



# INFS7901 DATABASE PRINCIPLES PROPOSAL

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## Project Description:

The overarching domain of this database project is a medium-sized cattle company, modelled after a real company, Seifert Belmont Reds. The domain will focus on the internal aspect of the business excluding any customer interactions. This includes major assets such as vehicles, cattle, properties and their paddocks, and primary staff excluding the owners but including managers.

This domain contains a few specific constraints and rules:

- Due to weather and property conditions, paddocks or entire farms may not always be utilised during a given period.
  - This involves paddocks without cattle or farms without staff or vehicles.
- All farms have at least one paddock.
- All farms and paddocks are named uniquely across the business.
- Vehicles refers to on property vehicles, not road-registered vehicles.
  - As such the vehicles do not have official registration and have an internal integer ID which is unique across all vehicles on all properties
- Staff can move between properties, as such their staff ID is unique across all properties, but they are registered to a primary location.

Following this domain, the primary functionality of this database is intended to assist in management and analytics of cattle. Though no direct analytics functionality is projected to be implemented in the database, aggregation functions are planned to be implemented in an accessible manor to assist in further insights. Secondary functionality includes systems to help manage staff, vehicle information, paddocks, and their feed bins.

To implement this project, MySQL will be used as the database management system. MySQL will be used with Python implementing the Flask library to build the application, while HTML and CSS will be used to build a graphical user interface for the application.

## ER Diagram:

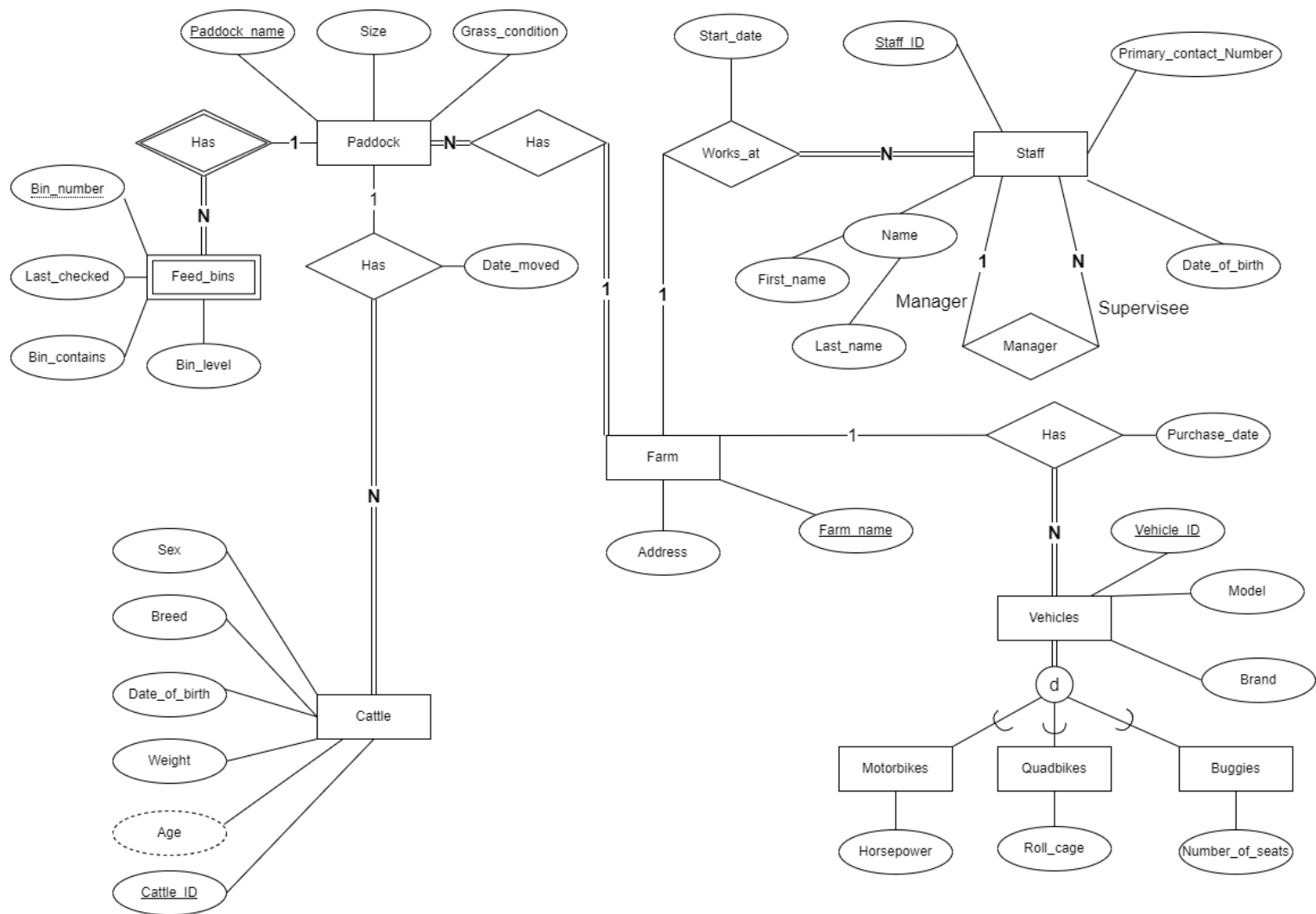


Figure 1 : ER Diagram

## Candidate Keys:

<u>Table</u>	<u>Primary Key</u>	<u>Candidate Keys</u>
<b>FARM</b>	Farm_name	Address
<b>STAFF</b>	Staff_ID	
<b>VEHICLES</b>	Vehicle_ID	
<b>PADDOCK</b>	Paddock_name	
<b>CATTLE</b>	Cattle_ID	
<b>Feed_BINS</b>	{Paddock_name, Bin_number}	

Table 1: Candidate Keys

## Schema:

### FARM

[Farm\_name : Variable string, Address : Variable string]

### STAFF

[Staff\_ID : Integer > 0, First\_name : Variable string, Last\_name : Varibale String, Date\_of\_birth : Date  
 , **Farm\_name** : Variable string, start\_date : Date, Manager\_ID : Integer > 0, Primary\_contact\_number  
 Variable string]

### PADDOCK

[Paddock\_name : Varibale string, Size : Real number > 0 , Grass\_condition : {'Dry', 'Green'},  
**Farm\_name** : Variable string]

### CATTLE

[Cattle\_ID : Integer > 0, Sex : {'Male', 'Female'}, Breed : {'Belmont Red', 'Angus', 'Cross'},  
 Date\_of\_birth : Date, Weight : Real number to two decimal places, **Paddock\_name** : Varibale string,  
 Date\_moved : Date]

### FEED\_BINS

[**Paddock\_name** : Integer > 0, Bin\_number : Integer > 0, Last\_checked : Date, Bin\_contains :  
 {'Wheat', 'Salt Lick', 'Sorghum'}, Bin\_level :  $0 \leq \text{real number} \leq 1$ ]

**VEHICLES**

[Vehicle\_ID : Integer > 0 , Model : Variable string, Brand : Variable string, **Farm\_name** : Variable string, Purchase\_date : Date]

**MOTORBIKES**

[Vehicle\_ID : Integer > 0 , Horsepower : Integer > 0]

**QUADBIKES**

[Vehicle\_ID : Integer > 0, Roll\_cage : {'Yes', 'No'}]

**BUGGIES**

[Vehicle\_ID : Integer > 0, Number\_of\_seats :  $2 \leq \text{Integer} \leq 4$  ]

Foreign Keys:

FEED\_BINS.Paddock\_name → PADDOCK.Paddock\_name

STAFF.Farm\_name → Farm.Farm\_name

STAFF.Manager\_ID → STAFF.Staff\_ID

VEHICLE.Farm\_name → Farm.Farm\_name

PADDOCK.Farm\_name → Farm.Farm\_name

CATTLE.Paddock\_name → PADDOCK.Paddock\_name

MOTORBIKES.Vehicle\_ID → VEHICLE\_Vehicle\_ID

QUADBIKES.Vehicle\_ID → VEHICLE\_Vehicle\_ID

BUGGIES.Vehicle\_ID → VEHICLE\_Vehicle\_ID

## Functional Dependencies:

### FARM:

- Farm\_name → Address
  - All farms have a unique name and one address. Therefore, for any given farm name, the address will be the same for every instance of said name.
- Address → Farm\_name
  - All farms have a unique name and one address. Therefore, for any given address, the farm name will be the same for every instance of said name.

### STAFF:

- Staff\_ID → First\_name, Last\_name, Date\_of\_birth, Farm\_name, Start\_date, Manager\_ID, Primary\_contact\_number
  - Staff IDs are unique across the entire business. Therefore, for any given Staff ID, the First name, last name, date of birth, the farm name the staff works at, their start date, and their managers ID will always be the same for every instance of said ID.
  - As multiple staff members may share a dwelling with a landline as their primary contact number, the contact number cannot be used as a determinant or primary key.

### Paddock:

- Paddock\_name → Size, Grass\_condition, Farm\_name
  - All paddocks across the entire business have unique names. Therefore, for any given paddock name, the size, grass condition, and farm it's apart of will be the same for every instance of said name.

**CATTLE:**

- Cattle\_ID → Sex, Breed, Date\_of\_birth, Weight, Paddock\_name, Date\_moved
  - All cattle across the entire business have a unique ID. Therefore, for any given cattle ID, the sex, breed, date of birth, weight, paddock they reside in, and the date they were last moved will be the same for every instance of said ID.

**VEHICLES:**

- Vehicle\_ID → Model, Brand, Farm\_name, Purchase\_date
  - Vehicle IDs are unique across the entire business. Therefore, for any given vehicle ID, the model, brand, farm the vehicle is used at, and the purchase date will be the same for every instance of said ID.
- Model → Brand
  - Each model name is only apart of one brand due to copyright laws.

**MOTORBIKES:**

- Vehicle\_ID → Horsepower
  - Vehicle IDs are unique across the entire business. Therefore, for any given vehicle ID, the horsepower will be the same for every instance of said ID.

**QUADBIKES:**

- Vehicle\_ID → Roll\_cage
  - Vehicle IDs are unique across the entire business. Therefore, for any given vehicle ID, the roll cage status will be the same for every instance of said ID.



**BUGGIES:**

- $\text{Vehicle\_ID} \rightarrow \text{Numer\_of\_seats}$ 
  - Vehicle IDs are unique across the entire business. Therefore, for any given vehicle ID, the number of seats will be the same for every instance of said ID.

**FEED\_BINS :**

- $\{\text{Paddock\_name}, \text{Bin\_number}\} \rightarrow \text{Last\_checked}, \text{Bin\_contains}, \text{Bin\_level}$ 
  - Bin numbers are unique in every paddock. Therefore, for any given bin number in addition to a paddock ID, the date the bin was last checked, what it contains, and its level will be the same for every instance of said paddock ID with bin number.

## Normalised Schema : BCNF

**FARM:**

- $\text{Farm\_name} \rightarrow \text{Address}$
- $\text{Address} \rightarrow \text{Farm\_name}$

$\text{Farm\_name}^+ \rightarrow X$  where X is all attributes of FARM. Therefore, Farm\_name is a superkey.

$\text{Address}^+ \rightarrow X$  where X is all attributes of FARM. Therefore, Address is a superkey.

As both Farm\_name, and Address are superkeys, X is a superkey for all  $X \rightarrow B$ . Therefore, FARM is in BCNF form.

FARM	
<u>Farm name : Variable string</u>	<u>Primary key</u>
Address : Variable string	Candidate key

**STAFF:**

- Staff\_ID → First\_name, Last\_name, Date\_of\_birth, Farm\_name, Start\_date, Manager\_ID, Primary\_contact\_number

Staff\_ID<sup>+</sup> → X where X is all attributes of STAFF. Therefore, Staff\_ID is a superkey.

As Staff\_ID is a superkey, X is a superkey for all X → B. Therefore, STAFF is in BCNF form.

<b>STAFF</b>	
<u>Staff_ID : Integer &gt; 0</u>	<u>Primary key</u>
First_name : Variable string	
Last_name : Variable string	
Date_of_birth : Date	
<b>Farm_name : Variable string</b>	<b>Foreign key → FARM.Farm_name</b>
Start_date : Date	
Manager_ID : Integer > 0	
Primary_contact_number : Variable string	

**Paddock:**

- Paddock\_name  $\rightarrow$  Size, Grass\_condition, Farm\_name

Paddock\_name<sup>+</sup>  $\rightarrow$  X where X is all attributes of Paddock. Therefore, Paddock\_name is a superkey.

As Paddock\_name is a superkey, X is a superkey for all  $X \rightarrow B$ . Therefore, Paddock is in BCNF form.

Paddock	
Paddock_name : Variable string	<u>Primary key</u>
Size : Real number > 0	
Grass_condition : {'Dry', 'Green'}	
Farm_name : Variable string	Foreign key $\rightarrow$ FARM.Farm_name

**Cattle:**

- Cattle\_ID  $\rightarrow$  Sex, Breed, Date\_of\_birth, Weight, Paddock\_name, Date\_moved

Cattle\_ID<sup>+</sup>  $\rightarrow$  X where X is all attributes of CATTLE. Therefore, Cattle\_ID is a superkey.

As Cattle\_ID is a superkey, X is a superkey for all  $X \rightarrow B$ . Therefore, CATTLE is in BCNF form.

CATTLE	
<u>Cattle_ID : Int &gt; 0</u>	<u>Primary key</u>
Sex : {'Male', 'Female'}	
Breed : {'Belmont Red', 'Angus', 'Cross'}	
Date_of_birth : Date	
Weight : Real number > 0	
Paddock_name : Variable string	Foreign key $\rightarrow$ Paddock.Paddock_name
Date_moved : Date	

**VEHICLES:**

- $\text{Vehicle\_ID} \rightarrow \text{Model, Brand, Farm\_name, Purchase\_date}$
- $\text{Model} \rightarrow \text{Brand}$ .

$\text{Vehicle\_ID}^+ \rightarrow X$  where X is all attributes of VEHICLES. Therefore, Vehicle\_ID is a superkey.

$\text{Model}^+$  does not  $\rightarrow X$  where X is all attributes of VEHICLES. Therefore, Model is not a superkey and

$\text{Model} \rightarrow \text{Brand}$  violates BCNF.

Therefore, VEHICLES is split.

VEHICLES	
<u>Vehicle_ID : Integer &gt; 0</u>	<u>Primary key</u>
Model : Variable string	
<b>Farm_name : Variable string</b>	<b>Foreign key <math>\rightarrow</math> FARM.Farm_name</b>
Purchase_date : Date	

- $\text{Vehicle\_ID} \rightarrow \text{Model, Brand, Farm\_name, Purchase\_date}$

$\text{Vehicle\_ID}^+ \rightarrow X$  where X is all attributes of VEHICLES. Therefore, Vehicle\_ID is a superkey.

As Vehicle\_ID is a superkey, X is a superkey for all  $X \rightarrow B$ . Therefore, VEHICLES is in BCNF form.

VEHICLE_BRANDS	
<u>Vehicle_ID : Integer &gt; 0</u>	<u>Primary key &amp; foreign key →</u>  VEHICLES.Vehicle_ID
Brand : Variable string	

- Model → Brand

Model<sup>+</sup> → X where X is all attributes of VEHICLES. Therefore, Model is a superkey.

As Model is a superkey, X is a superkey for all X → B. Therefore, VEHICLE\_BRANDS is in BCNF form.

#### MOTORBIKES:

- Vehicle\_ID → Horsepower

Vehicle\_ID<sup>+</sup> → X where X is all attributes of MOTORBIKES. Therefore, Vehicle\_ID is a superkey.

As Vehicle\_ID is a superkey, X is a superkey for all X → B. Therefore, MOTORBIKES is in BCNF form.

MOTORBIKES	
<u>Vehicle_ID : Integer &gt; 0</u>	<u>Primary key &amp; foreign key →</u>  VEHICLES.Vehicle_ID
Horsepower : Integer > 0	

**QUADBIKES:**

- $\text{Vehicle\_ID} \rightarrow \text{Roll\_cage}$

$\text{Vehicle\_ID}^+ \rightarrow X$  where X is all attributes of QUADBIKES. Therefore, Vehicle\_ID is a superkey.

As Vehicle\_ID is a superkey, X is a superkey for all  $X \rightarrow B$ . Therefore, QUADBIKES is in BCNF form.

QUADBIKES	
<u>Vehicle_ID : Integer &gt; 0</u>	<u>Primary key &amp; foreign key</u> →  VEHICLES.Vehicle_ID
Roll_cage : {'Yes', 'No'}	

**BUGGIES:**

- $\text{Vehicle\_ID} \rightarrow \text{Numer\_of\_seats}$

$\text{Vehicle\_ID}^+ \rightarrow X$  where X is all attributes of BUGGIES. Therefore, Vehicle\_ID is a superkey.

As Vehicle\_ID is a superkey, X is a superkey for all  $X \rightarrow B$ . Therefore, BUGGIES is in BCNF form.

BUGGIES	
<u>Vehicle_ID : Integer &gt; 0</u>	<u>Primary key &amp; foreign key</u> →  VEHICLES.Vehicle_ID
Number_of_seats : $2 \leq \text{Integer} \leq 4$	

**FEED\_BINS :**

- {Paddock\_name Bin\_number}  $\rightarrow$  Last\_checked, Bin\_contains, Bin\_level

{Paddock\_name, Bin\_number}  $^+ \rightarrow X$  where X is all attributes of FEED\_BINS. Therefore,

{Paddock\_name, Bin\_number} is a superkey.

As {Paddock\_name, Bin\_number} is a superkey, X is a superkey for all  $X \rightarrow B$ . Therefore, FEED\_BINS is in BCNF form.

FEED_BINS	
<u>Paddock_name</u> : Variable string	<u>Primary key &amp; foreign key</u> $\rightarrow$ PADDOCK.Paddock_name
<u>Bin_number</u> : Integer > 0	<u>Primary key</u>
Last_checked : Date	
Bin_contains : {'Wheat', 'Salt Lick', 'Sorghum'},	
Bin_level : $0 \leq \text{real number} \leq 1$	

## Screenshots:

The following screenshots show a basic implementation of a GUI. This GUI currently follows the styling of the example project provided. The screenshots also showcases the implementation of the GUI, by adding a staff member to the database hosted on the localhost. Staff ID is not implemented in the GUI as it is set to auto increment in the database. The phone number functionality is currently removing leading zeros

Flask Blog Home Cattle Staff Vehicles

### Add Staff

FirstName  
Lex

LastName  
Miros

Date of birth  
21/09/1995

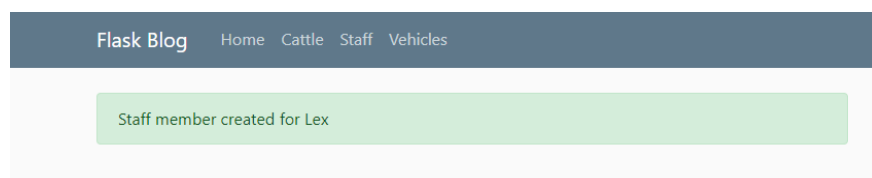
Start Date  
16/04/2022

Manager ID if applicable  
1

Staff's primary farm  
Farm1

Primary Contact Number  
0459116800

Add Staff



Server: 127.0.0.1 > Database: project\_db\_2 > Table: staff

Showing rows 0 - 5 (6 total, Query took 0.0004 seconds.)

SELECT \* FROM `staff`

Profiling [ Edit inline ] [ Edit ] [ Explain SQL ] [ Create PHP code ] [ Refresh ]

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

+ Options

	Staff_ID	First_name	Last_name	Date_of_birth	Farm_name	Start_date	Manager_ID	Primary_contact_number
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	1	John	Sugar	1980-01-01	Farm1	2005-12-04	NULL	12356789
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2	Jane	Smith	1999-05-09	Farm1	2020-01-19	1	346346241
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	3	Shelly	Ward	1993-11-21	Farm2	2022-04-12	NULL	235242
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	4	Leo	Harding	1996-03-28	Farm2	2021-01-01	3	23412351
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	5	Paul	Saint	1979-05-13	Farm2	2006-02-02	3	412415324
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	18	Lex	Miros	1995-09-21	Farm1	2022-04-16	1	459116800

Check all With selected: Edit Copy Delete Export

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None



## SQL Dump:

-- phpMyAdmin SQL Dump

-- version 5.1.3

-- <https://www.phpmyadmin.net/>

--

-- Host: 127.0.0.1

-- Generation Time: Apr 17, 2022 at 06:16 AM

-- Server version: 8.0.28

-- PHP Version: 7.4.28

SET SQL\_MODE = "NO\_AUTO\_VALUE\_ON\_ZERO";

START TRANSACTION;

SET time\_zone = "+00:00";

/\*!40101 SET @OLD\_CHARACTER\_SET\_CLIENT=@@CHARACTER\_SET\_CLIENT \*/;

/\*!40101 SET @OLD\_CHARACTER\_SET\_RESULTS=@@CHARACTER\_SET\_RESULTS \*/;

/\*!40101 SET @OLD\_COLLATION\_CONNECTION=@@COLLATION\_CONNECTION \*/;

/\*!40101 SET NAMES utf8mb4 \*/;

--

-- Database: `project\_db\_2`

--

-----

--

-- Table structure for table `buggies`

--

CREATE TABLE `buggies` (

```

`VehicleID` int NOT NULL,
`NumberOfSeats` int DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;

--
-- Dumping data for table `buggies`
--

INSERT INTO `buggies` (`VehicleID`, `NumberOfSeats`) VALUES
(11, 2),
(12, 4),
(13, 4),
(14, 4),
(15, 2);

-----

--
-- Table structure for table `cattle`
--

CREATE TABLE `cattle` (
  `CattleID` int NOT NULL,
  `Sex` enum('Male','Female') DEFAULT NULL,
  `Breed` enum('Belmont Red','Angus','Cross') DEFAULT NULL,
  `DateOfBirth` date DEFAULT NULL,
  `Weight` double DEFAULT NULL,
  `PaddockName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci DEFAULT NULL,
  `DateMoved` date DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;

```

```
--
-- Dumping data for table `cattle`
--

INSERT INTO `cattle` (`CattleID`, `Sex`, `Breed`, `DateOfBirth`, `Weight`, `PaddockName`,
`DateMoved`) VALUES
(1, 'Female', 'Belmont Red', '2020-01-01', 800, 'Paddock1', '2020-01-01'),
(2, 'Male', 'Cross', '2022-02-02', 1000, 'Paddock1', '2022-02-02'),
(3, 'Male', 'Angus', '2020-11-21', 1100, 'Paddock1', '2020-11-21'),
(4, 'Female', 'Belmont Red', '2019-09-19', 790, 'Paddock2', '2019-09-19'),
(5, 'Female', 'Belmont Red', '2018-09-18', 820, 'Paddock2', '2018-09-18');

-----

--
-- Table structure for table `farm`
--

CREATE TABLE `farm` (
  `FarmName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci NOT NULL,
  `Address` varchar(255) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;

--
-- Dumping data for table `farm`
--

INSERT INTO `farm` (`FarmName`, `Address`) VALUES
('Farm1', 'Address 1, QLD, 4111'),
('Farm2', 'Address 2, QLD, 4120'),
```

```

('Farm3', 'Address 3, QLD, 4001'),
('Farm4', 'Address 4, QLD, 4120'),
('Farm5', 'Address 5, QLD, 4122');

-----

--

-- Table structure for table `feed_bins`

--

CREATE TABLE `feed_bins` (
  `BinNumber` int NOT NULL,
  `PaddockName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci NOT NULL,
  `LastChecked` date DEFAULT NULL,
  `BinContains` enum('Wheat','Salt Lick','Sorghum') CHARACTER SET utf8mb4 COLLATE
utf8mb4_0900_ai_ci DEFAULT NULL,
  `BinLevel` double DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;

--

-- Dumping data for table `feed_bins`

--

INSERT INTO `feed_bins` (`BinNumber`, `PaddockName`, `LastChecked`, `BinContains`, `BinLevel`)
VALUES
(1, 'Paddock1', '2022-04-11', 'Wheat', 0.76),
(1, 'Paddock2', '2022-03-01', 'Sorghum', 1),
(2, 'Paddock1', '2022-04-10', 'Salt Lick', 0.75),
(2, 'Paddock2', '2022-04-10', 'Wheat', 0),
(3, 'Paddock1', '2022-04-10', 'Wheat', 1);

-----

```

```
--  
  
-- Table structure for table `motorbikes`  
  
--  
  
CREATE TABLE `motorbikes` (  
  `VehicleID` int NOT NULL,  
  `EngineCC` int DEFAULT NULL  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;  
  
--  
  
-- Dumping data for table `motorbikes`  
  
--  
  
INSERT INTO `motorbikes` (`VehicleID`, `EngineCC`) VALUES  
(1, 200),  
(2, 300),  
(3, 300),  
(4, 200),  
(5, 275);  
  
-----  
  
--  
  
-- Table structure for table `paddock`  
  
--  
  
CREATE TABLE `paddock` (  
  `PaddockName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci NOT NULL,  
  `Size` double DEFAULT NULL,
```

```
`GrassCondition` enum('Dry','Green') CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci
DEFAULT NULL,
```

```
`FarmName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;
```

```
--
```

```
-- Dumping data for table `paddock`
```

```
--
```

```
INSERT INTO `paddock` (`PaddockName`, `Size`, `GrassCondition`, `FarmName`) VALUES
```

```
('New Paddock', 1000, 'Dry', 'Farm1'),
```

```
('Paddock1', 500, 'Green', 'Farm1'),
```

```
('Paddock2', 250, 'Green', 'Farm2'),
```

```
('Paddock3', 900, 'Dry', 'Farm3'),
```

```
('Paddock4', 1200, 'Dry', 'Farm4'),
```

```
('Paddock5', 200, 'Dry', 'Farm5');
```

```
-----
```

```
--
```

```
-- Table structure for table `quadbikes`
```

```
--
```

```
CREATE TABLE `quadbikes` (
```

```
`VehicleID` int NOT NULL,
```

```
`RollCage` enum('Yes','No') CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci DEFAULT NULL
```

```
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;
```

```
--
```

```
-- Dumping data for table `quadbikes`
```

```
--
```

```
INSERT INTO `quadbikes` (`VehicleID`, `RollCage`) VALUES
```

```
(6, 'Yes'),
```

```
(7, 'No'),
```

```
(8, 'Yes'),
```

```
(9, 'Yes'),
```

```
(10, 'No');
```

```
-----
```

```
--
```

```
-- Table structure for table `staff`
```

```
--
```

```
CREATE TABLE `staff` (
```

```
  `StaffID` int NOT NULL,
```

```
  `FirstName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci DEFAULT NULL,
```

```
  `LastName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci DEFAULT NULL,
```

```
  `DateOfBirth` date DEFAULT NULL,
```

```
  `FarmName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci DEFAULT NULL,
```

```
  `StartDate` date DEFAULT NULL,
```

```
  `ManagerID` int DEFAULT NULL,
```

```
  `PrimaryContactNumber` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci  
  DEFAULT NULL
```

```
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;
```

```
--
```

```
-- Dumping data for table `staff`
```

```
--
```

```
INSERT INTO `staff` (`StaffID`, `FirstName`, `LastName`, `DateOfBirth`, `FarmName`, `StartDate`,  
  `ManagerID`, `PrimaryContactNumber`) VALUES
```

```
(1, 'John', 'Sugar', '1980-01-01', 'Farm1', '2005-12-04', NULL, '12356789'),
(2, 'Jane', 'Smith', '1999-05-09', 'Farm1', '2020-01-19', 1, '346346241'),
(3, 'Shelly', 'Ward', '1993-11-21', 'Farm2', '2022-04-12', NULL, '235242'),
(4, 'Leo', 'Harding', '1996-03-28', 'Farm2', '2021-01-01', 3, '23412351'),
(5, 'Paul', 'Saint', '1979-05-13', 'Farm2', '2006-02-02', 3, '412415324');
```

```
-- -----
```

```
--
```

```
-- Table structure for table `vehicles`
```

```
--
```

```
CREATE TABLE `vehicles` (
  `VehicleID` int NOT NULL,
  `Model` varchar(255) DEFAULT NULL,
  `FarmName` varchar(255) CHARACTER SET utf8mb4 COLLATE utf8mb4_0900_ai_ci DEFAULT NULL,
  `PurchaseDate` date DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;
```

```
--
```

```
-- Dumping data for table `vehicles`
```

```
--
```

```
INSERT INTO `vehicles` (`VehicleID`, `Model`, `FarmName`, `PurchaseDate`) VALUES
(1, 'Motorbike_M_1', 'Farm1', '2018-01-01'),
(2, 'Motorbike_M_2', 'Farm1', '2019-03-11'),
(3, 'Motorbike_M_3', 'Farm2', '2020-06-21'),
(4, 'Motorbike_M_4', 'Farm2', '2021-07-10'),
(5, 'Motorbike_M_5', 'Farm2', '2022-01-01'),
(6, 'Quadbike_M_1', 'Farm2', '2018-01-01'),
(7, 'Quadbike_M_2', 'Farm2', '2019-03-11'),
```



```
(8, 'Quadbike_M_3', 'Farm2', '2020-06-21'),
(9, 'Quadbike_M_4', 'Farm1', '2021-07-10'),
(10, 'Quadbike_M_5', 'Farm1', '2022-01-01'),
(11, 'Buggie_M_1', 'Farm1', '2018-01-01'),
(12, 'Buggie_M_2', 'Farm2', '2019-03-11'),
(13, 'Buggie_M_3', 'Farm1', '2020-06-21'),
(14, 'Buggie_M_4', 'Farm2', '2021-07-10'),
(15, 'Buggie_M_5', 'Farm1', '2022-01-01');
```

```
-- -----
```

```
--
```

```
-- Table structure for table `vehicle_brands`
```

```
--
```

```
CREATE TABLE `vehicle_brands` (
  `VehicleID` int NOT NULL,
  `Brand` varchar(255) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;
```

```
--
```

```
-- Dumping data for table `vehicle_brands`
```

```
--
```

```
INSERT INTO `vehicle_brands` (`VehicleID`, `Brand`) VALUES
```

```
(1, 'Mitsubishi'),
```

```
(2, 'Kawasaki'),
```

```
(3, 'Honda'),
```

```
(4, 'Honda'),
```

```
(5, 'Holden'),
```

```
(6, 'TGB'),
```

```
(7, 'Kawaski'),
(8, 'Kawaski'),
(9, 'Hyundi'),
(10, 'Toyota'),
(11, 'Toyota'),
(12, 'TGB'),
(13, 'Holden'),
(14, 'Mitsubishi'),
(15, 'Honda');

--

-- Indexes for dumped tables

--

--

-- Indexes for table `buggies`

--

ALTER TABLE `buggies`
  ADD PRIMARY KEY (`VehicleID`);

--

-- Indexes for table `cattle`

--

ALTER TABLE `cattle`
  ADD PRIMARY KEY (`CattleID`),
  ADD KEY `Paddock_name` (`PaddockName`);

--

-- Indexes for table `farm`

--

ALTER TABLE `farm`
```

```
ADD PRIMARY KEY (`FarmName`);

--

-- Indexes for table `feed_bins`

--

ALTER TABLE `feed_bins`

  ADD PRIMARY KEY (`BinNumber`,`PaddockName`),

  ADD KEY `Paddock_name` (`PaddockName`);

--

-- Indexes for table `motorbikes`

--

ALTER TABLE `motorbikes`

  ADD PRIMARY KEY (`VehicleID`);

--

-- Indexes for table `paddock`

--

ALTER TABLE `paddock`

  ADD PRIMARY KEY (`PaddockName`),

  ADD KEY `Farm_name` (`FarmName`);

--

-- Indexes for table `quadbikes`

--

ALTER TABLE `quadbikes`

  ADD PRIMARY KEY (`VehicleID`);

--

-- Indexes for table `staff`

--
```

```
ALTER TABLE `staff`  
  ADD PRIMARY KEY (`StaffID`),  
  ADD KEY `Farm_name` (`FarmName`),  
  ADD KEY `Manager_ID` (`ManagerID`);  
  
--  
-- Indexes for table `vehicles`  
--  
ALTER TABLE `vehicles`  
  ADD PRIMARY KEY (`VehicleID`),  
  ADD KEY `Farm_name` (`FarmName`);  
  
--  
-- Indexes for table `vehicle_brands`  
--  
ALTER TABLE `vehicle_brands`  
  ADD PRIMARY KEY (`VehicleID`);  
  
--  
-- AUTO_INCREMENT for dumped tables  
--  
--  
-- AUTO_INCREMENT for table `cattle`  
--  
ALTER TABLE `cattle`  
  MODIFY `CattleID` int NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=15;  
  
--  
-- AUTO_INCREMENT for table `staff`  
--
```

```
ALTER TABLE `staff`  
  MODIFY `StaffID` int NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=20;  
  
--  
-- AUTO_INCREMENT for table `vehicles`  
--  
ALTER TABLE `vehicles`  
  MODIFY `VehicleID` int NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=16;  
  
--  
-- Constraints for dumped tables  
--  
  
--  
-- Constraints for table `buggies`  
--  
ALTER TABLE `buggies`  
  ADD CONSTRAINT `BUGGIES_ibfk_1` FOREIGN KEY (`VehicleID`) REFERENCES `vehicles`  
  (`VehicleID`);  
  
--  
-- Constraints for table `cattle`  
--  
ALTER TABLE `cattle`  
  ADD CONSTRAINT `CATTLE_ibfk_1` FOREIGN KEY (`PaddockName`) REFERENCES `paddock`  
  (`PaddockName`);  
  
--  
-- Constraints for table `feed_bins`  
--  
ALTER TABLE `feed_bins`
```

```

    ADD CONSTRAINT `FEED_BINS_ibfk_1` FOREIGN KEY (`PaddockName`) REFERENCES `paddock`
    (`PaddockName`);

--

-- Constraints for table `motorbikes`

--

ALTER TABLE `motorbikes`

    ADD CONSTRAINT `MOTORBIKES_ibfk_1` FOREIGN KEY (`VehicleID`) REFERENCES `vehicles`
    (`VehicleID`);

--

-- Constraints for table `paddock`

--

ALTER TABLE `paddock`

    ADD CONSTRAINT `PADDOCK_ibfk_1` FOREIGN KEY (`FarmName`) REFERENCES `farm`
    (`FarmName`);

--

-- Constraints for table `quadbikes`

--

ALTER TABLE `quadbikes`

    ADD CONSTRAINT `QUADBIKES_ibfk_1` FOREIGN KEY (`VehicleID`) REFERENCES `vehicles`
    (`VehicleID`);

--

-- Constraints for table `staff`

--

ALTER TABLE `staff`

    ADD CONSTRAINT `STAFF_ibfk_1` FOREIGN KEY (`FarmName`) REFERENCES `farm` (`FarmName`),
    ADD CONSTRAINT `STAFF_ibfk_2` FOREIGN KEY (`ManagerID`) REFERENCES `staff` (`StaffID`);

--

```

```
-- Constraints for table `vehicles`
```

```
--
```

```
ALTER TABLE `vehicles`
```

```
  ADD CONSTRAINT `VEHICLES_ibfk_1` FOREIGN KEY (`FarmName`) REFERENCES `farm`  
  (`FarmName`);
```

```
--
```

```
-- Constraints for table `vehicle_brands`
```

```
--
```

```
ALTER TABLE `vehicle_brands`
```

```
  ADD CONSTRAINT `VEHICLE_BRANDS_ibfk_1` FOREIGN KEY (`VehicleID`) REFERENCES `vehicles`  
  (`VehicleID`);
```

```
COMMIT;
```

```
/*!40101 SET CHARACTER_SET_CLIENT=@OLD_CHARACTER_SET_CLIENT */;
```

```
/*!40101 SET CHARACTER_SET_RESULTS=@OLD_CHARACTER_SET_RESULTS */;
```

```
/*!40101 SET COLLATION_CONNECTION=@OLD_COLLATION_CONNECTION */;
```