Hannah Baek, Matt Skelton, Ashley Wu

CPSC304 Group 4: Farm Manager
Milestone 4: Project Implementation

Deliverables

1. **Description of final project and what it accomplished**
   This project models a farm management software designed for owners and managers to monitor the processes involved in running the farm. It is based on a schema including data on animals, farmers, inventory, customer transactions, equipment, and the interactions within and between those elements. Some specific uses of the application are to track profits, animal health, farmer working hours, machinery condition, and inventory location. Where appropriate, the information presented by the application can be customized to suit the user's needs. The application is also extensible, accommodating the addition, alteration, and removal of information in many of its fields as the farm grows.

2. **Description of how final schema differed from the schema we turned in**

- We changed attribute names such as Transaction# to TransactionNumber, and Phone# to PhoneNumber. This was to improve readability and avoid issues with special characters like # in SQL.
- We added a size to the VARCHAR data types because SQLPlus requires explicit length declarations for VARCHAR types.
- In EggRecords and DairyRecords, the AnimalID field was made NOT NULL because every egg or dairy product must be associated with a specific animal. This enforces data integrity and reflects real-world requirements.

3. **Final schema**

- Customer (cEmail: VARCHAR(200), cName: VARCHAR(200), cPhoneNumber: CHAR(200))
- Transaction (TransactionNumber: INTEGER, **cEmail**: VARCHAR(200) NOT NULL, tDate: DATE, Total: DECIMAL(10, 2))
- Products (BatchID: INTEGER, Yield: INTEGER, CollectionDate: DATE)
- PurchasedProducts (**BatchID**: INTEGER, **TransactionNumber**: INTEGER)
- Farmer (FarmerID: INTEGER, fName: VARCHAR(200), fPhoneNumber: VARCHAR(200) UNIQUE)
- Shift (**FarmerID**: INTEGER, sDate: DATE)
- StorageBuilding (BuildingID: INTEGER, sbType: VARCHAR(200))
- Crop (**BatchID**: INTEGER, crType: VARCHAR(200), PlantDate: DATE, **BuildingID**: INTEGER)
- CropMaintenance (TasksCompleted: VARCHAR(200), **FarmerID**: INTEGER, **sDate**: DATE, **BatchID**: INTEGER)
- Machinery (MachineID: INTEGER, mType: VARCHAR(200), Condition: VARCHAR(200))
- MachineryUsage (**FarmerID**: INTEGER, **MachineID**: INTEGER, **sDate**: DATE)

- Animal (AnimalID: INTEGER, aName: VARCHAR(200), Age: INTEGER, PenNumber: INTEGER, Weight: DECIMAL(10, 2))
- AnimalFeedingLog (**FarmerID**: INTEGER, **AnimalID**: INTEGER, **sDate**: DATE)
- Cow (**AnimalID**: INTEGER)
- DairyRecords (**BatchID**: INTEGER, dType: VARCHAR(200), **AnimalID**: INTEGER NOT NULL, **BuildingID**: INTEGER)
- Chicken (**AnimalID**: INTEGER)
- EggRecords (**BatchID**: INTEGER, **AnimalID**: INTEGER NOT NULL, **BuildingID**: INTEGER)

4. Data in the tables after running initialization script

Customer Table				
cEmail	**cName**	**cPhoneNumber**		
janesmith93@gmail.com	Jane Smith	604-122-3333		
masonyurb03@gmail.com	Mason Yurb	778-322-3992		
romantaurk87@gmail.com	Roman Taurk	778-981-6432		
rbauli22@gmail.com	Raiya Bauli	604-261-0184		
parmkarla84@gmail.com	Karla Parm	604-918-3651		

Transaction Table				
TransactionNumber	**cEmail**	**tDate**	**Total**	
1	janesmith93@gmail.com	2025-01-15	1366	
2	masonyurb03@gmail.com	2025-02-03	289.99	
3	romantaurk87@gmail.com	2025-02-10	534.5	
4	rbauli22@gmail.com	2025-02-20	875.75	
5	parmkarla84@gmail.com	2025-02-28	425.25	

Products Table				
BatchID	**Yield**	**CollectionDate**		
101	150	2025-01-15		
102	60	2025-02-03		
103	220	2025-02-10		
104	77	2025-02-20		
105	345	2025-02-28		
106	80	2025-01-17		
107	250	2025-02-05		
108	90	2025-03-10		
109	170	2025-02-22		
110	125	2025-08-28		
111	64	2025-01-15		
112	205	2025-02-02		
113	95	2025-09-15		
114	144	2025-01-22		
115	78	2025-05-25		

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PurchasedProducts Table

BatchID	TransactionNumber
111	1
112	2
113	3
114	4
115	5

Farmer Table

FarmerID	fName	fPhoneNumber
100	Jerry Jam	778-333-9898
101	Carrey Nicol	778-541-6312
102	Richelle Peters	778-232-1431
103	Tony Manning	778-619-6543
104	Peeta Parker	778-691-4234

Shift Table

FarmerID	sDate
100	2024-05-12
101	2025-01-22
102	2025-01-23
100	2025-01-24
103	2025-01-24

StorageBuilding Table

BuildingID	sbType
100	Egg Cellar
101	Milk House
102	Butter Place
103	Feed Shed
104	Crop Silo

Crop Table

BatchID	crType	PlantDate	BuildingID
111	Corn	2024-04-02	104
112	Wheat	2024-12-02	104
113	Carrot	2024-11-02	104
114	Soybean	2024-10-02	104
115	Pumpkin	2025-01-24	104

CropMaintenance Table

TasksCompleted	FarmerID	sDate	BatchID
Watering and weeding	100	2024-05-12	111
Harvesting	101	2025-01-22	112
Spraying pesticides & thinning	100	2025-01-24	113
Harvesting	102	2025-01-23	114
Planting	103	2025-01-24	115

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Machinery Table

MachineID	mType	Condition
1	Tractor	Fair
2	Planter	Good
3	Solar Panel	New
4	Weeding Machine	Needs Repair
5	Compost Machine	Poor

MachineryUsage Table

FarmerID	MachineID	sDate
100	1	2024-05-12
101	3	2025-01-22
102	4	2025-01-23
100	5	2025-01-24
103	1	2025-01-24
103	2	2025-01-24
103	3	2025-01-24
103	4	2025-01-24
103	5	2025-01-24

Animal Table

AnimalID	aName	Age	PenNumber	Weight
300	Pecky	8	121	2.42
301	Snoopy	4	123	505.45
302	Woodstock	4	123	2.75
303	Mooshu	10	124	484.84
304	Sir Loin	15	125	575.25
305	Yolks	3	127	1.67
306	Mooana	12	128	668.32
307	Feathers	8	125	1.81
308	Clucks	6	130	3.05
309	Milkshake	11	133	625.75
310	Ground Beef	9	133	250
311	Alexander	18	133	974.21
312	Bill Burger	7	133	889.89
313	T-Bone	1	133	150.64
314	Chuck	9	133	600.44
315	Ephraim	12	137	297.21

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AnimalFeedingLog Table

FarmerID	AnimalID	sDate
100	300	2024-05-12
101	301	2025-01-22
102	302	2025-01-23
100	303	2025-01-24
103	304	2025-01-24

Cow Table

AnimalID
301
303
304
306
309
310
311
312
313
314
315

DairyRecords Table

BatchID	dType	AnimalID	BuildingID
101	Milk	303	101
103	Milk	304	101
105	Butter	304	102
107	Butter	306	102
109	Milk	309	101

Chicken Table

AnimalID
300
302
305
307
308

EggRecords Table

BatchID	AnimalID	BuildingID
102	300	100
104	307	100
106	307	100
108	308	100
110	308	100

5. All SQL queries used to satisfy rubric items and where each query is found

- INSERT

  -
    ```
    INSERT INTO Shift (FarmerID, sDate) VALUES (:FarmerID,
    TO_DATE(:sDate, 'YYYY-MM-DD'))
    ```
  - Found in appService.js line 325
- DELETE

  -
    ```
    DELETE FROM Farmer WHERE FarmerID=:farmerID
    ```
  - Found in appService.js line 262
- UPDATE

  -
    ```
    UPDATE Farmer SET ${updates.join(", ")} WHERE FarmerID=:farmerID
    ```
  - Found in appService.js line 248
- Selection

  -
    ```
    SELECT * FROM Animal WHERE ${clauses}
    ```
  - Found in appService.js line 619
- Projection

  -
    ```
    SELECT ${colStr} FROM Transaction
    ```
  - Found in appService.js line 426
- Join

  -
    ```
    SELECT F.FarmerID, F.fName, F.fPhoneNumber FROM Shift S, Farmer F
    WHERE S.FarmerID = F.FarmerID AND sDate = TO_DATE(:sDate,
    'YYYY-MM-DD')
    ```
  - Found in appService.js line 343
- Aggregation with Group By

  -
    ```
    SELECT Condition, Count(*) AS Count FROM Machinery GROUP BY
    Condition
    ```
  - Found in appService.js line 541
  - This query retrieves the number of machinery items for each unique condition. It groups the records in the Machinery table by the Condition and returns the total number of items in each condition category.
- Aggregation with Having

  -
    ```
    SELECT tDate, sum(Total) AS TotalSum FROM Transaction GROUP BY
    tDate HAVING sum(Total) >= :minTotal
    ```
  - Found in appService.js line 356
  - This query retrieves the total transaction amount for each date that is at least some minimum value.
- Nested Aggregation with Group By

  -
    ```
    SELECT COUNT(C1.AnimalID)
    FROM MatureCow C1
    WHERE C1.Weight <= ALL(SELECT AVG(C2.Weight)
                           FROM MatureCow C2
                           GROUP BY Age)
    ```
  - Found in appService.js line 650 (references MatureCow View at line 644)
  - This query counts cows that weigh less than the average weight for every fully grown cow age, three and up. It is designed to count potentially sick cows.

- Division

  ```
  SELECT f.FarmerID, f.fName
  FROM Farmer f, Machinery M, MachineryUsage MU
  WHERE F.FarmerID = MU.FarmerID AND M.MachineID = MU.MachineID
  GROUP BY f.FarmerID, f.fName
  HAVING COUNT(DISTINCT m.mType) = (SELECT COUNT(DISTINCT mType)
                                     FROM Machinery)
  ```

  - Found in appService.js line 276
  - This query finds farmers that have used every machine in the farm database. It is designed to isolate the most qualified ‘super farmers.’