SQL PROJECT

LOCAL WILDLIFE CONSERVATION DATABASE

Submitted By

Name: Huzaifa Adil Akram

Roll no: 22024119-054

Semester: 4th

Submitted To

Name: Dr. Naveed Anwar butt

Course Name: Database System

Dept. of Computer Science

Submitted on 27th June 2024

Contents

PROJECT SCENARIO:

Context

A local wildlife conservation organization aims to monitor and protect various species within a designated conservation area. The organization focuses on tracking animal populations, their habitats, health status, and conservation activities. The organization collaborates with volunteers, researchers, and local authorities to achieve its goals.

Key Components

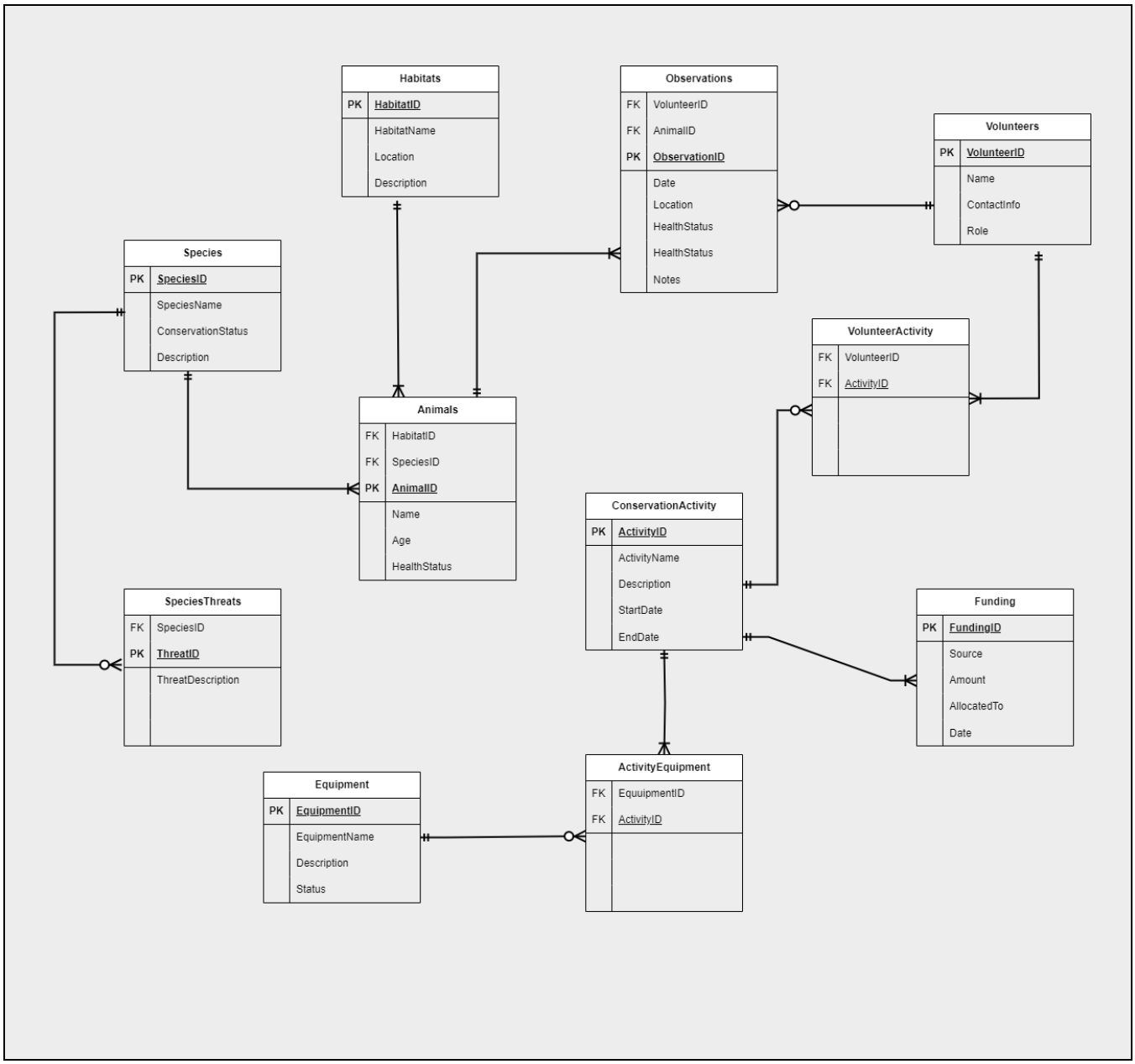
1. **Species**: Information about different species being monitored.
2. **Habitats**: Details about various habitats within the conservation area.
3. **Animals:** Individual animals being tracked, including identification, species, and health status.
4. **Observations:** Records of animal sightings and health checks.
5. **Conservation Activities:** Activities undertaken to protect and support wildlife (e.g., habitat restoration, anti-poaching patrols).
6. **Volunteers and Researchers:** Individuals involved in conservation efforts.
7. **Equipment:** Tools and equipment used in conservation activities.
8. **Incidents:** Records of any incidents affecting wildlife or habitats (e.g., poaching, natural disasters).

Scenario Description

The organization manages a database that includes comprehensive details about various species, their habitats, and individual animals. Each animal is identified with a unique ID and associated with a species and habitat. Researchers and volunteers record observations of animals, noting their location, health status, and behavior.

The organization conducts various conservation activities, which are documented along with the equipment used. Volunteers and researchers are assigned to activities and observations. In case of incidents like poaching or natural disasters, these are logged in the database to help coordinate response efforts and assess the impact on wildlife.

ERD DIAGARM


Habitats
PK HabitatID
HabitatName
Location
Description
Observations
FK VolunteerID
FK AnimalID
PK ObservationID
Date
Location
HealthStatus
HealthStatus
Notes
Volunteers
PK VolunteerID
Name
ContactInfo
Role
Species
PK SpeciesID
SpeciesName
ConservationStatus
Description
VolunteerActivity
FK VolunteerID
FK ActivityID
Animals
FK HabitatID
FK SpeciesID
PK AnimalID
Name
Age
HealthStatus
ConservationActivity
PK ActivityID
ActivityName
Description
StartDate
EndDate
SpeciesThreats
FK SpeciesID
PK ThreatID
ThreatDescription
Funding
PK FundingID
Source
Amount
AllocatedTo
Date
Equipment
PK EquipmentID
EquipmentName
Description
Status
ActivityEquipment
FK EquuipmentID
FK ActivityID

SQL CODE

```
-- Creating the Database
CREATE DATABASE WildlifeConservation;

-- Use the Database
USE WildlifeConservation;

-- Creating Species Table
CREATE TABLE Species (
    species_id INT PRIMARY KEY,
    common_name VARCHAR(100),
    scientific_name VARCHAR(100),
    conservation_status VARCHAR(50)
);

-- Creating Habitats Table
CREATE TABLE Habitats (
    habitat_id INT PRIMARY KEY,
    habitat_name VARCHAR(100),
    location VARCHAR(100)
);

-- Creating Animals Table
CREATE TABLE Animals (
    animal_id INT PRIMARY KEY,
    species_id INT,
    habitat_id INT,
    name VARCHAR(100),
    age INT,
    FOREIGN KEY (species_id) REFERENCES Species(species_id),
    FOREIGN KEY (habitat_id) REFERENCES Habitats(habitat_id)
);

-- Creating Observations Table
CREATE TABLE Observations (
    observation_id INT PRIMARY KEY,
    animal_id INT,
    observation_date DATE,
    notes TEXT,
    FOREIGN KEY (animal_id) REFERENCES Animals(animal_id)
);

-- Creating Volunteers Table
CREATE TABLE Volunteers (
    volunteer_id INT PRIMARY KEY,
    first_name VARCHAR(50),
    last_name VARCHAR(50),
    phone VARCHAR(20),
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```
    email VARCHAR(100)
);

-- Creating ConservationActivity Table
CREATE TABLE ConservationActivity (
    activity_id INT PRIMARY KEY,
    activity_name VARCHAR(100),
    description TEXT
);

-- Creating VolunteerActivity Table
CREATE TABLE VolunteerActivity (
    volunteer_id INT,
    activity_id INT,
    date DATE,
    hours INT,
    PRIMARY KEY (volunteer_id, activity_id),
    FOREIGN KEY (volunteer_id) REFERENCES Volunteers(volunteer_id),
    FOREIGN KEY (activity_id) REFERENCES ConservationActivity(activity_id)
);

-- Creating Equipment Table
CREATE TABLE Equipment (
    equipment_id INT PRIMARY KEY,
    equipment_name VARCHAR(100),
    description TEXT
);

-- Creating ActivityEquipment Table
CREATE TABLE ActivityEquipment (
    activity_id INT,
    equipment_id INT,
    quantity INT,
    PRIMARY KEY (activity_id, equipment_id),
    FOREIGN KEY (activity_id) REFERENCES ConservationActivity(activity_id),
    FOREIGN KEY (equipment_id) REFERENCES Equipment(equipment_id)
);

-- Creating SpeciesThreats Table
CREATE TABLE SpeciesThreats (
    threat_id INT PRIMARY KEY,
    threat_name VARCHAR(100),
    description TEXT
);

-- Creating Funding Table
CREATE TABLE Funding (
    funding_id INT PRIMARY KEY,
    source VARCHAR(100),
    amount DECIMAL(10, 2),
    funding_date DATE
```

```
);

-- Inserting data into Species Table
INSERT INTO Species (species_id, common_name, scientific_name, conservation_status)
VALUES
(1, 'African Elephant', 'Loxodonta africana', 'Vulnerable'),
(2, 'Bengal Tiger', 'Panthera tigris tigris', 'Endangered'),
(3, 'Giant Panda', 'Ailuropoda melanoleuca', 'Vulnerable'),
(4, 'Snow Leopard', 'Panthera uncia', 'Vulnerable'),
(5, 'Blue Whale', 'Balaenoptera musculus', 'Endangered'),
(6, 'Green Turtle', 'Chelonia mydas', 'Endangered'),
(7, 'Chimpanzee', 'Pan troglodytes', 'Endangered'),
(8, 'Orangutan', 'Pongo pygmaeus', 'Critically Endangered'),
(9, 'Polar Bear', 'Ursus maritimus', 'Vulnerable'),
(10, 'Red Panda', 'Ailurus fulgens', 'Endangered');

-- Inserting data into Habitats Table
INSERT INTO Habitats (habitat_id, habitat_name, location)
VALUES
(1, 'Savannah', 'Africa'),
(2, 'Rainforest', 'Asia'),
(3, 'Temperate Forest', 'China'),
(4, 'Mountain Range', 'Himalayas'),
(5, 'Ocean', 'Global'),
(6, 'Coral Reef', 'Oceania'),
(7, 'Tropical Forest', 'Congo Basin'),
(8, 'Mangrove', 'Southeast Asia'),
(9, 'Arctic', 'Arctic Circle'),
(10, 'Bamboo Forest', 'Eastern Himalayas');

-- Inserting data into Animals Table
INSERT INTO Animals (animal_id, species_id, habitat_id, name, age)
VALUES
(1, 1, 1, 'Dumbo', 10),
(2, 2, 2, 'Sheru', 7),
(3, 3, 3, 'Bao Bao', 5),
(4, 4, 4, 'Snowy', 8),
(5, 5, 5, 'Big Blue', 25),
(6, 6, 6, 'Shelly', 50),
(7, 7, 7, 'Chimp', 12),
(8, 8, 8, 'Orangie', 15),
(9, 9, 9, 'Polaris', 10),
(10, 10, 10, 'Red', 6);

-- Inserting data into Observations Table
INSERT INTO Observations (observation_id, animal_id, observation_date, notes)
VALUES
(1, 1, '2024-01-01', 'Observed grazing.'),
(2, 2, '2024-02-01', 'Observed hunting.'),
(3, 3, '2024-03-01', 'Observed playing.'),
(4, 4, '2024-04-01', 'Observed climbing.'),
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```
(5, 5, '2024-05-01', 'Observed swimming.'),
(6, 6, '2024-06-01', 'Observed nesting.'),
(7, 7, '2024-07-01', 'Observed tool using.'),
(8, 8, '2024-08-01', 'Observed foraging.'),
(9, 9, '2024-09-01', 'Observed hunting.'),
(10, 10, '2024-10-01', 'Observed eating bamboo.');

-- Inserting data into Volunteers Table
INSERT INTO Volunteers (volunteer_id, first_name, last_name, phone, email)
VALUES
(1, 'John', 'Doe', '123-456-7890', 'john.doe@example.com'),
(2, 'Jane', 'Smith', '987-654-3210', 'jane.smith@example.com'),
(3, 'Alice', 'Johnson', '555-555-5555', 'alice.johnson@example.com'),
(4, 'Bob', 'Brown', '555-123-4567', 'bob.brown@example.com'),
(5, 'Charlie', 'Davis', '555-987-6543', 'charlie.davis@example.com'),
(6, 'Diana', 'Miller', '555-555-1234', 'diana.miller@example.com'),
(7, 'Evan', 'Garcia', '555-555-5678', 'evan.garcia@example.com'),
(8, 'Fiona', 'Martinez', '555-555-8765', 'fiona.martinez@example.com'),
(9, 'George', 'Wilson', '555-555-4321', 'george.wilson@example.com'),
(10, 'Hannah', 'Taylor', '555-555-6789', 'hannah.taylor@example.com');

-- Inserting data into ConservationActivity Table
INSERT INTO ConservationActivity (activity_id, activity_name, description)
VALUES
(1, 'Tree Planting', 'Planting trees in deforested areas.'),
(2, 'Clean-Up Drive', 'Cleaning up litter in natural habitats.'),
(3, 'Wildlife Monitoring', 'Monitoring the health and behavior of wildlife.'),
(4, 'Habitat Restoration', 'Restoring damaged habitats.'),
(5, 'Environmental Education', 'Educating the public about conservation.'),
(6, 'Species Research', 'Conducting research on endangered species.'),
(7, 'Anti-Poaching Patrols', 'Patrolling areas to prevent poaching.'),
(8, 'Wildlife Rescue', 'Rescuing injured or endangered wildlife.'),
(9, 'Marine Conservation', 'Protecting marine environments and species.'),
(10, 'Climate Action', 'Taking action to mitigate climate change.');

-- Inserting data into VolunteerActivity Table
INSERT INTO VolunteerActivity (volunteer_id, activity_id, date, hours)
VALUES
(1, 1, '2024-01-15', 4),
(2, 2, '2024-02-15', 3),
(3, 3, '2024-03-15', 5),
(4, 4, '2024-04-15', 6),
(5, 5, '2024-05-15', 2),
(6, 6, '2024-06-15', 7),
(7, 7, '2024-07-15', 8),
(8, 8, '2024-08-15', 4),
(9, 9, '2024-09-15', 3),
(10, 10, '2024-10-15', 6);

-- Inserting data into Equipment Table
INSERT INTO Equipment (equipment_id, equipment_name, description)
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```
VALUES
(1, 'Shovels', 'Used for digging.'),
(2, 'Trash Bags', 'Used for collecting litter.'),
(3, 'Binoculars', 'Used for observing wildlife.'),
(4, 'Cameras', 'Used for documenting wildlife.'),
(5, 'GPS Devices', 'Used for tracking animal movements.'),
(6, 'Drones', 'Used for aerial surveys.'),
(7, 'Nets', 'Used for capturing small animals safely.'),
(8, 'Protective Gear', 'Used for safety in the field.'),
(9, 'Boats', 'Used for marine activities.'),
(10, 'Monitoring Equipment', 'Used for environmental monitoring.');

-- Inserting data into ActivityEquipment Table
INSERT INTO ActivityEquipment (activity_id, equipment_id, quantity)
VALUES
(1, 1, 10),
(2, 2, 50),
(3, 3, 5),
(4, 4, 20),
(5, 5, 15),
(6, 6, 8),
(7, 7, 30),
(8, 8, 25),
(9, 9, 10),
(10, 10, 12);

-- Inserting data into SpeciesThreats Table
INSERT INTO SpeciesThreats (threat_id, threat_name, description)
VALUES
(1, 'Poaching', 'Illegal hunting of animals.'),
(2, 'Habitat Loss', 'Destruction of natural habitats.'),
(3, 'Climate Change', 'Global changes in climate affecting species.'),
(4, 'Pollution', 'Contamination of natural habitats.'),
(5, 'Invasive Species', 'Non-native species harming the ecosystem.'),
(6, 'Disease', 'Outbreaks of disease among wildlife.'),
(7, 'Overfishing', 'Excessive fishing reducing marine populations.'),
(8, 'Deforestation', 'Clearing of forests for human use.'),
(9, 'Urbanization', 'Expansion of cities into natural habitats.'),
(10, 'Water Scarcity', 'Lack of water affecting species survival.');

-- Inserting data into Funding Table
INSERT INTO Funding (funding_id, source, amount, funding_date)
VALUES
(1, 'Wildlife Conservation Fund', 5000.00, '2024-01-01'),
(2, 'Global Environmental Organization', 10000.00, '2024-02-01'),
(3, 'National Parks Association', 7500.00, '2024-03-01'),
(4, 'Conservation Trust', 6000.00, '2024-04-01'),
(5, 'Eco-Friendly Enterprises', 8500.00, '2024-05-01'),
(6, 'Wildlife Lovers Club', 3000.00, '2024-06-01'),
(7, 'Green Earth Initiative', 9500.00, '2024-07-01'),
(8, 'Nature Supporters Group', 12000.00, '2024-08-01'),
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(9, 'Animal Protection Fund', 7000.00, '2024-09-01'),
(10, 'Environmentalist Society', 11000.00, '2024-10-01');

-- View for Animals with their Species and Habitat information
CREATE VIEW AnimalDetails AS
SELECT
    a.animal_id,
    a.name AS animal_name,
    s.common_name AS species_name,
    h.habitat_name
FROM
    Animals a
    JOIN Species s ON a.species_id = s.species_id
    JOIN Habitats h ON a.habitat_id = h.habitat_id;

-- View for Volunteer Activities with Volunteer names and Activity details
CREATE VIEW VolunteerActivityDetails AS
SELECT
    va.volunteer_id,
    v.first_name,
    v.last_name,
    ca.activity_name,
    va.date,
    va.hours
FROM
    VolunteerActivity va
    JOIN Volunteers v ON va.volunteer_id = v.volunteer_id
    JOIN ConservationActivity ca ON va.activity_id = ca.activity_id;

-- View for Observation details with Animal names
CREATE VIEW ObservationDetails
AS
SELECT
    o.observation_id,
    a.name AS animal_name,
    o.observation_date,
    o.notes
FROM
    Observations o
    JOIN Animals a ON o.animal_id = a.animal_id;

-- Index on the species_id column in Animals table
CREATE INDEX idx_species_id ON Animals(species_id);

-- Index on the habitat_id column in Animals table
CREATE INDEX idx_habitat_id ON Animals(habitat_id);

-- Index on the volunteer_id column in VolunteerActivity table
CREATE INDEX idx_volunteer_id ON VolunteerActivity(volunteer_id);

-- Index on the activity_id column in VolunteerActivity table
```

```
CREATE INDEX idx_activity_id ON VolunteerActivity(activity_id);

-- Index on the animal_id column in Observations table
CREATE INDEX idx_animal_id ON Observations(animal_id);

-- 1. Retrieve all animals with their species and habitat details
CREATE PROCEDURE GetAllAnimalsDetails
as
Begin
SELECT * FROM AnimalDetails;
END;

-- 2. Retrieve all volunteer activities with volunteer names and activity details
CREATE PROCEDURE GetAllVolunteerActivities
AS
BEGIN
   SELECT * FROM VolunteerActivityDetails;
END;

-- 3. Retrieve all observations with animal names and observation details
CREATE PROCEDURE GetAllObservations
AS
BEGIN
   SELECT * FROM ObservationDetails;
END;

-- 4. Find all animals in a specific habitat (e.g., 'Savannah')
CREATE PROCEDURE GetAnimalsInHabitat (
   @habitat_name VARCHAR(100)
)
AS
BEGIN
   SELECT * FROM AnimalDetails WHERE habitat_name = @habitat_name;
END;

-- 5. Find all activities done by a specific volunteer (e.g., volunteer_id = 1)
CREATE PROCEDURE GetActivitiesByVolunteer (
   @volunteer_id INT
)
AS
BEGIN
   SELECT * FROM VolunteerActivityDetails WHERE volunteer_id = @volunteer_id;
END;

-- 6. Find all observations for a specific animal (e.g., animal_id = 1)
CREATE PROCEDURE GetObservationsByAnimal (
   @animal_id INT
)
AS
BEGIN
   SELECT * FROM ObservationDetails;
```

```
END;

-- 7. Count the number of animals per species
CREATE PROCEDURE CountAnimalsPerSpecies
AS
BEGIN
   SELECT species_id, COUNT(*) AS num_animals
   FROM Animals
   GROUP BY species_id;
END;

-- 8. Count the number of volunteers involved in each activity
CREATE PROCEDURE CountVolunteersPerActivity
AS
BEGIN
   SELECT activity_id, COUNT(*) AS num_volunteers
   FROM VolunteerActivity
   GROUP BY activity_id;
END;

-- 9. Calculate the total funding received from each source
CREATE PROCEDURE TotalFundingPerSource
AS
BEGIN
   SELECT source, SUM(amount) AS total_funding
   FROM Funding
   GROUP BY source;
END;
```

OUTPUTS

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Results | Messages

	animal_id	animal_name	species_name	habitat_name
1	1	Dumbo	African Elephant	Savannah
2	2	Sheru	Bengal Tiger	Rainforest
3	3	Bao Bao	Giant Panda	Temperate Forest
4	4	Snowy	Snow Leopard	Mountain Range
5	5	Big Blue	Blue Whale	Ocean
6	6	Shelly	Green Turtle	Coral Reef
7	7	Chimp	Chimpanzee	Tropical Forest
8	8	Orangie	Orangutan	Mangrove
9	9	Polaris	Polar Bear	Arctic
10	10	Red	Red Panda	Bamboo Forest

EXEC GetAllAnimalsDetails

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Results | Messages

	volunteer_id	first_name	last_name	activity_name	date	hours
1	1	John	Doe	Tree Planting	2024-01-15	4
2	2	Jane	Smith	Clean-Up Drive	2024-02-15	3
3	3	Alice	Johnson	Wildlife Monitoring	2024-03-15	5
4	4	Bob	Brown	Habitat Restoration	2024-04-15	6
5	5	Charlie	Davis	Environmental Education	2024-05-15	2
6	6	Diana	Miller	Species Research	2024-06-15	7
7	7	Evan	Garcia	Anti-Poaching Patrols	2024-07-15	8
8	8	Fiona	Martinez	Wildlife Rescue	2024-08-15	4
9	9	George	Wilson	Marine Conservation	2024-09-15	3
10	10	Hannah	Taylor	Climate Action	2024-10-15	6

EXEC GetAllVolunteerActivities

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Results | Messages

	observation_id	animal_name	observation_date	notes
1	1	Dumbo	2024-01-01	Observed grazing.
2	2	Sheru	2024-02-01	Observed hunting.
3	3	Bao Bao	2024-03-01	Observed playing.
4	4	Snowy	2024-04-01	Observed climbing.
5	5	Big Blue	2024-05-01	Observed swimming.
6	6	Shelly	2024-06-01	Observed nesting.
7	7	Chimp	2024-07-01	Observed tool using.
8	8	Orangie	2024-08-01	Observed foraging.
9	9	Polaris	2024-09-01	Observed hunting.
10	10	Red	2024-10-01	Observed eating bamboo.

```
EXEC GetAllObservations
```

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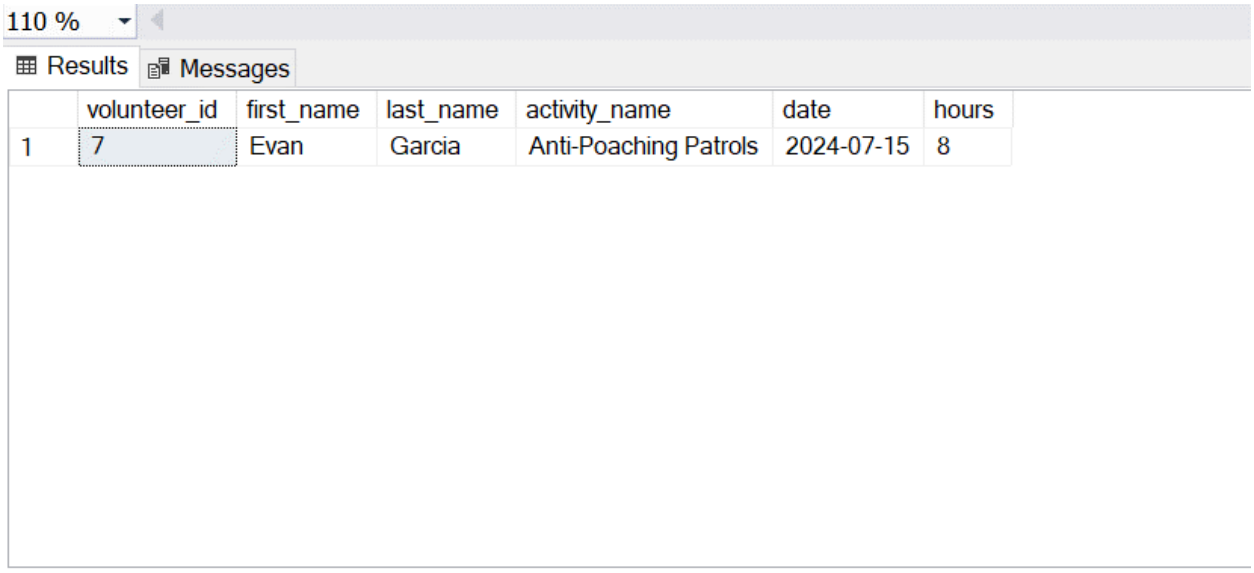
Results | Messages

	animal_id	animal_name	species_name	habitat_name
1	2	Sheru	Bengal Tiger	Rainforest

```
EXEC GetAnimalsInHabitat @habitat_name = 'Rainforest';
```



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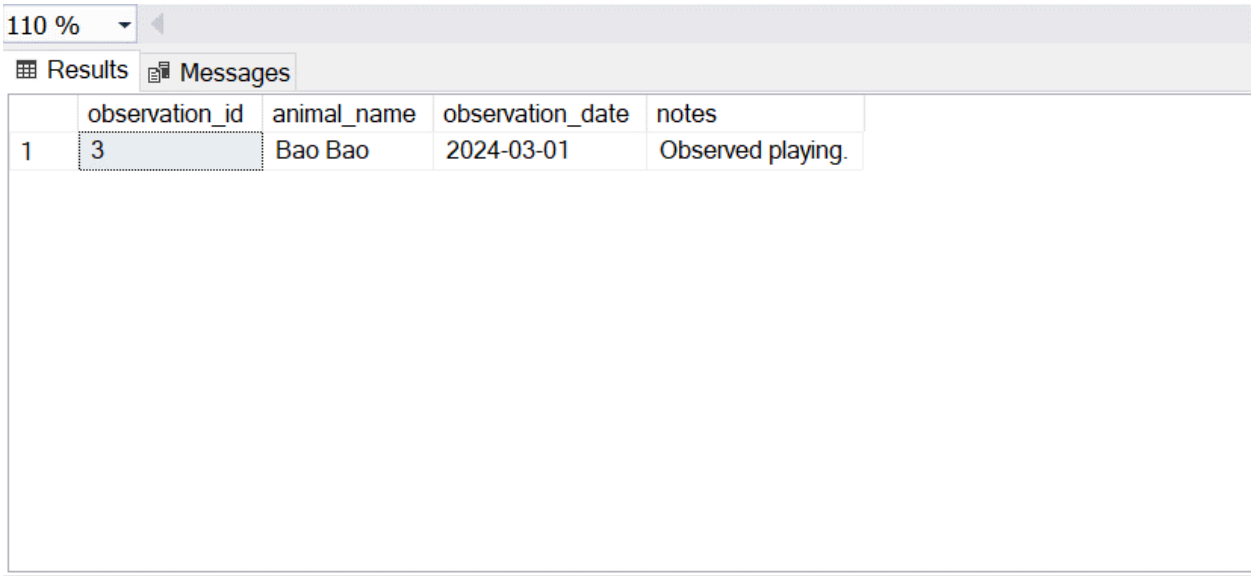
Results | Messages

	volunteer_id	first_name	last_name	activity_name	date	hours
1	7	Evan	Garcia	Anti-Poaching Patrols	2024-07-15	8

```
EXEC GetActivitiesByVolunteer @volunteer_id = 7;
```



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Results | Messages

	observation_id	animal_name	observation_date	notes
1	3	Bao Bao	2024-03-01	Observed playing.

```
EXEC GetObservationsByAnimal @animal_name = 'Bao Bao';
```

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Results | Messages

	species_id	num_animals
1	1	1
2	2	1
3	3	1
4	4	1
5	5	1
6	6	1
7	7	1
8	8	1
9	9	1
10	10	1

```
EXEC CountAnimalsPerSpecies;
```

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Results | Messages

	activity_id	num_volunteers
1	1	1
2	2	1
3	3	1
4	4	1
5	5	1
6	6	1
7	7	1
8	8	1
9	9	1
10	10	1

```
EXEC CountVolunteersPerActivity;
```

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Results | Messages

	source	total_funding
1	Animal Protection Fund	7000.00
2	Conservation Trust	6000.00
3	Eco-Friendly Enterprises	8500.00
4	Environmentalist Society	11000.00
5	Global Environmental Organization	10000.00
6	Green Earth Initiative	9500.00
7	National Parks Association	7500.00
8	Nature Supporters Group	12000.00
9	Wildlife Conservation Fund	5000.00
10	Wildlife Lovers Club	3000.00

```
EXEC TotalFundingPerSource;
```