

Entities and Relationships in the Zoo ER Diagram

Entities:

Animal

Attributes:

Animal_ID (Primary Key)

Name

Species

Date_of_Birth

Gender

Enclosure_ID (Foreign Key)

Constraints:

1. Each animal must have a unique Animal_ID.
2. Species should follow a predefined list of species.

Enclosure

Attributes:

Enclosure_ID (Primary Key)

Name

Size (square meters)

Habitat_Type

Constraints:

1. Each enclosure must have a unique Enclosure_ID.
2. Habitat_Type should match predefined categories like "Savannah," "Aquatic," etc.

Zookeeper

Attributes:

Zookeeper_ID (Primary Key)

First_Name

Last_Name

Contact_Number

Specialization (e.g., Reptiles, Mammals, Birds)

Constraints:

1. Each zookeeper must have a unique Zookeeper_ID.
2. Contact_Number must follow a valid phone format.

Relationships:

Animal - Enclosure (Many-to-One)

Each animal is housed in one enclosure, but an enclosure can contain multiple animals.

Represented using a foreign key `Enclosure_ID` in the Animal table.

Zookeeper - Enclosure (Many-to-Many)

A zookeeper can be responsible for multiple enclosures, and each enclosure can be managed by multiple zookeepers.

Implemented using a junction table

Zookeeper_Enclosure:

1. Zookeeper_ID (Foreign Key)
2. Enclosure_ID (Foreign Key)

Justification of Constraints:

The **Animal-Enclosure** relationship ensures that each animal has a designated space while allowing multiple animals to be grouped in one enclosure for social or environmental reasons.

The **Zookeeper-Enclosure** relationship captures the reality that zookeepers often specialize in certain types of animals and manage multiple enclosures.

The **Species constraint** in the Animal table ensures data consistency and prevents incorrect entries.

The **Contact_Number constraint** for zookeepers ensures that valid phone numbers are stored.

ER Diagram

```
+-----+
|      Animal      |
+-----+
```

Animal_ID (PK)
Name
Species
Date_of_Birth
Gender
Enclosure_ID (FK)

+-----+

|
| (Many-to-One)
|

+-----+

Enclosure

+-----+

Enclosure_ID (PK)
Name
Size
Habitat_Type

+-----+

|
| (Many-to-Many via Zookeeper_Enclosure)
|

+-----+

Zookeeper

+-----+

Zookeeper_ID (PK)
First_Name
Last_Name
Contact_Number
Specialization

+-----+