MARKS

CO2: / 50

CO3: / 50

CO4: / 20

Faculty of Computing, UMPSA
BCI2033 Database Systems
Semester 1 2023/2024

Group No: 6

Lab Section: 02G

Lecturer: Ts. Dr. Liew Siau Chuin

Project Title: FRESHWATER FISH FARMING SYSTEM

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1.0 Project Background

Technology now has a significant impact on a variety of industries, including farming management systems. In order to ensure that the fish are not contaminated, the manual method of data recording is therefore unsuitable due to numerous inaccuracies and concerns with the pond's water quality. Employee workloads rise in tandem with the growth in demand for seafood purchases. It will be challenging to stay on top of all the fish, clients, orders, and more when running a fish farming operation on paper.

The freshwater fish farming management system is designed to assist the fish farmers in monitoring fish ponds using the computer-based system. It provides real-time monitoring of fish ponds, the system database significantly reduces the risk of losses and improves efficiency. This system will store all the fish names, their disease, the employee in charge at every pond, track the order made from the customer, making sure all the tools needed there, harvesting and feeding time to make sure not missed out. Lastly, this would allow for the efficient organisation and retrieval of data related to the fish farming project.

2.0 Objectives

The objectives of this proposed project that we want to achieve are:

- To produce healthy, and high-quality fish that are safe for consumption and meet market demands.
- To improve water quality management
- To enhance operational efficiency
- To provide employment opportunities and economic advantages, particularly in areas with thriving fish industries.
- To optimise customer management.

3.0 Scopes

A freshwater fish farming management system covers important aspects like planning and running the farm, taking care of the ponds, managing water quality, and figuring out what and how to feed the fish. It also includes making sure the fish stay healthy by preventing and treating diseases. To keep things organised, the system involves keeping records, managing finances, and following rules. Technology, like automation and monitoring tools, helps collect data and run the farm better. The scope also includes looking at the market, creating effective ways to sell fish, and promoting eco-friendly practices. Training the staff is important too, so they know how to do their job safely and prevent diseases. The goal is to build a strong and responsible fish farming system that's both productive and mindful of the environment and market trends.

4.0 Analysis

	Database System 1	Database System 2
Process/Flowchart	● User ● Login ● Roles ● Permission ● Treatments ● Medicines ● Farm ● Employee	● Owner ● Farm ● Parcel ● Crops ● Livestock ● EventLog ● Employees ● AccessRoads ● Equipment ● Buildings
Attributes	● User -user_id -user_name -user_mobile -user_email -user_address ● Login -login_id -login_role_id -login_username -user_password ● Roles -role_id -role_name -role_desc ● Permission -per_id	● Owner -OwnerID -OwnerFName -OwnerLName -OwnerDOB -OwnerAddress ● Farm -ParcelID -FarmID -FarmName -FarmType -FarmArea -EquipmentID -RoadID -LiverstockID -CropID -EmployeeID

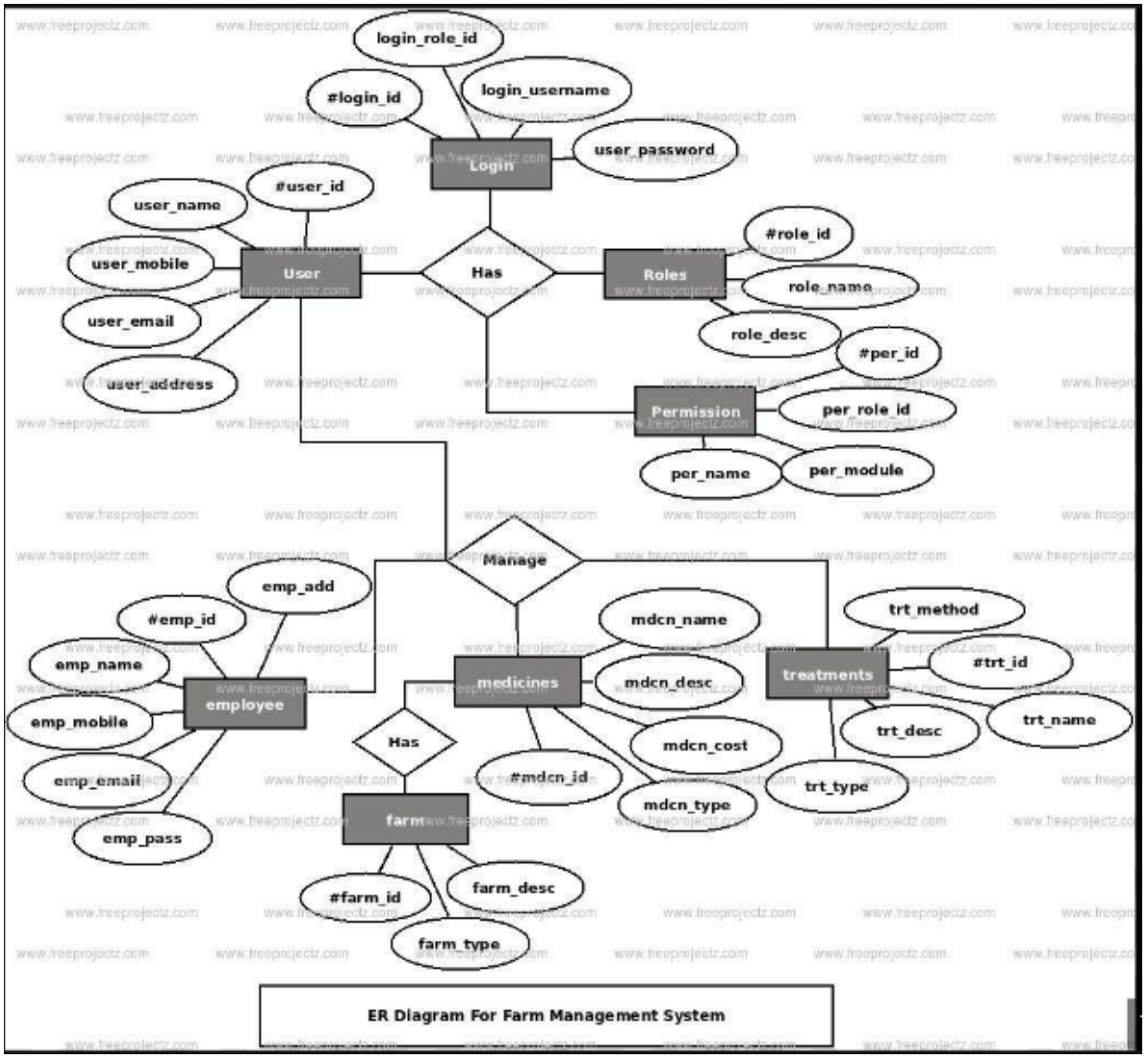
	-per_role_id -per_module -per_name ● Treatments -trt_id -trt_method -trt_name -trt_desc -trt_type ● Medicines -mdcn_id -mdcn_name -mdcn_type -mdcn_desc -mdcn_cost ● Farm -farm_id -farm_type -farm_desc ● Employee -emp_id -emp_add -emp_name -emp_email -emp_pass -emp_mobile	-EventID -BuildingID ● Parcel -ParcelID -ParcelArea -OwnerID -ParcelLocation -ParcelAddress -BuildingID ● Crops -CropID -CropName -CropQuantity -CropYield ● Liverstock -LiverstockID -LiverstockName -LiverstockQuantity -LiverstockAge -LiverstockSpecies ● EventLog -EventID -EventType -EventDate -EmployeeID -CropID -LiverstockID ● Employees -EmployeeID -EmployeeFName -EmployeeLName -EmployeeDOB -EmployeeTitle -EmployeeAddress ● AccessRoads -RoadID -RoadMaterial -AccessType -SpeedLimit -LastMaintenance ● Equipment -EquipmentID -EquipmentService -EquipmentType -EquipmentAge -FuelType
Primary keys	● User	● Owner

	-user_id • Login -login_id • Roles -role_id • Permission -per_id • Treatments -trt_id • Medicines -mdcn_id • Farm -farm_id • Employee -emp_id	-OwnerID • Farm -ParcelID • Parcel -ParcelID • Crops -CropID • Liverstock -LiverstockID • EventLog -EventID • Employees -EmployeeID • AccessRoads -RoadID • Equipment -EquipmentID
Other features		• Parcel FK -OwnerID -BuildingID • Farm FK -ParcelID -EquipmentID -RoadID -LivestockID -CropID -EmployeeID -EventID -BuildingID • Event FK -EmployeeID -CropID -LivestockID

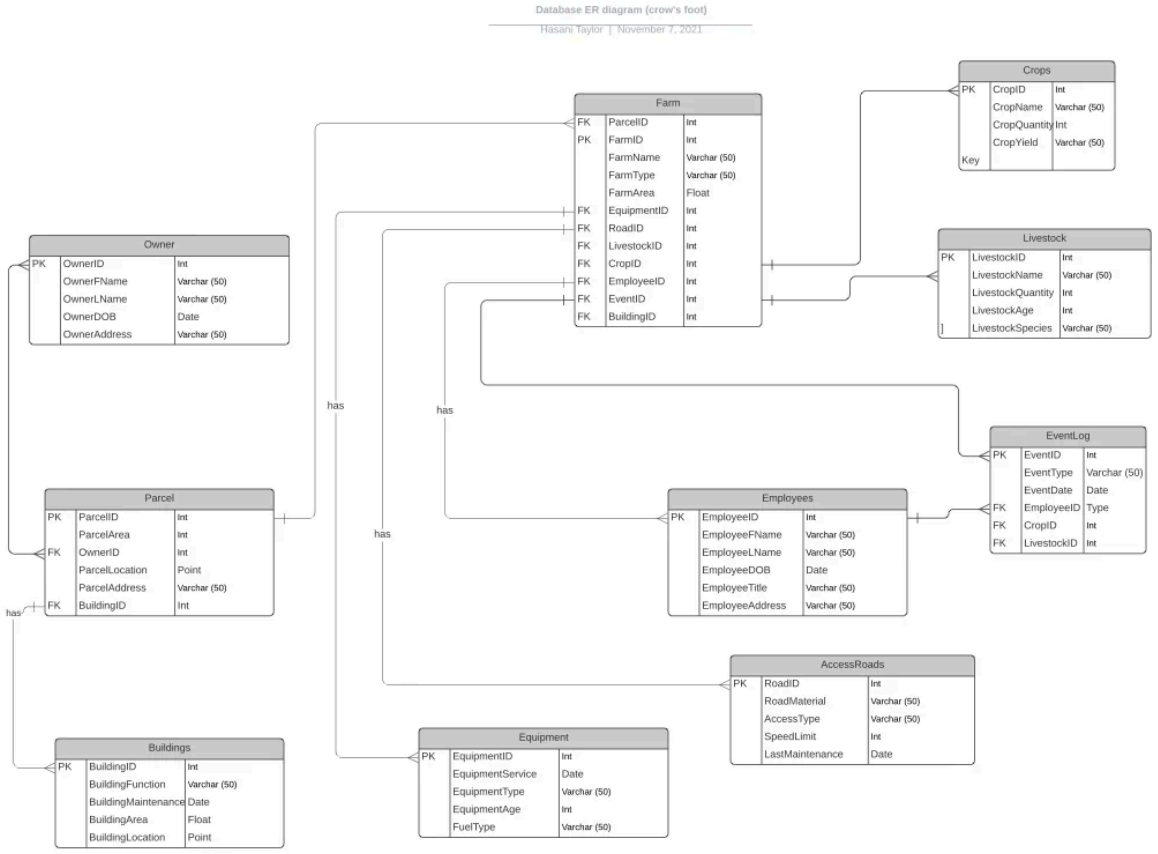
References	*Farm Management System ER Diagram	FreeProjectz*. (n.d.). Www.freeprojectz.com. Retrieved December 27, 2023, from https://www.freeprojectz.com/entity-relationship/farm-management-system-er-diagram	hasanihasani. (2021, November 7). *Guidance on farm database ER diagram*. https://www.reddit.com/r/PostgreSQL/comments/qonbyj/guidance_on_farm_database_er_diagram/

DIAGRAM

Database 1



Database 2


Database ER diagram (crow's foot)
Hasani Taylor | November 7, 2021
Crops
PK CropID Int
CropName Varchar (50)
CropQuantity Int
CropYield Varchar (50)
Key
Farm
FK ParcelID Int
PK FarmID Int
FarmName Varchar (50)
FarmType Varchar (50)
FarmArea Float
FK EquipmentID Int
FK RoadID Int
FK LivestockID Int
FK CropID Int
FK EmployeeID Int
FK EventID Int
FK BuildingID Int
Owner
PK OwnerID Int
OwnerFName Varchar (50)
OwnerLName Varchar (50)
OwnerDOB Date
OwnerAddress Varchar (50)
Livestock
PK LivestockID Int
LivestockName Varchar (50)
LivestockQuantity Int
LivestockAge Int
LivestockSpecies Varchar (50)
has
has
has
has
has
EventLog
PK EventID Int
EventType Varchar (50)
EventDate Date
FK EmployeeID Type
FK CropID Int
FK LivestockID Int
Parcel
PK ParcelID Int
ParcelArea Int
FK OwnerID Int
ParcelLocation Point
ParcelAddress Varchar (50)
FK BuildingID Int
Employees
PK EmployeeID Int
EmployeeFName Varchar (50)
EmployeeLName Varchar (50)
EmployeeDOB Date
EmployeeTitle Varchar (50)
EmployeeAddress Varchar (50)
AccessRoads
PK RoadID Int
RoadMaterial Varchar (50)
AccessType Varchar (50)
SpeedLimit Int
LastMaintenance Date
Buildings
PK BuildingID Int
BuildingFunction Varchar (50)
BuildingMaintenance Date
BuildingArea Float
BuildingLocation Point
Equipment
PK EquipmentID Int
EquipmentService Date
EquipmentType Varchar (50)
EquipmentAge Int
FuelType Varchar (50)

5.0 Business Rules

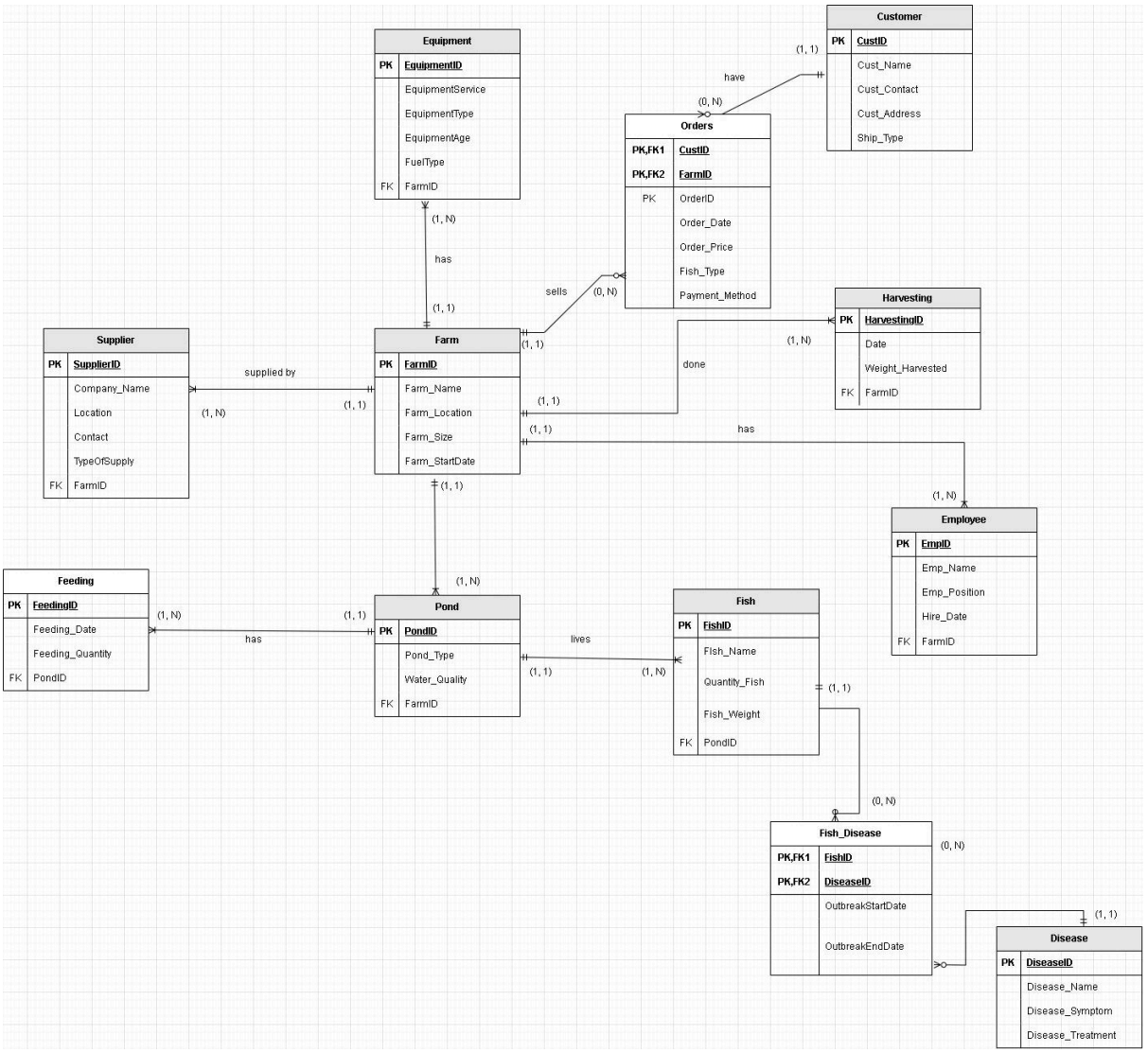
Entity	Entity	Relationship	Business Rules
Farm PK: FarmID	Pond PK:PondID FK: FarmID	1:M	Each farm can have one or many ponds
Pond PK: PondID FK: FarmID	Farm PK:FarmID	1:1	Each pond can be in only one farm
Farm PK: FarmID	Employee PK: EmployeeID FK:FarmID	1:M	Each farm can have one or many employees
Employee PK: EmployeeID FK: FarmID	Farm PK:FarmID	1:1	Each employee can work only at one farm
Pond PK:PondID FK: FarmID	Fish PK: FishID FK: PondID	1:M	Each pond can live by at least one fishes
Fish PK: FishID FK: PondID	Pond PK:PondID FK: FarmID	1:1	Each fish can live only in one pond
Pond PK: PondID FK: FarmID	Feeding PK: FeedingID FK: PondID	1:M	Each pond requires one or multiple feeding sessions
Feeding	Pond	1:1	Each feeding session is specific to only

PK: FeedingID FK:PondID	PK: PondID FK: FarmID		one pond
Harvesting PK: HarvestingID FK: FarmID	Farm PK: FarmID	1:M	Each harvesting session can be done in one or many farm
Farm PK: FarmID	Harvesting PK: HarvestingID FK: FarmID	1:1	Each farm have one harvesting session
Fish PK: FishID FK: PondID	Fish_Disease PK1,FK1: FishID PK2, FK2: DiseaseID	0:M	A fish can be affected by zero to many diseases Diseases can affect zero to many fishes
Fish_Disease PK1,FK1: FishID PK2, FK2: DiseaseID	Fish PK: FishID FK: PondID	1:1	Each fish diseases can affect one fish
Fish_Disease PK1,FK1: FishID PK2, FK2: DiseaseID	Disease PK: DiseaseID	1:M	Each fish disease can affect multiple disease
Disease PK: DiseaseID	Fish_Disease PK1,FK1: FishID PK2, FK2: DiseaseID	1:1	
Farm PK: FarmID	Equipment PK: EquipmentID	1:M	Each farm can have one to many equipment

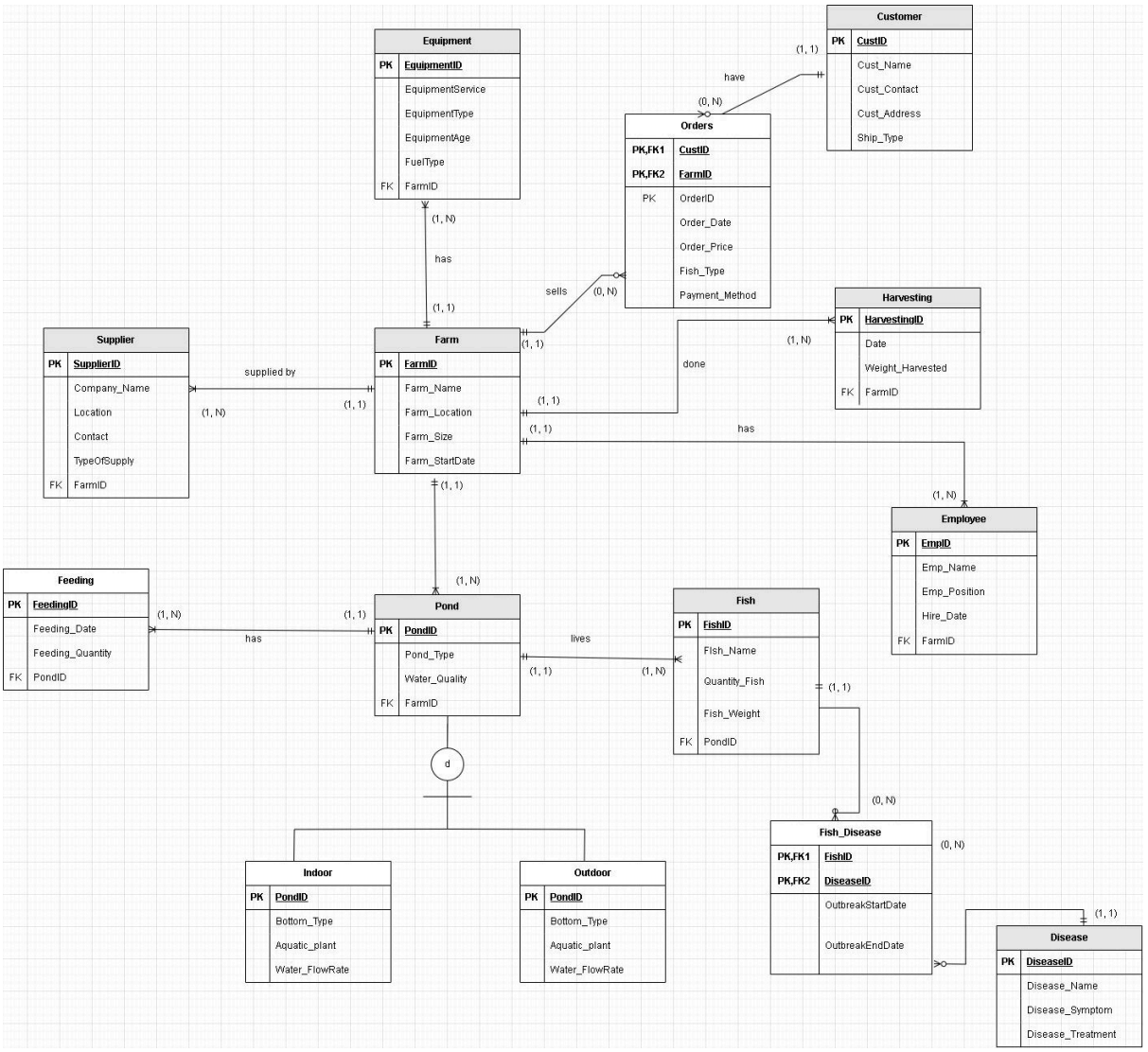
	FK: FarmID		
Equipment PK: EquipmentID FK: FarmID	Farm PK: FarmID	1:1	Equipment must be equipped by at least one farm
Farm PK: FarmID	Supplier PK:SupplierID FK:FarmID	1:M	Each farm can be supplied by one or many suppliers
Supplier PK:SupplierID FK:FarmID	Farm PK: FarmID	1:1	Each supplier can supply to one farm
Orders PK: OrderID PK1,FK1: CustomerID PK1,FK1: FarmID	Customer PK: CustID	1:1	Each orders is ordered by a customer
Customer PK: CustID	Orders PK: OrderID PK1,FK1: CustomerID PK1,FK1: FarmID	0:M	A customer can have zero to many orders
Farm PK: FarmID	Orders PK: OrderID PK1,FK1: CustomerID PK1,FK1: FarmID	0:M	Each farm can have zero to many orders.

Orders PK: OrderID PK1,FK1: CustomerID PK1,FK1: FarmID	Farm PK: FarmID	1:1	Each orders belong to one farm

6.0 ERD & EERD



ERD


Customer
PK CustID
Cust_Name
Cust_Contact
Cust_Address
Ship_Type
(1, 1)
have
(0, N)
Equipment
PK EquipmentID
EquipmentService
EquipmentType
EquipmentAge
FuelType
FK FarmID
Orders
PK,FK1 CustID
PK,FK2 FarmID
PK OrderID
Order_Date
Order_Price
Fish_Type
Payment_Method
(1, N)
has
(1, 1)
sells
(0, N)
Harvesting
PK HarvestingID
Date
Weight_Harvested
FK FarmID
Supplier
PK SupplierID
Company_Name
Location
Contact
TypeOfSupply
FK FarmID
supplied by
(1, N)
(1, 1)
Farm
PK FarmID
Farm_Name
Farm_Location
Farm_Size
Farm_StartDate
(1, 1)
done
(1, N)
(1, 1)
has
(1, N)
Employee
PK EmpID
Emp_Name
Emp_Position
Hire_Date
FK FarmID
(1, 1)
(1, N)
Feeding
PK FeedingID
Feeding_Date
Feeding_Quantity
FK PondID
(1, N)
has
(1, 1)
Pond
PK PondID
Pond_Type
Water_Quality
FK FarmID
lives
(1, 1)
(1, N)
Fish
PK FishID
FIsh_Name
Quantity_Fish
Fish_Weight
FK PondID
(1, 1)
d
(0, N)
Fish_Disease
PK,FK1 FishID
PK,FK2 DiseaseID
OutbreakStartDate
OutbreakEndDate
(0, N)
(1, 1)
Disease
PK DiseaseID
Disease_Name
Disease_Symptom
Disease_Treatment
Indoor
PK PondID
Bottom_Type
Aquatic_plant
Water_FlowRate
Outdoor
PK PondID
Bottom_Type
Aquatic_plant
Water_FlowRate

EERD

7.0 Data Definition Language (DDL)

CREATE DATABASE

```
create database FreshWater;
```

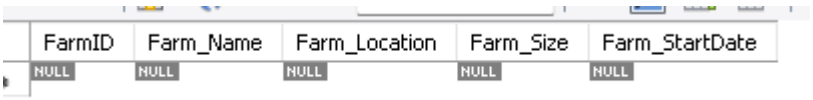
USE DATABASE

```
use FreshWater;
```

CREATE TABLES

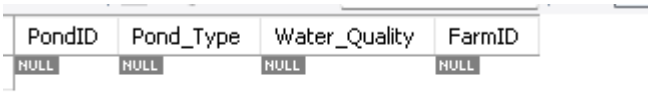
CREATE TABLE FARM

```
create table Farm (
FarmID varchar(10) not null primary key,
Farm_Name varchar(255),
Farm_Location varchar(255),
Farm_Size int,
Farm_StartDate date,
);
select * from Farm
```



CREATE TABLE POND

```
create table Pond(
PondID varchar (10) not null primary key,
Pond_Type varchar (10),
Water_Quality varchar (10),
FarmID int,
foreign key (FarmID) references Farm (FarmID)
);
select * from Pond
```

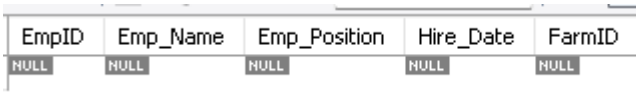


CREATE TABLE FEEDING

```
create table Feeding(
FeedingID varchar (10) not null primary key,
Feeding_Date date,
Feeding_Quantity decimal(6,2),
PondID varchar (10),
foreign key (PondID) references Pond (PondID)
);
select * from Feeding
```

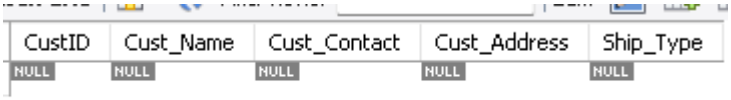
CREATE TABLE EMPLOYEE

```
create table Employee (
EmpID varchar(10) not null primary key,
Emp_Name varchar(50),
Emp_Position varchar(50),
Hire_Date date,
FarmID int,
foreign key (FarmID) references Farm(FarmID),
);
select * from Employee
```



CREATE TABLE CUSTOMER

```
create table Customer (
CustID varchar(10) not null primary key,
Cust_Name varchar(50),
Cust_Contact varchar (50),
Cust_Address varchar(100),
Ship_Type varchar(20)
);
select * from Customer
```



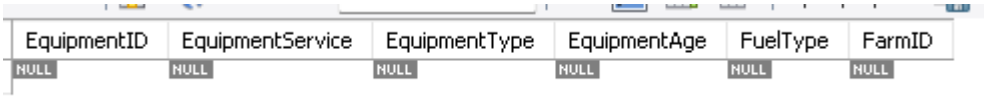
CREATE TABLE HARVESTING

```
create table Harvesting (
HarvestingID varchar(10) not null primary key,
Date DATE,
Weight_Harvested int,
FarmID varchar(10),
foreign key (FarmID) references Farm(FarmID)
);
select * from Harvesting
```

HarvestingID	Date	Weight_Harvested	FarmID
NULL	NULL	NULL	NULL

CREATE TABLE EQUIPMENT

```
create table Equipment(
EquipmentID varchar(10) not null primary key,
EquipmentService varchar(5),
EquipmentType varchar(50),
EquipmentAge int,
FuelType varchar(30),
FarmID varchar(10),
foreign key (FarmID) references Farm(FarmID)
);
select * from Equipment
```



EquipmentID	EquipmentService	EquipmentType	EquipmentAge	FuelType	FarmID
NULL	NULL	NULL	NULL	NULL	NULL

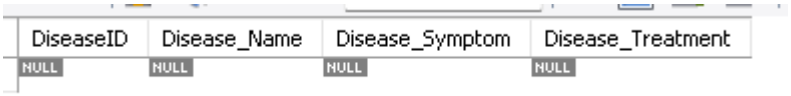
CREATE TABLE SUPPLIER

```
create table Supplier(
SupplierID varchar(10) not null primary key,
CompanyName varchar(30),
Location varchar(50),
Contact varchar(20),
TypeOfSupply varchar(30),
FarmID int,
foreign key (FarmID) references Farm (FarmID)
);
select * from Supplier
```

SupplierID	CompanyName	Location	Contact	TypeOfSupply	FarmID
NULL	NULL	NULL	NULL	NULL	NULL

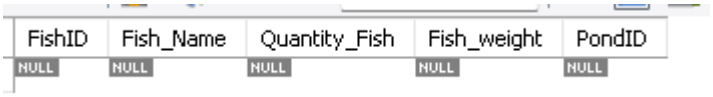
CREATE TABLE DISEASE

```
create table Disease (
DiseaseID varchar(10) not null primary key,
Disease_Name varchar(50),
Disease_Symptom varchar(100),
Disease_Treatment varchar (100)
);
select * from Disease
```



CREATE TABLE FISH

```
create table Fish (
FishID varchar(10) not null primary key,
Fish_Name varchar(50),
Quantity_Fish INT,
Fish_weight Decimal(6,2)
PondID varchar (10),
Foreign key (PondID) references Pond (PondID)
);
select * from Fish
```

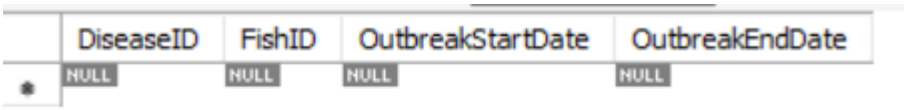


CREATE TABLE ORDERS

```
CREATE TABLE Orders
(
OrderID int,
FarmID VARCHAR(10) not null,
CustID varchar (10) not null,
Order_Date date,
Order_Price decimal (6,2),
Fish_Type varchar (10),
Payment_Method varchar(10),
PRIMARY KEY (FarmID, CustID),
FOREIGN KEY (FarmID) REFERENCES Farm(FarmID),
FOREIGN KEY (CustID) REFERENCES Customer(CustID)
);
```

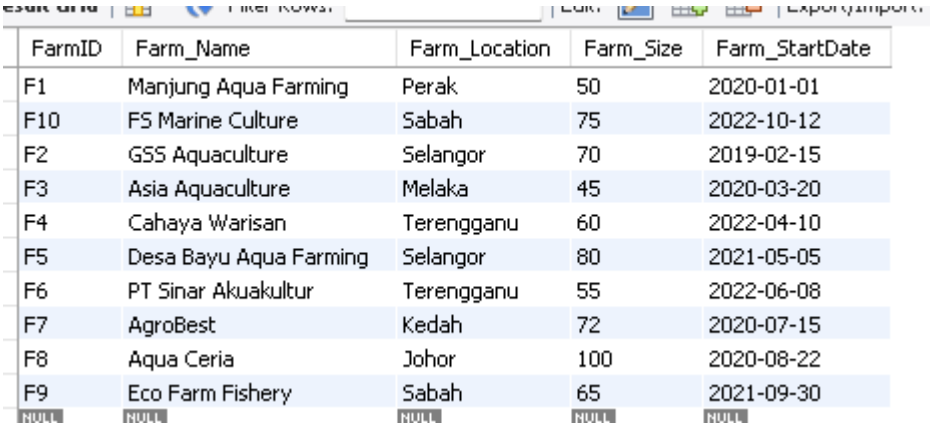
CREATE TABLE FISH_DISEASE

```
create table fish_disease(
DiseaseID varchar (10) not null,
FishID varchar (10) not null,
OutbreakStartDate DATE,
OutbreakEndDate DATE,
primary key (DiseaseID, FishID),
foreign key (DiseaseID) references Disease(DiseaseID),
foreign key (FishID) references Fish(FishID)
);
```



INSERT INTO TABLES

```
INSERT INTO Farm VALUES
(F1, 'Manjung Aqua Farming', 'Perak', 50, '2020-01-01'),
(F2, 'GSS Aquaculture', 'Selangor', 70, '2019-02-15'),
(F3, 'Asia Aquaculture', 'Melaka', 45, '2020-03-20'),
(F4, 'Cahaya Warisan', 'Terengganu', 60, '2022-04-10'),
(F5, 'Desa Bayu Aqua Farming', 'Selangor', 80, '2021-05-05'),
(F6, 'PT Sinar Akuakultur', 'Terengganu', 55, '2022-06-08'),
(F7, 'AgroBest', 'Kedah', 72, '2020-07-15'),
(F8, 'Aqua Ceria', 'Johor', 100, '2020-08-22'),
(F9, 'Eco Farm Fishery', 'Sabah', 65, '2021-09-30'),
(F10, 'FS Marine Culture', 'Sabah', 75, '2022-10-12');
```



FarmID	Farm_Name	Farm_Location	Farm_Size	Farm_StartDate
F1	Manjung Aqua Farming	Perak	50	2020-01-01
F10	FS Marine Culture	Sabah	75	2022-10-12
F2	GSS Aquaculture	Selangor	70	2019-02-15
F3	Asia Aquaculture	Melaka	45	2020-03-20
F4	Cahaya Warisan	Terengganu	60	2022-04-10
F5	Desa Bayu Aqua Farming	Selangor	80	2021-05-05
F6	PT Sinar Akuakultur	Terengganu	55	2022-06-08
F7	AgroBest	Kedah	72	2020-07-15
F8	Aqua Ceria	Johor	100	2020-08-22
F9	Eco Farm Fishery	Sabah	65	2021-09-30
NULL	NULL	NULL	NULL	NULL

```
insert into Pond values
('PD001','Nursery','Good','F1'),
('PD002','Breeding','Average','F2'),
('PD003','Grow Out','Good','F9'),
('PD004','Nursery','Good','F3'),
('PD005','Grow Out','Good','F4'),
('PD006','Grow Out','Bad','F5'),
('PD007','Breeding','Average','F6'),
('PD008','Nursery','Bad','F10'),
('PD009','Grow Out','Good','F8'),
('PD010','Nursery','Average','F7');
```

PondID	Pond_Type	Water_Quality	FarmID
PD001	Nursery	Good	F1
PD002	Breeding	Average	F2
PD003	Grow Out	Good	F9
PD004	Nursery	Good	F3
PD005	Grow Out	Good	F4
PD006	Grow Out	Bad	F5
PD007	Breeding	Average	F6
PD008	Nursery	Bad	F10
PD009	Grow Out	Good	F8
PD010	Nursery	Average	F7
NULL	NULL	NULL	NULL

```
insert into feeding values
('FD001','2023-05-10',0.5,'PD002'),
('FD002','2023-08-25',1.1,'PD005'),
('FD003','2023-01-17',1.0,'PD001'),
('FD004','2023-12-29',0.8,'PD003'),
('FD005','2023-05-28',1.2,'PD010'),
('FD006','2023-03-20','0.95','PD007'),
('FD007','2023-10-06','0.6','PD008'),
('FD008','2023-11-13','1.1','PD004'),
('FD009','2023-06-28','0.85','PD006'),
('FD010','2023-02-12','0.3','PD009');
```

FeedingID	Feeding_Date	Feeding_Quantity	PondID
FD001	2023-05-10	0.50	PD002
FD002	2023-08-25	1.10	PD005
FD003	2023-01-17	1.00	PD001
FD004	2023-12-29	0.80	PD003
FD005	2023-05-28	1.20	PD010
FD006	2023-03-20	0.95	PD007
FD007	2023-10-06	0.60	PD008
FD008	2023-11-13	1.10	PD004
FD009	2023-06-28	0.85	PD006
FD010	2023-02-12	0.30	PD009

```
INSERT INTO Employee VALUES
('EMP001','Faiz Roslan','Farm Manager','2021-01-05','F1'),
('EMP002','Maryam Isa','Aquaculturist','2022-03-12','F2'),
('EMP003','Abu Samad','Feed Technician','2020-11-08','F5'),
('EMP004','Muhd Kamal','Water Quality
Specialist','2023-05-20','F3'),
('EMP005', 'Lee Chang Wei', 'Harvester', '2021-08-15','F2'),
('EMP006','Darshini', 'Production Assistant', '2020-07-02','F1'),
('EMP007','Siti Saleha ','Maintenance
Technician','2022-12-01','F3'),
```

```
('EMP008', 'Kumar', 'Harvester', '2021-04-23','F7'),
('EMP009', 'Salman Khan', 'Feed Technician','2023-06-09','F1'),
('EMP010', 'Umar', 'Veterinarian', '2022-09-18','F3');
```

EmpID	Emp_Name	Emp_Position	Hire_Date	FarmID
EMP001	Faiz Roslan	Farm Manager	2021-01-05	F1
EMP002	Maryam Isa	Aquaculturist	2022-03-12	F2
EMP003	Abu Samad	Feed Technician	2020-11-08	F5
EMP004	Muhd Kamal	Water Quality Specialist	2023-05-20	F3
EMP005	Lee Chang Wei	Harvester	2021-08-15	F2
EMP006	Darshini	Production Assistant	2020-07-02	F1
EMP007	Siti Saleha	Maintenance Technician	2022-12-01	F3
EMP008	Kumar	Harvester	2021-04-23	F7
EMP009	Salman Khan	Feed Technician	2023-06-09	F1
EMP010	Umar	Veterinarian	2022-09-18	F3
NULL	NULL	NULL	NULL	NULL

```
INSERT INTO Equipment values
('EQP001', 'No', 'Feeding Tools', 3, 'Gasoline', 'F3'),
('EQP002', 'Yes', 'Aeration Tools', 2, 'Electricity', `F9'),
('EQP003', 'Yes', 'Production Systems', 4, 'Electricity', 'F6'),
('EQP004', 'Yes', 'Harvesting Equipment', 2, 'Propane', `F8'),
('EQP005', 'No', 'Boats', 6, 'Diesel', 'F1'),
('EQP006', 'Yes', 'Water Quality Monitoring Equipment', 3,
'Electricity', 'F4'),
('EQP007', 'Yes', 'Hatchery Equipment', 10, 'N/A', 'F5'),
('EQP008', 'No', 'Pond Maintenance Tools', 2, 'Electricity',
'F7'),
('EQP009', 'Yes', 'Fish Diseases Checker', 3, 'Electricity',
'F2'),
('EQP010', 'Yes', 'Medicines', 3, 'N/A', 'F10');
```

EquipmentID	EquipmentService	EquipmentType	EquipmentAge	FuelType	FarmID
EQP001	No	Feeding Tools	3	Gasoline	F3
EQP002	Yes	Aeration Tools	2	Electricity	F9
EQP003	Yes	Production Systems	4	Electricity	F6
EQP004	Yes	Harvesting Equipment	2	Propane	F8
EQP005	No	Boats	6	Diesel	F1
EQP006	Yes	Water Quality Monitoring Equipment	3	Electricity	F4
EQP007	Yes	Hatchery Equipment	10	N/A	F5
EQP008	No	Pond Maintenance Tools	2	Electricity	F7
EQP009	Yes	Fish Diseases Checker	3	Electricity	F2
EQP010	Yes	Medicines	3	N/A	F10

```
INSERT INTO Fish VALUES
('F1', 'Rainbow Trout', 50,'1.0', 'PD002'),
('F2', 'Snakehead', 30, '2.5','PD004'),
('F3', 'Catfish', 80, '1.5', 'PD006'),
('F4', 'Koi', 40, '1.5', 'PD008'),
('F5', 'Goldfish', 50, '1.0', 'PD009'),
('F6', 'Tilapia', 60, '0.8', 'PD007'),
('F7', 'Crayfish', 100, '1.2', 'PD005'),
('F8', 'Carp', 85, '1.7','PD003'),
('F9', 'Guppy', 20,'2.0', 'PD010'),
('F10', 'Molly Fish', 20, '1.5','PD001');
```

FishID	Fish_Name	Quantity_Fish	Fish_weight	PondID
F1	Rainbow Trout	50	1.00	PD002
F10	Molly Fish	20	1.50	PD001
F2	Snakehead	30	2.50	PD004
F3	Catfish	80	1.50	PD006
F4	Koi	40	1.50	PD008
F5	Goldfish	50	1.00	PD009
F6	Tilapia	60	0.80	PD007
F7	Crayfish	100	1.20	PD005
F8	Carp	85	1.70	PD003
F9	Guppy	20	2.00	PD010
NULL	NULL	NULL	NULL	NULL

```
INSERT INTO Disease VALUES
('D1', 'Ichthyophthirius (Ich)', 'White spots on skin, fins
clamped, rubbing against objects.', 'Medication like copper
sulfate or formalin, increased temperature.'),
('D2', 'Fin Rot', 'Decaying or eroding fins, redness or
inflammation.', 'Antibiotics, clean water conditions, and removal
of affected tissue.'),
('D3', 'Dropsy', 'Swollen body, protruding scales, bloating.',
'Antibiotics, quarantine, and maintaining clean water.'),
('D4', 'Columnaris', 'White, gray, or fuzzy patches on skin or
gills, lethargy.', 'Antibiotics like tetracycline, improved water
quality.'),
('D5', 'Velvet Disease', 'Golden or rust-colored dust-like
appearance on skin, rapid gill movement.', 'Copper-based
medications, increased temperature.'),
('D6', 'Anchor Worms', 'Visible thread-like worms on fish,
redness, and irritation.', 'Remove the worms manually, medicated
baths.'),
('D7', 'Swim Bladder Disorder', 'Abnormal swimming behavior,
buoyancy issues.', 'Diet adjustment, improving water quality.'),
```

```
('D8', 'Hole-in-the-Head Disease', 'Pitting or lesions on the
head, lack of appetite.', 'Improving water quality, adding
essential vitamins to the diet.'),
('D9', 'Fish Fungus', 'Cotton-like growths on skin or fins,
irritation.', 'Antifungal medications, improved water quality.'),
('D10', 'Mouth Fungus', 'White growths around the mouth,
difficulty eating.', 'Antifungal medications, quarantine, and
improving water quality.');
```

DiseaseID	Disease_Name	Disease_Symptom	Disease_Treatment
D1	Ichthyophthirius (Ich)	White spots on skin, fins clamped, rubbing agai...	Medication like copper sulfate or formalin, incre...
D10	Mouth Fungus	White growths around the mouth, difficulty eati...	Antifungal medications, quarantine, and improvi...
D2	Fin Rot	Decaying or eroding fins, redness or inflammation.	Antibiotics, clean water conditions, and removal...
D3	Dropsy	Swollen body, protruding scales, bloating.	Antibiotics, quarantine, and maintaining clean w...
D4	Columnaris	White, gray, or fuzzy patches on skin or gills, le...	Antibiotics like tetracycline, improved water qua...
D5	Velvet Disease	Golden or rust-colored dust-like appearance on ...	Copper-based medications, increased temperat...
D6	Anchor Worms	Visible thread-like worms on fish, redness, and i...	Remove the worms manually, medicated baths.
D7	Swim Bladder Disorder	Abnormal swimming behavior, buoyancy issues.	Diet adjustment, improving water quality.
D8	Hole-in-the-Head Disease	Pitting or lesions on the head, lack of appetite.	Improving water quality, adding essential vitami...
D9	Fish Fungus	Cotton-like growths on skin or fins, irritation.	Antifungal medications, improved water quality.
NULL	NULL	NULL	NULL

```
INSERT INTO Customer VALUES
  ('CUST001', 'Lee Min Ho', '01152766544', 'No 100, Taman Jaya
Ria, Kuala Lumpur', 'Standard Shipping'),
  ('CUST002', 'Hakim Rosli', '0137766522', 'Lot 3122, Jalan Murai,
Raub, Pahang', 'Express Shipping'),
  ('CUST003', 'Aisyah Hanum', '0173986543', 'No 51, Taman Pasir
Putih, Machang, Kelantan', 'Local Pickup'),
  ('CUST004', 'Izzat', '0128855321', 'No 9, Taman Beaufort,
Bangsar, Kuala Lumpur', 'Standard Shipping'),
  ('CUST005', 'Usop Wilcha', '0142233666', 'Lot 2928, Jalan
Kampung Pisang, Jeram, Perak', 'Overnight Shipping'),
  ('CUST006', 'Maimunah', '0132754468', 'No 88, Jalan Baiduri,
Gambang, Pahang', 'Standard Shipping'),
  ('CUST007', 'Izzat', '0128855321', 'No 9, Taman Beaufort,
Bangsar, Kuala Lumpur', 'Local Pickup'),
  ('CUST008', 'Kirthana', '01951456702', 'No 3, Vista Apartment,
Cyberjaya, Selangor', 'Express Shipping'),
  ('CUST009', 'Mimi Lana', '01744663399', 'Angsana Villa
Condominium, Johor Bahru, Johor', 'Standard Shipping'),
  ('CUST010', 'Daler Yusuf', '011512887733', 'No 1, Taman
Southville, Cheras, Selangor ', 'Local Pickup');
```

CustID	Cust_Name	Cust_Contact	Cust_Address	Ship_Type
CUST001	Lee Min Ho	01152766544	No 100, Taman Jaya Ria, Kuala Lumpur	Standard Shipping
CUST002	Hakim Rosli	0137766522	Lot 3122, Jalan Murai, Raub, Pahang	Express Shipping
CUST003	Aisyah Hanum	0173986543	No 51, Taman Pasir Putih, Machang, Kelantan	Local Pickup
CUST004	Izzat	0128855321	No 9, Taman Beaufort, Bangsar, Kuala Lumpur	Standard Shipping
CUST005	Usop Wilcha	0142233666	Lot 2928, Jalan Kampung Pisang, Jeram, Perak	Overnight Shipping
CUST006	Maimunah	0132754468	No 88, Jalan Baiduri, Gambang, Pahang	Standard Shipping
CUST007	Izzat	0128855321	No 9, Taman Beaufort, Bangsar, Kuala Lumpur	Local Pickup
CUST008	Kirthana	01951456702	No 3, Vista Apartment, Cyberjaya, Selangor	Express Shipping
CUST009	Mimi Lana	01744663399	Angsana Villa Condominium, Johor Bahru, Johor	Standard Shipping
CUST010	Daler Yusuf	011512887733	No 1, Taman Southville, Cheras, Selangor	Local Pickup

```
INSERT INTO Supplier values
('SP001', 'AquaHarvest Supply Co.', 'Pahang', '035246845',
'Harvest Equipments', F5),
('SP002', 'FinTech Aqua Sdn. Bhd.', 'Selangor', '0125486329',
'Maintenance Equipment', F9),
('SP003', 'Zen & Jo FishFood', 'Perak', '031114256', 'Fish Foods',
F2),
('SP004', 'BerjayaEdge Company', 'Pulau Pinang', '01163254896',
'Systems', F8),
('SP005', 'PrecisionPond Technologies', 'Selangor', '035264128',
'Water Quality Tools', F1),
('SP006', 'BlueHarbor Supplies', 'Kuala Lumpur', '01152498563',
'Plants & Substrate', F10),
('SP007', 'HealthDeAqua Bhd.', 'Terengganu', '01325461222',
'Medicines', F7),
('SP008', 'BoatShips Boats Supplies', 'Perak', '01199856478',
'Boats', F3),
('SP009', 'EverBlue Corporation', 'Kelantan', '01145213675',
'Hatchery Equipments', F6),
('SP010', 'AirWater Sdn. Bhd.', 'Pahang', '01985423716', 'Aeration
Tools', F4);
```

SupplierID	CompanyName	Location	Contact	TypeOfSupply	FarmID
SP001	AquaHarvest Supply Co.	Pahang	035246845	Harvest Equipments	F5
SP002	FinTech Aqua Sdn. Bhd.	Selangor	0125486329	Maintenance Equipment	F9
SP003	Zen & Jo FishFood	Perak	031114256	Fish Foods	F2
SP004	BerjayaEdge Company	Pulau Pinang	01163254896	Systems	F8
SP005	PrecisionPond Technologies	Selangor	035264128	Water Quality Tools	F1
SP006	BlueHarbor Supplies	Kuala Lumpur	01152498563	Plants & Substrate	F10
SP007	HealthDeAqua Bhd.	Terengganu	01325461222	Medicines	F7
SP008	BoatShips Boats Supplies	Perak	01199856478	Boats	F3
SP009	EverBlue Corporation	Kelantan	01145213675	Hatchery Equipments	F6
SP010	AirWater Sdn. Bhd.	Pahang	01985423716	Aeration Tools	F4
NULL	NULL	NULL	NULL	NULL	NULL

```
INSERT INTO Harvesting VALUES
('HR001', '2023-01-10', 1.0,'F5'),
('HR002', '2023-02-20', 1.2,'F2'),
('HR003', '2023-03-15', 0.8,'F9'),
('HR004', '2023-04-25', 0.95,'F1'),
('HR005', '2023-05-30', 1.5,'F7'),
('HR006', '2023-06-05', 0.7,'F8'),
('HR007', '2023-07-18', 1.3,'F10'),
('HR008', '2023-08-10', 0.6,'F4'),
('HR009', '2023-09-28', 1.1,'F3'),
('HR010', '2023-10-15', 1.4,'F6');
```

HarvestingID	Date	Weight_Harvested	FarmID
HR001	2023-01-10	1.00	F5
HR002	2023-02-20	1.20	F2
HR003	2023-03-15	0.80	F9
HR004	2023-04-25	0.95	F1
HR005	2023-05-30	1.50	F7
HR006	2023-06-05	0.70	F8
HR007	2023-07-18	1.30	F10
HR008	2023-08-10	0.60	F4
HR009	2023-09-28	1.10	F3
HR010	2023-10-15	1.40	F6
NULL	NULL	NULL	NULL

```
INSERT INTO Orders VALUES
('1001','F1','CUST003','2023-12-20','90.00','online banking'),
('1002','F3','CUST010','2023-12-20','150.00','COD'),
('1003','F5','CUST010','2023-12-28','60.00','online banking'),
('1004','F10','CUST001','2023-12-24','100.00','online
banking'),
('1005','F5','CUST004','2024-01-01','300.00','COD'),
('1006','F6','CUST007','2023-07-08','250.00','online
banking'),
('1007','F7','CUST005','2023-03-15','90.00','COD'),
('1008','F2','CUST009','2023-10-22','100.00','online
banking'),
('1009','F9','CUST006','2023-02-11','300.00','online
banking'),
('1010','F10','CUST008','2023-10-08','200.00','COD');
```

OrderID	FarmID	CustID	Order_Date	Order_Price	Payment_Method
1001	F1	CUST003	2023-12-20	90.00	online banking
1004	F10	CUST001	2023-12-24	100.00	online banking
1010	F10	CUST008	2023-10-08	200.00	COD
1008	F2	CUST009	2023-10-22	100.00	online banking
1002	F3	CUST010	2023-12-20	150.00	COD
1005	F5	CUST004	2024-01-01	300.00	COD
1003	F5	CUST010	2023-12-28	60.00	online banking
1006	F6	CUST007	2023-07-08	250.00	online banking
1007	F7	CUST005	2023-03-15	90.00	COD
1009	F9	CUST006	2023-02-11	300.00	online banking
NULL	NULL	NULL	NULL	NULL	NULL

```
INSERT INTO fish_disease (DiseaseID, FishID, OutbreakStartDate,
OutbreakEndDate)
VALUES
('D1', 'F1', '2023-01-05', '2023-01-15'),
('D2', 'F2', '2023-02-20', '2023-02-28'),
('D3', 'F3', '2023-03-10', '2023-03-20'),
('D4', 'F4', '2023-04-18', '2023-04-28'),
('D5', 'F5', '2023-05-25', '2023-06-05'),
('D6', 'F6', '2023-06-01', '2023-06-10'),
('D7', 'F7', '2023-07-15', '2023-07-25'),
('D8', 'F8', '2023-08-05', '2023-08-15'),
('D9', 'F9', '2023-09-20', '2023-09-30'),
('D10', 'F10', '2023-10-05', '2023-10-15');
```

DiseaseID	FishID	OutbreakStartDate	OutbreakEndDate
D1	F1	2023-01-05	2023-01-15
D10	F10	2023-10-05	2023-10-15
D2	F2	2023-02-20	2023-02-28
D3	F3	2023-03-10	2023-03-20
D4	F4	2023-04-18	2023-04-28
D5	F5	2023-05-25	2023-06-05
D6	F6	2023-06-01	2023-06-10
D7	F7	2023-07-15	2023-07-25
D8	F8	2023-08-05	2023-08-15
D9	F9	2023-09-20	2023-09-30
NULL	NULL	NULL	NULL

ALTER TABLES

```
alter table customer
add column cust_email varchar(30);

select* from customer;
```

CustID	Cust_Name	Cust_Contact	Cust_Address	Ship_Type	Cust_Email
CUST001	Lee Min Ho	01152766544	No 100, Taman Jaya Ria, Kuala Lumpur	Standard Shipping	NULL
CUST002	Hakim Rosli	0137766522	Lot 3122, Jalan Murai, Raub, Pahang	Express Shipping	NULL
CUST003	Aisyah Hanum	0173986543	No 51, Taman Pasir Putih, Machang, Kelantan	Local Pickup	NULL
CUST004	Izzat	0128855321	No 9, Taman Beaufort, Bangsar, Kuala Lumpur	Standard Shipping	NULL
CUST005	Usop Wilcha	0142233666	Lot 2928, Jalan Kampung Pisang, Jeram, Perak	Overnight Shipping	NULL
CUST006	Maimunah	0132754468	No 88, Jalan Baiduri, Gambang, Pahang	Standard Shipping	NULL
CUST007	Izzat	0128855321	No 9, Taman Beaufort, Bangsar, Kuala Lumpur	Local Pickup	NULL
CUST008	Kirthana	01951456702	No 3, Vista Apartment, Cyberjaya, Selangor	Express Shipping	NULL
CUST009	Mimi Lana	01744663399	Angsana Villa Condominium, Johor Bahru, Johor	Standard Shipping	NULL
CUST010	Daler Yusuf	011512887733	No 1, Taman Southville, Cheras, Selangor	Local Pickup	NULL

```
alter table employee
add column emp_phoneNum varchar(20);

select* from employee;
```

EmpID	Emp_Name	Emp_Position	Hire_Date	FarmID	emp_phoneNum
EMP001	Faiz Roslan	Farm Manager	2021-01-05	F1	NULL
EMP002	Maryam Isa	Aquaculturist	2022-03-12	F2	NULL
EMP003	Abu Samad	Feed Technician	2020-11-08	F5	NULL
EMP004	Muhd Kamal	Water Quality Specialist	2023-05-20	F3	NULL
EMP005	Lee Chang Wei	Harvester	2021-08-15	F2	NULL
EMP006	Darshini	Production Assistant	2020-07-02	F1	NULL
EMP007	Siti Saleha	Maintenance Technician	2022-12-01	F3	NULL
EMP008	Kumar	Harvester	2021-04-23	F7	NULL
EMP009	Salman Khan	Feed Technician	2023-06-09	F1	NULL
EMP010	Umar	Veterinarian	2022-09-18	F3	NULL
NULL	NULL	NULL	NULL	NULL	NULL

DROP TABLES

```
drop table feeding
```

Tables_in_freshwater
customer
disease
employee
equipment
farm
fish
harvesting
pond
supplier

```
drop table harvesting
```

Tables_in_freshwater
customer
disease
employee
equipment
farm
fish
pond
supplier

8.0 Data Manipulation Language (DML)

UPDATE TABLES

```
update employee
set Emp_Position='Farm Assistant'
where EmpID='EMP008';

select* from employee;
```

EmpID	Emp_Name	Emp_Position	Hire_Date	FarmID	emp_phoneNum
EMP001	Faiz Roslan	Farm Manager	2021-01-05	F1	NULL
EMP002	Maryam Isa	Aquaculturist	2022-03-12	F2	NULL
EMP003	Abu Samad	Feed Technician	2020-11-08	F5	NULL
EMP004	Muhd Kamal	Water Quality Specialist	2023-05-20	F3	NULL
EMP005	Lee Chang Wei	Harvester	2021-08-15	F2	NULL
EMP006	Darshini	Production Assistant	2020-07-02	F1	NULL
EMP007	Siti Saleha	Maintenance Technician	2022-12-01	F3	NULL
EMP008	Kumar	Farm Assistant	2021-04-23	F7	NULL
EMP009	Salman Khan	Feed Technician	2023-06-09	F1	NULL
EMP010	Umar	Veterinarian	2022-09-18	F3	NULL
NULL	NULL	NULL	NULL	NULL	NULL

```
update customer
set ship_type='Express Shipping'
where CustID='CUST004';

select* from customer;
```

CustID	Cust_Name	Cust_Contact	Cust_Address	Ship_Type	cust_email
CUST001	Lee Min Ho	01152766544	No 100, Taman Jaya Ria, Kuala Lumpur	Standard Shipping	NULL
CUST002	Hakim Rosli	0137766522	Lot 3122, Jalan Murai, Raub, Pahang	Express Shipping	NULL
CUST003	Aisyah Hanum	0173986543	No 51, Taman Pasir Putih, Machang, Kelantan	Local Pickup	NULL
CUST004	Izzat	0128855321	No 9, Taman Beaufort, Bangsar, Kuala Lumpur	Express Shipping	NULL
CUST005	Usop Wilcha	0142233666	Lot 2928, Jalan Kampung Pisang, Jeram, Perak	Overnight Shipping	NULL
CUST006	Maimunah	0132754468	No 88, Jalan Baiduri, Gambang, Pahang	Standard Shipping	NULL
CUST007	Izzat	0128855321	No 9, Taman Beaufort, Bangsar, Kuala Lumpur	Local Pickup	NULL
CUST008	Kirthana	01951456702	No 3, Vista Apartment, Cyberjaya, Selangor	Express Shipping	NULL
CUST009	Mimi Lana	01744663399	Angsana Villa Condominium, Johor Bahru, Johor	Standard Shipping	NULL
CUST010	Daler Yusuf	011512887733	No 1, Taman Southville, Cheras, Selangor	Local Pickup	NULL
NULL	NULL	NULL	NULL	NULL	NULL

DELETE

```
select * from Fish;
ALTER TABLE Fish
DROP COLUMN Fish_weight;
```

FishID	Fish_Name	Quantity_Fish	PondID
F1	Rainbow Trout	50	PD002
F10	Molly Fish	20	PD001
F2	Snakehead	30	PD004
F3	Catfish	80	PD006
F4	Koi	40	PD008
F5	Goldfish	50	PD009
F6	Tilapia	60	PD007
F7	Crayfish	100	PD005
F8	Carp	85	PD003
F9	Guppy	20	PD010
NULL	NULL	NULL	NULL

```
DELETE FROM Disease
WHERE DiseaseID IN ('D3','D5','D1');
select * from Disease
```

DiseaseID	Disease_Name	Disease_Symptom	Disease_Treatment
D10	Mouth Fungus	White growths around the mouth, difficulty eati...	Antifungal medications, quarantine, and improvi...
D2	Fin Rot	Decaying or eroding fins, redness or inflammation.	Antibiotics, clean water conditions, and removal...
D4	Columnaris	White, gray, or fuzzy patches on skin or gills, le...	Antibiotics like tetracycline, improved water qua...
D6	Anchor Worms	Visible thread-like worms on fish, redness, and i...	Remove the worms manually, medicated baths.
D7	Swim Bladder Disorder	Abnormal swimming behavior, buoyancy issues.	Diet adjustment, improving water quality.
D8	Hole-in-the-Head Disease	Pitting or lesions on the head, lack of appetite.	Improving water quality, adding essential vitami...
D9	Fish Fungus	Cotton-like growths on skin or fins, irritation.	Antifungal medications, improved water quality.

ORDER BY

```
SELECT Farm_Name
FROM Farm
ORDER BY Farm_Name asc;
```

Farm_Name
AgroBest
Aqua Ceria
Asia Aquaculture
Cahaya Warisan
Desa Bayu Aqua Farming
Eco Farm Fishery
FS Marine Culture
GSS Aquaculture
Manjung Aqua Farming
PT Sinar Akuakultur

LIKE

```
SELECT * FROM Customer
WHERE Cust_Name LIKE '%ana%';
```

CustID	Cust_Name	Cust_Contact	Cust_Address	Ship_Type	cust_email
CUST008	Kirthana	01951456702	No 3, Vista Apartment, Cyberjaya, Selangor	Express Shipping	NULL
CUST009	Mimi Lana	01744663399	Angsana Villa Condominium, Johor Bahru, Johor	Standard Shipping	NULL
NULL	NULL	NULL	NULL	NULL	NULL

AND/BETWEEN/ORDER BY

```
SELECT * FROM employee
WHERE Hire_Date BETWEEN '2021-01-05' AND '2023-05-20'
order by hire_date asc;
```

EmpID	Emp_Name	Emp_Position	Hire_Date	FarmID	emp_phoneNum
EMP001	Faiz Roslan	Farm Manager	2021-01-05	F1	NULL
EMP008	Kumar	Farm Assistant	2021-04-23	F7	NULL
EMP005	Lee Chang Wei	Harvester	2021-08-15	F2	NULL
EMP002	Maryam Isa	Aquaculturist	2022-03-12	F2	NULL
EMP010	Umar	Veterinarian	2022-09-18	F3	NULL
EMP007	Siti Saleha	Maintenance Technician	2022-12-01	F3	NULL
EMP004	Muhd Kamal	Water Quality Specialist	2023-05-20	F3	NULL
NULL	NULL	NULL	NULL	NULL	NULL

AGGREGATE FUNCTION

```
SELECT PondID,sum(Feeding_Quantity) AS TotalFeedingQuantity
FROM Feeding
GROUP BY PondID;
```

PondID	TotalFeedingQuantity
PD001	1000
PD002	500
PD003	800
PD004	1100
PD005	1100
PD006	850
PD007	950
PD008	600
PD009	300
PD010	1200

```
SELECT PondID, AVG(Quantity_Fish) AS AverageFishQuantity
FROM Fish
GROUP BY PondID;
```

PondID	AverageFishQuantity
PD001	15.0000
PD002	10.0000
PD003	7.0000
PD004	25.0000
PD005	4.0000
PD006	8.0000
PD007	12.0000
PD008	5.0000
PD009	15.0000
PD010	10.0000

JOIN TABLES

```
select c.Cust_Name, c.Cust_Address
from customer c
where c.custID in
      (select  o.custID
      from orders o
      where month(Order_Date)= 12);
```

Cust_Name	Cust_Address
Lee Min Ho	No 100, Taman Jaya Ria, Kuala Lumpur
Aisyah Hanum	No 51, Taman Pasir Putih, Machang, Kelantan
Daler Yusuf	No 1, Taman Southville, Cheras, Selangor

SELECT s.Company_Name, e.EquipmentTame, p.Pond_Type

FROM Supplier s

INNER JOIN equipment e ON s.FarmID = e.FarmID

INNER JOIN pond p ON e.FarmID = p.FarmID;

esult Grid | Filter Rows: | Export: | Wrap Cell Content:

CompanyName	EquipmentType	Pond_Type
AquaHarvest Supply Co.	Hatchery Equipment	Grow Out
FinTech Aqua Sdn. Bhd.	Aeration Tools	Grow Out
Zen & Jo FishFood	Fish Diseases Checker	Breeding
BerjayaEdge Company	Harvesting Equipment	Grow Out
PrecisionPond Technologies	Boats	Nursery
BlueHarbor Supplies	Medicines	Nursery
HealthDeAqua Bhd.	Pond Maintenance Tools	Nursery
BoatShips Boats Supplies	Feeding Tools	Nursery
EverBlue Corporation	Production Systems	Breeding
AirWater Sdn. Bhd.	Water Quality Monitoring Equipment	Grow Out

9.0 Normalization

Dependency

FarmID,CustID,DiseaseID-> Order_Date,Order_Price,Fish_Type,Payment_Method, OutbreakStartDate,OutbreakEndDate	Primary key
FarmID=>EquipmentID,SupplierID,HarvestingID,EmployeeID, PondID,FeedingID,FishID,OutbreakStartDate, OutbreakEndDate	partial
CustID->Order_Date,Order_Price,Fish_Type, Payment_Method.	partial
DiseaseID=>OutbreakStartDate,OutbreakEndDate	partial
PondID->FeedingID	transitive
PondID=>FishID,OutbreakStartDate,OutbreakEndDate	transitive
FishID=>OutbreakStartDate,OutbreakEndDate	transitive

1NF

FishFarm(FarmID,CustID,DiseaseID,FishID,PondID,SupplierID,EmpID,EquipmentID,HarvestingID,FeedingID,Farm_Name,Farm_Location,Farm_Size,Farm_StartDate,Pond_Type,Water_Quality,Feeding_Date,Feeding_Quantity,Emp_Name,Emp_Position,Hire_Date,Cust_Name,Cust_Contact,Cust_Address,Ship_Type,Date,Weight_Harvested,EquipmentService,EquipmentType,EquipmentAge,FuelType,Company_Name,Location,Contact,TypeofSupply,Disease_Name,Disease_Symptom,Disease_Treatment,Fish_Name,Quantity_Fish,Fish_Weight)

2NF

FishFarm(FarmID,CustID,DiseaseID,Order_Date,Order_Price,Fish_Type,Payment_Method, OutbreakStartDate,OutbreakEndDate)

Farm(FarmID,EquipmentID,SupplierID,HarvestingID,EmployeeID,PondID,FeedingID,FishID,OutbreakStartDate,OutbreakEndDate)

Customer(CustID,Order_Date,Order_Price,Fish_Type,Payment_Method)

Disease(DiseaseID,OutbreakStartDate,OutbreakEndDate)

3NF

Farm (FarmID,Farm_Name,Farm_Location,Farm_Size,Farm_StartDate)

Orders(CustID,FarmID,Order_Date,Order_Price,Fish_Type,Payment_Method)

Customer(CustID,Cust_Name,Cust_Name,Cust_Contact,Cust_Adress,Ship_Type)

Equipment(EquipmentID,FarmID,EquipmentService,EquipmentType,EquipmentAge,FuelType)

Supplier(SupplierID,CompanyName,Location,Contact,TypeofSupply)

Pond(PondID,FarmID,Pond_Type,Water_Quality)

Fish(FishID, PondID,Fish_Name,Quantity_Fish,Fish_Weight)

Fish_Disease(FishID,DiseaseID,OutbreakStartDate,OutbreakEndDate)

Disease(DiseaseID,Disease_Name,Symptom,Treatment)

Employee(EmployeeID,FarmID,Emp_Name,Emp_Position,Hire_Date)

10.0 Data Dictionary (DD)

FARM ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	FarmID	Farm ID number	varchar	10	PK NOT NULL
2	Farm_Name	Farm name	varchar	255	
3	Farm_Location	Farm location	varchar	255	
4	Farm_Size	Farm size	int		
5	Farm_StartDate	Farm starting date	date		

POND ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	PondID	Pond ID number	varchar	10	PK NOT NULL
2	Pond_Type	Pond type	varchar	10	
3	Water_Quality	Water quality of pond	varchar	10	
4	FarmID	Farm ID number	varchar	10	FK

FEEDING ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	FeedingID	Feeding ID number	varchar	10	PK NOT NULL
2	Feeding_Date	Feeding Date schedule	date		
3	Feeding_Quantity	Feeding Quantity per day	decimal	(6,2)	
4	PondID	Pond ID number	varchar	10	FK

EMPLOYEE ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	EmpID	Employee ID number	varchar	10	PK NOT NULL
2	Emp_Name	Employee name	varchar	50	
3	Emp_Position	Employee position	varchar	50	
4	Hire_Date	Employee hiring date	date		
5	FarmID	Farm ID number	varchar	10	FK

CUSTOMER ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	CustID	Customer ID number	varchar	10	PK NOT NULL
2	Cust_Name	Customer name	varchar	50	
3	Cust_Contact	Customer contact	varchar	50	
4	Cust_Address	Customer address	varchar	100	
5	Ship_Type	Shipment type	varchar	20	

HARVESTING ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	HarvestingID	Harvesting ID number	varchar	10	PK NOT NULL
2	Date	Date of harvest	date		
3	Weight_Harvested	Weight harvested	int		
4	FarmID	Fram ID number	varchar	10	FK

EQUIPMENT ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	EquipmentID	Equipment ID number	varchar	10	PK NOT NULL
2	EquipmentService	Equipment Service	varchar	5	
3	EquipmentType	Equipment Type	varchar	50	
4	EquipmentAge	Equipment age	int		
5	FuelType	Fuel Type	varchar	30	
6	FarmID	Farm ID number	varchar	10	FK

SUPPLIER ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	SupplierID	Suppliers ID number	varchar	10	PK NOT NULL
2	CompanyName	Suppliers company name	varchar	30	
3	Location	Suppliers' location	varchar	50	
4	Contact	Suppliers' contact number	varchar	20	
5	TypeofSupply	Type of supplies	varchar	30	
6	FarmID	Farm ID number	varchar	10	FK

DISEASE ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	DiseaseID	Fish Diseases ID	varchar	10	PK NOT NULL
2	Disease_Name	Diseases names	varchar	50	
3	Disease_Symptom	Symptom of diseases	varchar	100	
4	Disease_Treatment	Treatment of Diseases	varchar	100	

FISH ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	FishID	Fish ID number	varchar	10	PK NOT NULL
2	Fish_Name	Fish names	varchar	50	
3	Quantity_Fish	Quantity of fish	int		
4	Fish_Weight	Weight of fish	decimal		
5	PondID	Pond ID number	varchar	10	FK

FISH_DISEASE ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	FishID	Fish ID number	varchar	10	PK NOT NULL,FK
2	DiseaseID	Disease ID number	varchar	10	PK NOT NULL,FK
3	OutbreakStartDate	Starting date of disease affected	date		
4	OutbreakEndDate	End date of disease	date		

ORDERS ENTITY

NO	DATA	DESCRIPTION	TYPE	LENGTH	PK/FK
1	CustID	Customer ID number	varchar	10	PK NOT NULL, FK
2	FarmID	Farm ID number	varchar	10	PK NOT NULL, FK
3	OrderID	Order ID number	int		PK
4	Order_Date	Date of order	date		
5	Order_Price	Price of order	decimal	(6,2)	
6	Fish_Type	Type of fish buy	varchar	10	
7	Payment_Method	Payment method	varchar		

11.0 References

1. *1NF 2NF 3NF DBMS*. (n.d.). Www.youtube.com. Retrieved January 11, 2024, from https://youtu.be/xPzgK6sOCfg?si=I0jDuToIabLmASTX

2. Riyana, J. (2021, April 18). *Drawing ER and EER Diagrams & Relational Mapping*. Nerd for Tech. https://medium.com/nerd-for-tech/drawing-er-and-eer-diagrams-mapping-4965e2b3cc3e

3. W3Schools. (2019). *SQL DELETE Statement*. W3schools.com. https://www.w3schools.com/sql/sql_delete.asp
4. Www.techonthenet.com (no date) *MySQL: Subqueries*. Available at:
    a. https://www.techonthenet.com/mysql/subqueries.php (Accessed: 12 January 2024).

12.0 Planning

Part 1: Proposal of Database System

- Project background: Khai
- Objective: Tasha
- Scopes Dayah
- Case study & tables: Khai
- Business rules: Yasmin
- ERD: All
- EERD: All

Part 2: SQL & Normalization

- SQL Question 5.0: All
- SQL Question 6.0: All
- Normalization: Tasha
- Data Dictionary: Nad

13.0 Appendix

Meeting Report

<table>
<tr><td colspan="4">Group Meeting Report No: 1</td></tr>
<tr><td colspan="2">Date:
2/11/23</td><td>Venue:
ZDK-04</td><td rowspan="2">Attendees:

1. Nurkhairul Izzati bt Mohd Sallehan
2. Amirah Yasmin bt Zailanee
3. Nurul Hidayah bt Roslan
4. Nurin Nadhirah Izzah bt Zainuddin
5. Nurul Syafiqah Natasha bt Mohd Razi</td></tr>
<tr><td colspan="2">Time:
8-10 am</td><td>SCL Leader:
Nurkhairul Izzati bt Mohd Sallehan</td></tr>
<tr><td>No</td><td colspan="2">Task List</td><td>Progress Task/Table Involves/Remarks</td><td>(PIC)</td></tr>
<tr><td>1</td><td colspan="2">Discussion on what 10 attributes should have in ERD</td><td>-feeding

-pond</td><td>Nurkhairul Izzati</td></tr>
<tr><td>2</td><td colspan="2">Discussion on what 10 attributes should have in ERD</td><td>-employee

-customer</td><td>Amirah Yasmin</td></tr>
<tr><td>3</td><td colspan="2">Discussion on what 10 attributes should have in ERD</td><td>-farm

-harvesting</td><td>Nurul Hidayah</td></tr>
<tr><td>4</td><td colspan="2">Discussion on what 10 attributes should have in ERD</td><td>-equipment

-supplier</td><td>Nurin Nadhirah</td></tr>
<tr><td>5</td><td colspan="2">Discussion on what 10 attributes should have in ERD</td><td>-disease

-fish</td><td>Syafiqah Natasha</td></tr>
</table>

Group Meeting Report No: 2			
Date:	**Venue:** FSK-14	**Attendees:** 1. Nurkhairul Izzati bt Mohd Sallehan 2. Amirah Yasmin bt Zailanee 3. Nurul Hidayah bt Roslan 4. Nurin Nadhirah Izzah bt Zainuddin 5. Nurul Syafiqah Natasha bt Mohd Razi	
Time: **8-10**	**SCL Leader:** Amirah Yasmin Bt Zailanee		
No	**Task List**	**Progress Task/Table Involves/Remarks**	**(PIC)**
1	Discuss and do the ERD and EERD together	ERD and EERD diagram	Syafiqah Natasha
2	Discuss and do the ERD and EERD together	ERD and EERD diagram	Nurin Nadhirah
3	Discuss and do the ERD and EERD together	ERD and EERD diagram	Nurul Hidayah
4	Discuss and do the ERD and EERD together	ERD and EERD diagram	Amirah Yasmin
5	Based on the discussion of ERD and EERD, create the business rule	Business rules tables	Nurkhaiul Izzati

Group Meeting Report No: 3			
Date: **18/11/2023**	**Venue:** Whatsapp	**Attendees:** Nurkhairul Izzati bt Mohd Sallehan 1. Amirah Yasmin bt Zailanee 2. Nurul Hidayah bt Roslan 3. Nurin Nadhirah Izzah bt Zainuddin 4. Nurul Syafiqah Natasha bt Mohd Razi	
Time: **2-4 pm**	**SCL Leader:** Nurul Hidayah bt Roslan		
No	**Task List**	**Progress Task/Table Involves/Remarks**	**(PIC)**
1	**Analysis table**	*Farm Management System ER Diagram	FreeProjectz*. (n.d.). Www.freeprojectz.com. Retrieved December 27, 2023, from https://www.freeprojectz.com/entity-relationship/farm-management-system-er-diagram	**Nurul Hidayah**
2	**Analysis table**	hasanihasani. (2021, November 7). *Guidance on farm database ER diagram*. https://www.reddit.com/r/PostgreSQL/comments/qonbyj/guidance_on_farm_database_er_diagram/	**Nurin Nadhirah**
3	**Continue erd & eerd , business rule**		**Tasha**
4	**Continue erd & eerd, business rule**		**Khairul**

5	**Continue erd & eerd, business rule**		**yasmin**

Group Meeting Report No: 4			
Date: **20/12/2023**	**Venue:** WS Group	**Attendees:** Nurkhairul Izzati bt Mohd Sallehan Amirah Yasmin bt Zailanee Nurul Hidayah bt Roslan Nurin Nadhirah Izzah bt Zainuddin Nurul Syafiqah Natasha bt Mohd Razi	
Time: **8-10 pm**	**SCL Leader:** Nurin Nadhirah Izzah bt Zainuddin		
No	**Task List**	**Progress Task/Table Involves/Remarks**	**(PIC)**
1	**Question no 7 & 8**		**khai**
2	**Question no 7 & 8**		**tasha**
3	**Question no 7 & 8**		**yasmin**

4	**Question no 7 & 8**		**dayah**
5	**Question no 7 & 8**		**nad**

Group Meeting Report No: 5			
Date: **30/12/2023**	**Venue:** **Ws group**	**Attendees:** Nurkhairul Izzati bt Mohd Sallehan Amirah Yasmin bt Zailanee Nurul Hidayah bt Roslan Nurin Nadhirah Izzah bt Zainuddin Nurul Syafiqah Natasha bt Mohd Razi	
Time: **8-10**	**SCL Leader:** Nurul Syafiqah Natasha bt Mohd Razi		
No	**Task List**	**Progress Task/Table Involves/Remarks**	**(PIC)**
1	**Data dictionary**		**Nad, dayah**
2	**normalization**		**Khai, tasha**

3	**References, planning**		**yasmin**
4			
5			