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Relational Databases – Continued Assesment 2

Implementation Document for a Beef Farm Database

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EERD Changes

Multiple changes were made to the EER diagram after the Design Document was submitted and feedback was given. Firstly, the UIDs from the Agrochemical subtypes “Fertiliser” and “Pesticides” were removed, and subsequently a UID in the Agrochemical Supertype, “agrochemID” was added. Attribute “fertiliserType” in “Fertiliser” was changed to “npkValue”. The attribute “phLevels” in the “Fields” entity was incorrectly listed as a multivalued attribute, so it was corrected to “phLevel”. Only the most recent PH Level for a field entity should be stored. Also, many to many relationships between Livestock and Cereals, and Livestock and Forage were added. As such, these changes required an inheritance entity for each relationship, which were created as “Cereal Usage” and “Forage Usage” respectively. Finally, the attribute “prevOwner” in livestock was changed to optional, as it is possible the animal has no previous owner and was born into the owner’s herd. All these changes were reflected in the updated version of the business rules and the EER Diagram.

Diagram

Description automatically generated

Normalised Tables

* livestock (tag\_num, birth\_date, breed, sex, last\_tb\_test, curr\_owner, prev\_owner, herd\_num)
* medication(batch\_num, purch\_date, expiry\_date, application\_method, dosage, withdraw\_period, cost)
* medication\_usages(medic\_num, date\_used, amount\_used, batch\_num)
* forage(cut\_num, forage\_type, amount, field\_id, plot\_id)
* forage\_usages(feed\_num, date\_fed, amount\_used, cut\_num)
* cereals(batch\_num, purch\_date, cost, cereal\_type, weight)
* cereal\_usages(feed\_num, date\_fed, batch\_num)
* fields(field\_id, plot\_id, crop, soil\_qual, ph\_level)
* agrochemicals(agrochem\_id, purch\_date, cost, chemical\_units, npk\_value, cas\_num, chem\_name)
* agrochemical\_usages(spread\_num, spread\_date, kl\_p\_acre, op\_pu\_num, chems\_used, fields\_spread)

Table Mapping

Table Name: livestock

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| tag\_num | int | 15 | NOT NULL | pk | Unique number assigned to the animal’s tag. |
| birth\_date | date |  | NOT NULL |  | Date of birth of the animal. |
| breed | varchar | 20 | NOT NULL |  | Breed of the animal. |
| sex | char | 1 | NOT NULL |  | Sex of the animal. |
| last\_tb\_test | date |  | NOT NULL |  | Date of the last tb test the animal had. |
| curr\_owner | varchar | 35 | NOT NULL |  | Full name of the animal’s current owner |
| prev\_owner | varchar | 35 | NULL |  | Full name of the animal’s previous owners. |
| herd\_num | int | 8 | NOT NULL |  | The herd number of the herd the animal is currently in. |

Table Name: medication

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| batch\_num | int | 11 | NOT NULL | pk | Unique number assigned to the bottle of medication. |
| purch\_date | date |  | NOT NULL |  | Purchase date of the medication. |
| expiry\_date | date |  | NOT NULL |  | Expiry date of the medication. |
| application\_method | varchar | 15 | NOT NULL |  | Method of application of the medicine. |
| dosage | varchar | 16 | NOT NULL |  | Recommended dosage of the medicine per kg. |
| withdraw\_period | varchar | 10 | NOT NULL |  | Amount of days the animal cant be sold for after administration. |
| cost | decimal | 5 | NOT NULL |  | Cost of the medicine in euros. |

Table Name: medication\_usage

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| medic\_num | int |  | NOT NULL | pk | The nth time medicine has been adminstered. |
| date\_used | date |  | NOT NULL |  | Date medicine was used. |
| amount\_used | int | 3 | NOT NULL |  | Amount of medicine used in millilitres. |
| batch\_num | int | 11 | NOT NULL | fk | Batch number of the medicine used. |

Table Name: forage

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| cut\_num | int | 2 | NOT NULL | pk | Number of the cut this forage originated from. |
| forage\_type | varchar | 10 | NOT NULL |  | Type of forage (eg. Hay/Silage). |
| amount | int | 3 | NOT NULL |  | Amount of forage produced from this cut of the field. |
| field\_id | varchar | 3 | NOT NULL | fk | Id of the field that produced this forage. |
| plot\_id | varchar | 3 | NULL |  | Id of the plot that produced this forage. |

Table Name: forage\_usages

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| feed\_num | int |  | NOT NULL | pk | The nth time forage has been fed. |
| date\_fed | date |  | NOT NULL |  | Date forage was fed. |
| amount\_used | int | 3 | NOT NULL |  | Amount of forage fed. |
| cut\_num | int | 2 | NOT NULL | fk | Cut number of the forage used. |

Table Name: fields

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| field\_id | varchar | 2 | NOT NULL | pk | Unique ID assigned to each field. |
| plot\_id | varchar | 2 | NULL | uk | ID of plots contained in field if relevant. |
| crop | varchar | 15 | NOT NULL |  | Crop planted in the field. |
| soil\_qual | int | 2 | NOT NULL |  | Quality rating of the soil (1-10). |
| ph\_level | int | 2 | NOT NULL |  | Ph-level of the soil. |

Table Name: cereals

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| batch\_num | int | 12 | NOT NULL | pk | Unique batch number of the cereals, assigned at purchase. |
| purch\_date | date |  | NOT NULL |  | Date of purchase of these cereals. |
| cost | decimal | 5 | NOT NULL |  | Cost of of cereal. |
| cereal\_type | varchar | 20 | NOT NULL |  | Type of cereal. |
| weight | decimal | 5 | NOT NULL |  | Amount of cereals in kgs. |

Table Name: cereal\_usages

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| feed\_num | int |  | NOT NULL | pk | The nth time cereals have been fed. |
| date\_fed | date |  | NOT NULL |  | Date cereals were fed. |
| batch\_num | int | 12 | NOT NULL | fk | Batch number of the cereals used. |

Table Name: agrochemicals

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Field | Data Type | Size | NULL/NOT NULL | Constraints | Description |
| agrochem\_id | int | 12 | NOT NULL | pk | Unique id assigned to each agrochemical purchased. |
| purch\_date | date |  | NOT NULL |  | Date of purchase of this agrochemical. |
| cost | decimal | 5 | NOT NULL |  | Cost of the agrochemical. |
| chem\_units | int | 20 | NULL |  | Fertiliser ppm. |
| npk\_value | varchar | 8 | NULL |  | Fertiliser npk value. |
| cas\_num | int | 9 | NULL |  | CAS Number of the pesticide. |
| chem\_name | varchar | 5 | NULL |  | Name of the chemical. |

SQL Queries

* Code to view all cattle in order of tag number
* Sql code to view all cattle with previous owners, in descending order of their tags

This would be used when a farmer wants to see what cattle in his stock he bought in.

* Sql code to view all cattle with no previous owners, in descending order of their tags. This would be used when a farmer wants to see all the cattle he owns that he did not buy into his herd.
* Sql code for the farmer to view forage that was made from Field 1, Plot 1A
* Code to see the batch number and weight of all cereal purchase that cost more then 110 euro. This allows the farmer to see the correct weight he has to buy to stay near a certain price.
* This code allows the farmer to see the dates where he fed cattle more than two bales.
* Code to see total cost of all medicine.
* Code to see fertilisers used in order of cost.
* Code to see pesticides used in order of cost.