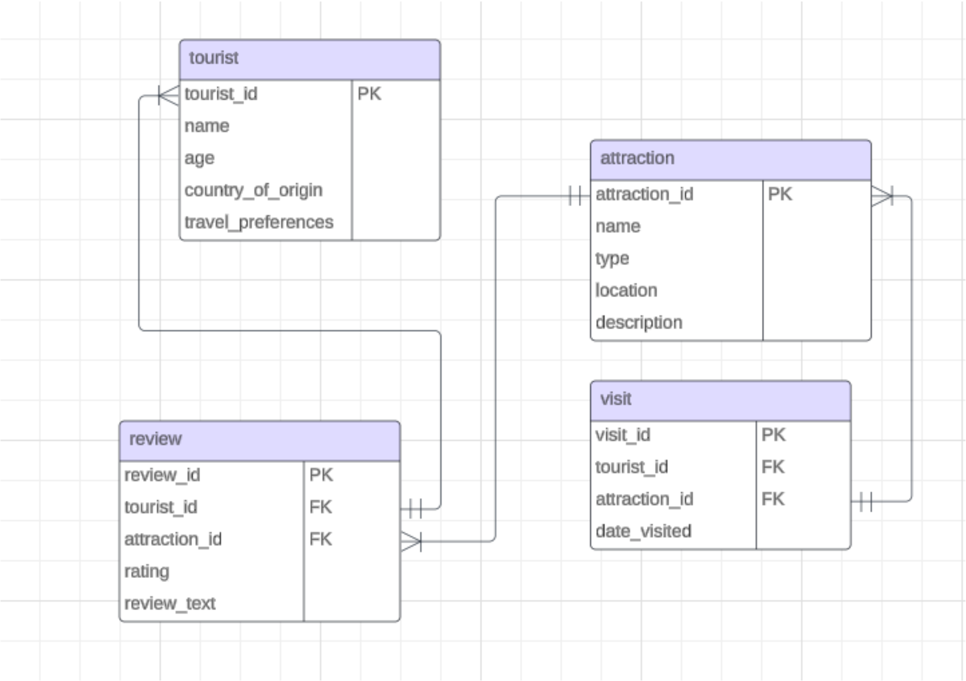
tourist (tourist_id, name, age, country_of_origin, travel_preferences)
attraction (attraction_id, name, type, location, description)
review (review_id, tourist_id, attraction_id, rating, review_text)
visit (visit_id, tourist_id, attraction_id, date_visited)

c. Primary Keys

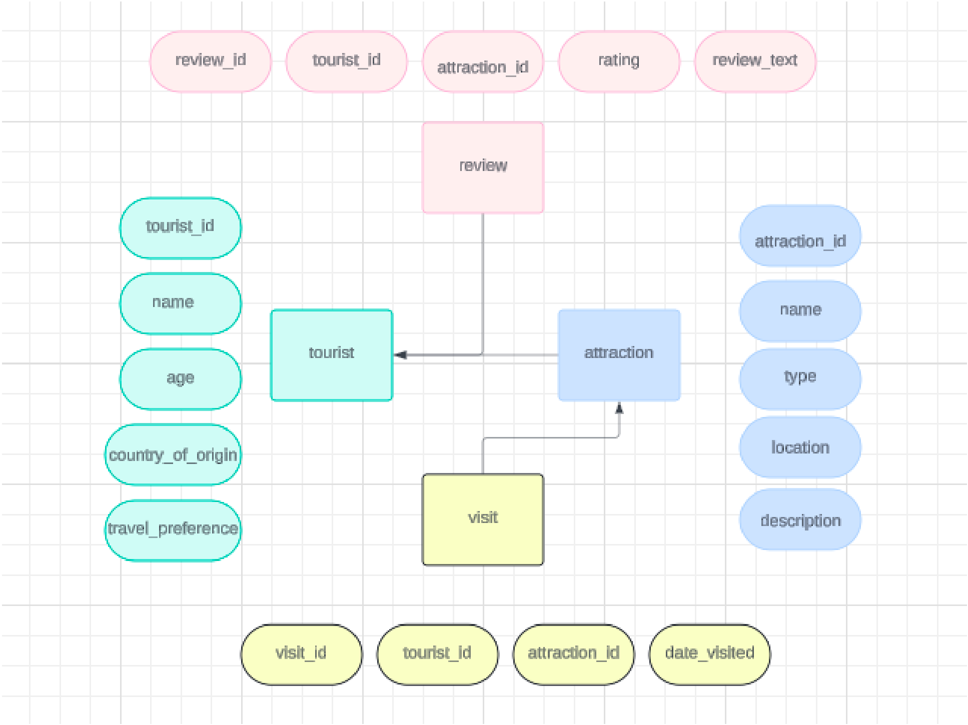
tourist: tourist_id PK
attraction: attraction_id PK
review: review_id PK
visit: visit_id PK

d. Foreign Keys

tourist: n/a
attraction: n/a
review: tourist_id FK, attraction_id FK
visit: tourist_id FK, attraction_id FK



ERD Diagram



ER Model

e. Assumptions

- Tourist can write many Reviews, but each review is written by exactly one Tourist.
- An Attraction can receive many Reviews, but each review is written exactly for one Attraction.
- A Tourist can visit many Attractions, and an Attraction can be visited by many Tourists.
- An Attraction can be visited by many Tourists, but each Visit refers to only one Attraction.

Section 2: Create Database and Test Data

a. Create Database and Tables

```
CREATE DATABASE wild_atlantic_way_feedback_hub;

USE wild_atlantic_way_feedback_hub;
CREATE TABLE tourist (
tourist_id INT(11) NOT NULL AUTO_INCREMENT PRIMARY KEY,
name VARCHAR(100)  NOT NULL,
age SMALLINT NOT NULL,
country_of_origin VARCHAR(50) DEFAULT NULL,
travel_preferences VARCHAR(50) DEFAULT NULL
);
```

```
USE wild_atlantic_way_feedback_hub;
CREATE TABLE attraction (
attraction_id INT(11) NOT NULL AUTO_INCREMENT PRIMARY KEY,
name VARCHAR(100) NOT NULL,
type VARCHAR(50) NOT NULL,
location VARCHAR(50) NOT NULL,
description TEXT DEFAULT NULL
);

USE wild_atlantic_way_feedback_hub;
CREATE TABLE review (
review_id INT(11) NOT NULL  AUTO_INCREMENT PRIMARY KEY,
tourist_id INT(11) NOT NULL,
attraction_id INT(11) NOT NULL,
rating INT(11) NOT NULL,
review TEXT DEFAULT NULL,
FOREIGN KEY (tourist_id) REFERENCES tourist(tourist_id),
FOREIGN KEY (attraction_id) REFERENCES attraction(attraction_id)
);

USE wild_atlantic_way_feedback_hub;
CREATE TABLE visit (
visit_id INT(11) NOT NULL  AUTO_INCREMENT PRIMARY KEY,
tourist_id INT(11) NOT NULL,
attraction_id INT(11) NOT NULL,
date_visited DATE NOT NULL,
FOREIGN KEY (tourist_id) REFERENCES tourist(tourist_id),
FOREIGN KEY (attraction_id) REFERENCES attraction(attraction_id)
);
```

b. Insert test data (two items per table)

```
INSERT INTO tourist (tourist_id, name, age, country_of_origin, travel_preferences)
VALUES
( '1', 'Jackson Brown', '30', 'USA', 'Nature'),
( '2', 'Margot Monet', '46', 'France', 'History');

INSERT INTO attraction (attraction_id, name, type, location, description) VALUES
( '1', 'Annagh Head', 'Natural', 'County Mayo', 'Rugged headland on the Mullet Peninsula'),
( '2', 'Derrynane House', 'Historic', 'County Kerry', 'Ancestral home of Daniel O''Connell');

INSERT INTO review (review_id, tourist_id, attraction_id, rating, review) VALUES
( 1, 1, 1, 5, 'Breathtaking view! Must-visit spot.'),
( 2, 2, 2, 4, 'Beautiful architecture');

INSERT INTO visit (visit_id, tourist_id, attraction_id, date_visited) VALUES
( 1, 1, 1, '2024-04-20'),
( 2, 2, 2, '2024-04-22');
```

Section 3: CRUD Queries

a. Select

```
SELECT DISTINCT t.name
FROM tourist t
JOIN review r ON t.tourist_id = r.tourist_id
GROUP BY t.tourist_id
HAVING COUNT(DISTINCT r.attraction_id) >= 2
AND MIN(r.rating) >= 4;
```

b. Insert

```
INSERT INTO tourist (name, age, country_of_origin, travel_preferences)
SELECT 'Emily Johnson', 28, 'Canada', 'Adventure'
FROM dual
WHERE NOT EXISTS (
    SELECT 1
    FROM tourist
    WHERE name = 'Emily Johnson'
);
```

c. Update

```
UPDATE tourist
SET age = age + 5
WHERE tourist_id IN (
    SELECT DISTINCT t.tourist_id
    FROM tourist t
    JOIN visit v ON t.tourist_id = v.tourist_id
    JOIN attraction a ON v.attraction_id = a.attraction_id
    WHERE a.type = 'Natural'
);
```

d. Delete

```
DELETE FROM tourist
WHERE country_of_origin = 'Canada'
AND age > 25;
```

e. Other interesting queries

IF() Function

To categorise tourists by age:

```
SELECT
    name,
    age,
    CASE
        WHEN age <= 18 THEN 'Under 18'
        WHEN age BETWEEN 19 AND 30 THEN '19-30'
        WHEN age BETWEEN 31 AND 45 THEN '31-45'
        ELSE 'Over 45'
    END AS age_group
```

```
FROM
    tourist;
```

VIEW

Create a view to see a summary about tourists visits to attractions:

```
CREATE VIEW Tourist_Attraction_Visit_Summary AS
SELECT
    v.visit_id,
    t.name AS tourist_name,
    t.age AS tourist_age,
    t.country_of_origin,
    a.name AS attraction_name,
    a.type AS attraction_type,
    a.location AS attraction_location,
    v.date_visited
FROM
    visit v
JOIN
    tourist t ON v.tourist_id = t.tourist_id
JOIN
    attraction a ON v.attraction_id = a.attraction_id;

SELECT * FROM Tourist_Attraction_Visit_Summary;
```

Aggregate Functions

To see the average rating and total number of reviews per attraction:

```
SELECT
    a.name AS attraction_name,
    AVG(r.rating) AS average_rating,
    COUNT(r.review_id) AS total_reviews
FROM
    attraction a
LEFT JOIN
    review r ON a.attraction_id = r.attraction_id
GROUP BY
    a.name;
```

Section 4: Codd’s Rules

a. Demonstrate 3 Codd’s rules by writing SQL statements to demonstrate each rule

Rule 2: Guaranteed Access

```
SELECT country_of_origin FROM tourist WHERE tourist_id = 1;
```

Rule 4: Active Online Catalog Rule

```
SELECT table_name, column_name, data_type
FROM information_schema.columns
```

```
WHERE table_schema = 'Wild_Atlantic_Way_Feedback_Hub' AND table_name IN
('Tourist', 'Attraction', 'Review', 'Visit');
```

Rule 5: The Comprehensive Data Sublanguage Rule

```
SELECT COUNT(*) AS num_travelers
FROM visit
WHERE date_visited = '2024-04-22';
```

Rule 7: High Level Insert Update Delete Rule

```
UPDATE tourist
SET travel_preferences = 'Adventure'
WHERE country_of_origin IN ('USA', 'Canada');
```

```
INSERT INTO tourist (name, age, country_of_origin, travel_preferences) VALUES
('John Smith', 35, 'USA', 'Adventure'),
('Emma Johnson', 28, 'Canada', 'Nature');
```