University of British Columbia, Vancouver
Department of Computer Science

CPSC 304 Project Cover Page

Milestone #: 0

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Group Number: 85

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

CPSC 304 Project Milestone 2 - Animal Shelter Database

Relational Schema:

- Animal(ID, Species, Breed, Weight, Birth Date, **Ward#, PC, Street#, Street Name**)
- AdoptionApplication(Date, **Name, PC, Street#, Street Name, AID, Species**)
- Owner(Name, PC, Street#, Street Name, City, Province, Phone#)
- Eat(**AID**, **Species**, **Food Type**, **Food Brand**, Amount)
- Food(Type, Brand, Price/KG)
- IntakeForm(IntakeDate, IntakeID)
- Ward(Number, **PC, Street#, Street Name**)
- Shelter(PC, Street#, Street Name, City, Province, Budget, Capacity)
- Worker(ID, Phone#, Email, **Ward#, PC, Street#, Street Name**)
- Veterinarian(**ID,** Salary)
- Volunteer(**ID,** Volunteer Hours)

Functional Dependencies:

In the relation Owner(Owner Name, Street#, Postal Code, Street Name, Province, City), Postal Code -> Province, City

In the relation Shelter(Postal Code, Street#, Street Name, City, Province, Budget, Capacity), Postal Code -> Province, City

Normalization:

Owner(Owner Name, Street#, Postal Code, Street Name, Province, City)

Postal Code → Province, City

- Breaks 2NF, and therefore 3NF and BCNF as well. Non-prime attributes (Province, City) are functionally dependent on a subset of the candidate key of the relation (Postal Code). This means the relation is only in 1NF.

R1(Postal Code, City, Province)

R2(Owner Name, Street#, Postal Code, Street Name, Phone#)

Shelter(Postal Code, Street#, Street Name, City, Province, Budget, Capacity)

Postal Code → Province, City

- Breaks 2NF, and therefore 3NF and BCNF as well. Non-prime attributes (Province, City) are functionally dependent on a subset of the candidate key of the relation (Postal Code). This means the relation is only in 1NF.

R1(Postal Code, City, Province)
R2(Street#, Postal Code, Street Name, Budget, Capacity)

SQL DDL:

```
CREATE TABLE Worker(
        ID                  CHAR(8) PRIMARY KEY
        Name                CHAR(20)
        Phone#              INTEGER
        Email               CHAR(20)
        Ward#               INTEGER NOT NULL
        SID                 CHAR(8) NOT NULL
        FOREIGN KEY(Ward#, ID) REFERENCES Ward(Number, ID)
                ON DELETE NO ACTION
                ON UPDATE CASCADE)

CREATE TABLE Veterinarian(
        ID                  CHAR(8) PRIMARY KEY
        Salary              INTEGER
        FOREIGN KEY(ID) REFERENCES Worker)

CREATE TABLE Volunteer(
        ID                  CHAR(8) PRIMARY KEY
        Volunteer Hours     INTEGER
        FOREIGN KEY(ID) REFERENCES Worker)

CREATE TABLE Ward(
        Street#             INTEGER
        Street Name         CHAR(12)
        Postal Code         CHAR(6)
        Number              INTEGER
        PRIMARY KEY(Street#, Street Name, Postal Code, Number),
        FOREIGN KEY(Street#, Street Name, Postal Code) REFERENCES Shelter
                ON DELETE CASCADE
                ON UPDATE CASCADE)
```

```
CREATE TABLE Shelter(
        Street#             INTEGER
        Street Name         CHAR(12)
        Postal Code         CHAR(6)
        Budget              INTEGER
        Capacity            INTEGER
        PRIMARY KEY(Street#, Street Name, Postal Code))

CREATE TABLE Animal(
        ID                  CHAR(8)
        Species             CHAR(20)
        Birth Date          CHAR(10)
        Breed               CHAR(20)
        Weight              INTEGER
        Ward#               INTEGER NOT NULL
        Street#             INTEGER NOT NULL
        Street Name         CHAR(12) NOT NULL
        Postal Code         CHAR(6) NOT NULL
        PRIMARY KEY(ID, Species)
        FOREIGN KEY(Ward#, Street#, Street Name, Postal Code) REFERENCES Ward(Number)
                ON DELETE NO ACTION
                ON UPDATE CASCADE)

CREATE TABLE Intake Form(
        Intake ID           CHAR(8) PRIMARY KEY
        Intake Date         CHAR(10)
        AID                 CHAR(8) NOT NULL
        Species             CHAR(20) NOT NULL
        FOREIGN KEY(AID, Species) REFERENCES Animal(ID, Species)
                ON DELETE CASCADE
                ON UPDATE CASCADE)

CREATE TABLE Food(
        Type                CHAR(10)
        Brand               CHAR(10)
        Price/KG            INTEGER
        PRIMARY KEY(Type, Brand))

CREATE TABLE Eat(
        AID                 CHAR(8) NOT NULL
        Species             CHAR(20) NOT NULL
```

```
        Food Type           CHAR(10)
        Food Brand          CHAR(10)
        Amount              INTEGER
        PRIMARY KEY(AID, Species, Food Type, Food Brand),
        FOREIGN KEY(AID, Species) REFERENCES Animal(ID, Species),
        FOREIGN KEY(Food Type, Food Brand) REFERENCES Food(Type, Brand))

CREATE TABLE Adoption Application(
        Name            CHAR(12)
        Street#         INTEGER
        Street Name     CHAR(12)
        Postal Code     CHAR(6)
        Date            CHAR(10)
        AID             CHAR(8) UNIQUE NOT NULL
        Species         CHAR(20) UNIQUE NOT NULL
        PRIMARY KEY(Name, Street#, Street Name, Postal Code, Date),
        FOREIGN KEY(AID, Species) REFERENCES Animal(ID),
        FOREIGN KEY(Name, Street#, Street Name, Postal Code) REFERENCES Owner
                ON DELETE CASCADE
                ON UPDATE CASCADE)

CREATE TABLE Owner(
        Name            CHAR(12)
        Street#         INTEGER
        Street Name     CHAR(12)
        Postal Code     CHAR(6)
        City            CHAR(14)
        Province        CHAR(14)
        Phone#          INTEGER
        PRIMARY KEY(Name, Street#, Street Name, Postal Code))
```

Sample Tables:

Worker							
ID	Name	Phone#	Email	Ward#	Shelter Street Number	Shelter Street Name	Shelter Postal Code
12345678	John Doe	604 555 5555	john.doe@gmail.com	4	555	West 9th Ave	V5D 4T2
23456789	Jane Deo	604 987 5555	jane.deo@gmail.com	3	3263	Maple Ave	V6H 8Y7
86632359	Laura Pio	604 123 2346	Laura.Pio@gmail.com	4	555	West 9th Ave	V5D 4T2
84750218	Aminatou Olayinka	604 163 5677	Aminatou.Olayinka@gmail.com	5	1482	McDonald Ave	V1L 5UJ
91642469	Anuj Tipene	604 793 0934	Anuj.Tipene@gmail.com	6	365	Yew St	V9R 3P2
16296422	Liliana Ninel	604 236 9023	Liliana.Ninel@gmail.com	5	1482	McDonald Ave	V1L 5UJ
31979870	Katsuhito Stanislav	604 982 5546	Katsuhito.Stanislav@gmail.com	6	365	Yew St	V9R 3P2
57940862	Wendi Khan	604 090 8231	Wendi.Khan@gmail.com	6	365	Yew St	V9R 3P2
15759770	Yamilet Eline	604 856 2102	Yamilet.Eline@gmail.com	1	3472	Ray Court	V6S 1L8
49439812	Murtaz Phyllida	604 450 9612	Murtaz.Phyllida@gmail.com	1	3472	Ray Court	V6S 1L8
91754684	Manca Sumati	604 834 9061	Manca.Sumati@gmail.com	1	3472	Ray Court	V6S 1L8

Volunteer	
ID	Volunteer

	Hours
23456789	600
31979870	100
57940862	50
15759770	500
49439812	350

Veterinarian	
ID	Salary
12345678	60,000
86632359	63,000
84750218	66,000
91642469	69,000
16296422	72,000

Ward			
Number	Shelter Street Number	Shelter Street Name	Shelter Postal Code
4	555	West 9th Ave	V5D 4T2
3	3263	Maple Ave	V6H 8Y7
5	1482	McDonald Ave	V1L 5UJ
6	365	Yew St	V9R 3P2
1	3472	Ray Court	V6S 1L8

Shelter						
Budget	Capacity	Street Number	Street Name	Postal Code	City	Province
$40,000,000	500	555	West 9th Ave	V5D 4T2	Vancouver	BC
$6,000,000	50	3263	Maple Ave	V6H 8Y7	Surrey	BC
$22,000,000	200	1482	McDonald Ave	V1L 5UJ	Richmond	BC
$12,000,000	75	365	Yew St	V9R 3P2	Vancouver	BC
$67,000,000	1000	3472	Ray Court	V6S 1L8	Burnaby	BC

Animal								
ID	Species	Birth Date	Breed	Weight	Ward#	Shelter Street Number	Shelter Street Name	Shelter Postal Code
87047410	Dog	2020-10-25	Golden Retriever	35.1kg	4	555	West 9th Ave	V5D 4T2
78217232	Cat	2013-05-21	Maine Coon	7.6kg	3	3263	Maple Ave	V6H 8Y7
61558339	Dog	2016-01-30	Boston Terrier	10.9kg	4	555	West 9th Ave	V5D 4T2
50276739	Dog	2021-04-23	Pug	5.2kg	6	365	Yew St	V9R 3P2
13015895	Cat	2019-08-11	Siamese	5.6kg	3	3263	Maple Ave	V6H 8Y7

Intake Form			
Intake ID	Intake Date	AID	Species
82488620	2021-08-12	87047410	Dog
57966565	2021-03-24	78217232	Cat
31413656	2021-10-11	61558339	Dog
54474563	2021-09-30	50276739	Dog
47725067	2021-07-05	13015895	Cat

Eat				
AID	Species	Food Type	Food Brand	Amount
87047410	Dog	Dog Food	Royal Canin	500g
78217232	Cat	Cat Food	Purina	150g
61558339	Dog	Dog Food	Royal Canin	400g
50276739	Dog	Dog Food	Hill's Pet Nutrition	450g
13015895	Cat	Cat Food	Hill's Pet Nutrition	200g

Food		
Type	Brand	Price/KG
Dog Food	Royal Canin	$5
Cat Food	Purina	$8
Dog Food	Hill's Pet Nutrition	$7
Cat Food	Hill's Pet Nutrition	$4
Cat Food	Royal Canin	$6

Adoption Application						
Name	Street#	Street Name	Postal Code	Date	AID	Species
Haris Barbara	123	Vine St	V6S 1L5	2021-10-15	87047410	Dog
Aygul Antinanco	5212	Cedar St	V2R 9Y7	2021-09-25	78217232	Cat
Medusa Karol	2345	Oak Ave	V7H 2R9	2021-08-11	61558339	Dog
Kanako Ana	1456	Maple Ave	V8L H94	2021-10-09	50276739	Dog
Olamide Gayathri	3465	Yew St	V9Z 1B6	2021-10-18	13015895	Cat

Owner						
Name	Street#	Street Name	Postal Code	City	Province	Phone#
Haris Barbara	123	Vine St	V6S 1L5	Vancouver	BC	604 832 3284
Aygul Antinanco	5212	Cedar St	V2R 9Y7	Richmond	BC	604 238 4982
Medusa Karol	2345	Oak Ave	V7H 2R9	Vancouver	BC	604 582 8412
Kanako Ana	1456	Maple Ave	V8L H94	Vancouver	BC	604 283 4234
Olamide Gayathri	3465	Yew St	V9Z 1B6	Surrey	BC	604 320 4981

Sample Query:

Insertion: Add an animal to our database of animals, ensuring it has an intake form and a ward.

Delete: If an Owner requests to be removed from our database of Animal Owners, all Adoption Applications under the Owner must also be removed

Delete: Remove an Animal from our database if they die, then Intake Form must also be deleted

Update: be able to change the Weight, WardNumber, or ShelterID for an Animal that has been reweighed or moved

Selection: Select animals or an animal from any table with any specified attributes

Projection: Select any subset of Animal's attributes to view, such as {Species, Breed, Weight, BirthDate} for example, useful to see physical properties of an Animal without other information

Join: Join Animal, AdoptionApplication, and Owner tables, to find all animals that have been adopted and where they are

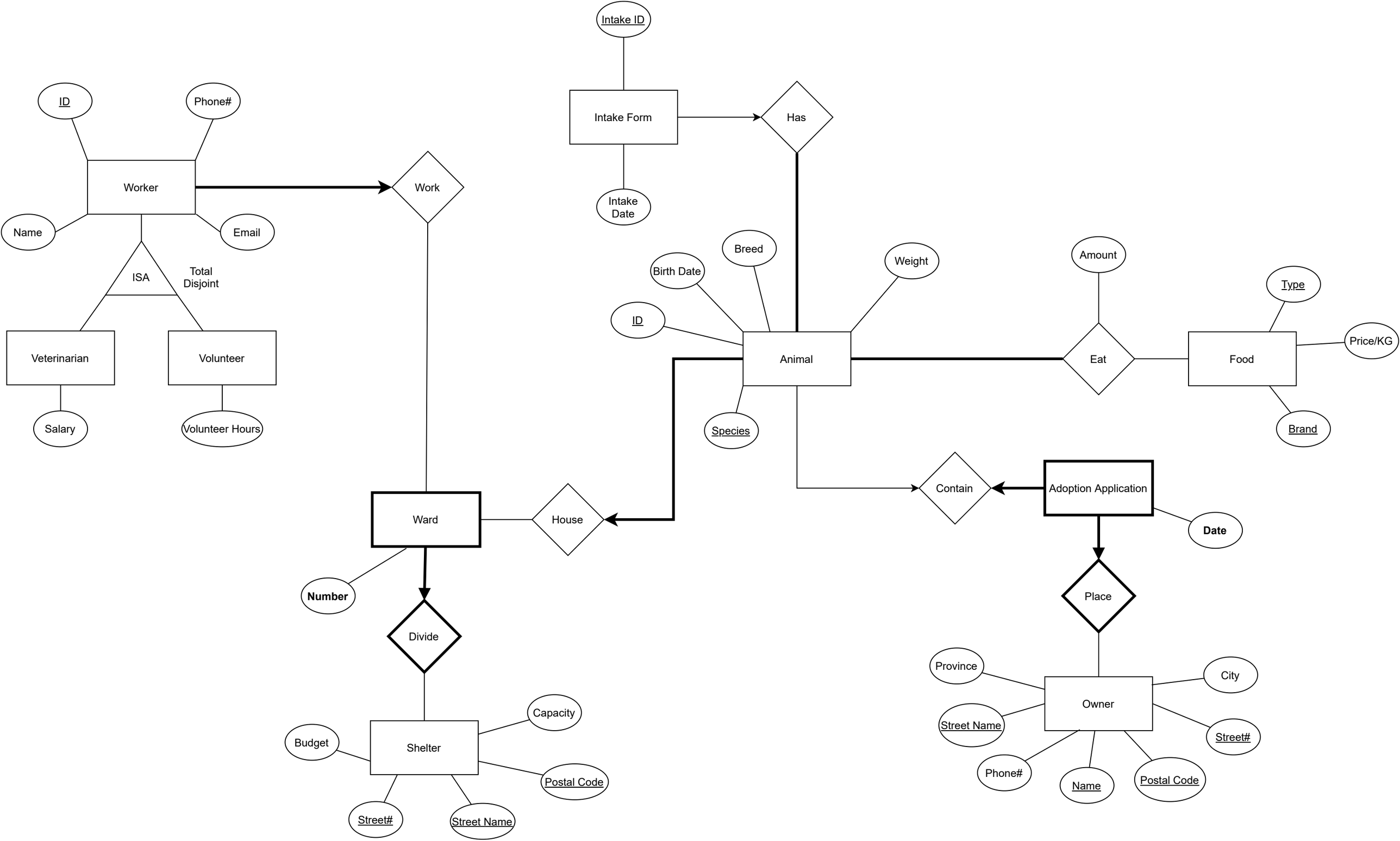
Aggregation with Group By: Display the average age (calculated by BirthDate) of each Species of Animal, sorted in descending order, to approximate which species spends most time in the shelter. Can do the same with the average of (IntakeDate - AdoptionDate) to get a more precise list.

Aggregation with Having: Find Shelters that have total Veterinarian Salary below a certain threshold, to identify which ones can afford to hire another Vet

Nested Aggregation with Group By: Display the average weight of each species of animal grouped by shelter ID where calculated age is less than one year, to find a shelter that has more puppies and kittens.

Division: Query to find which Animal Species are found in every Shelter, so we know which animals to divert more funds to

ER Diagram:


ID
Phone#
Worker
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Veterinarian
Volunteer
Salary
Volunteer Hours
Intake ID
Intake Form
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Birth Date
Weight
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Animal
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Food
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Species
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Ward
House
Number
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Capacity
Budget
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Street Name
Contain
Adoption Application
Date
Place
Province
City
Owner
Street Name
Street#
Phone#
Name
Postal Code