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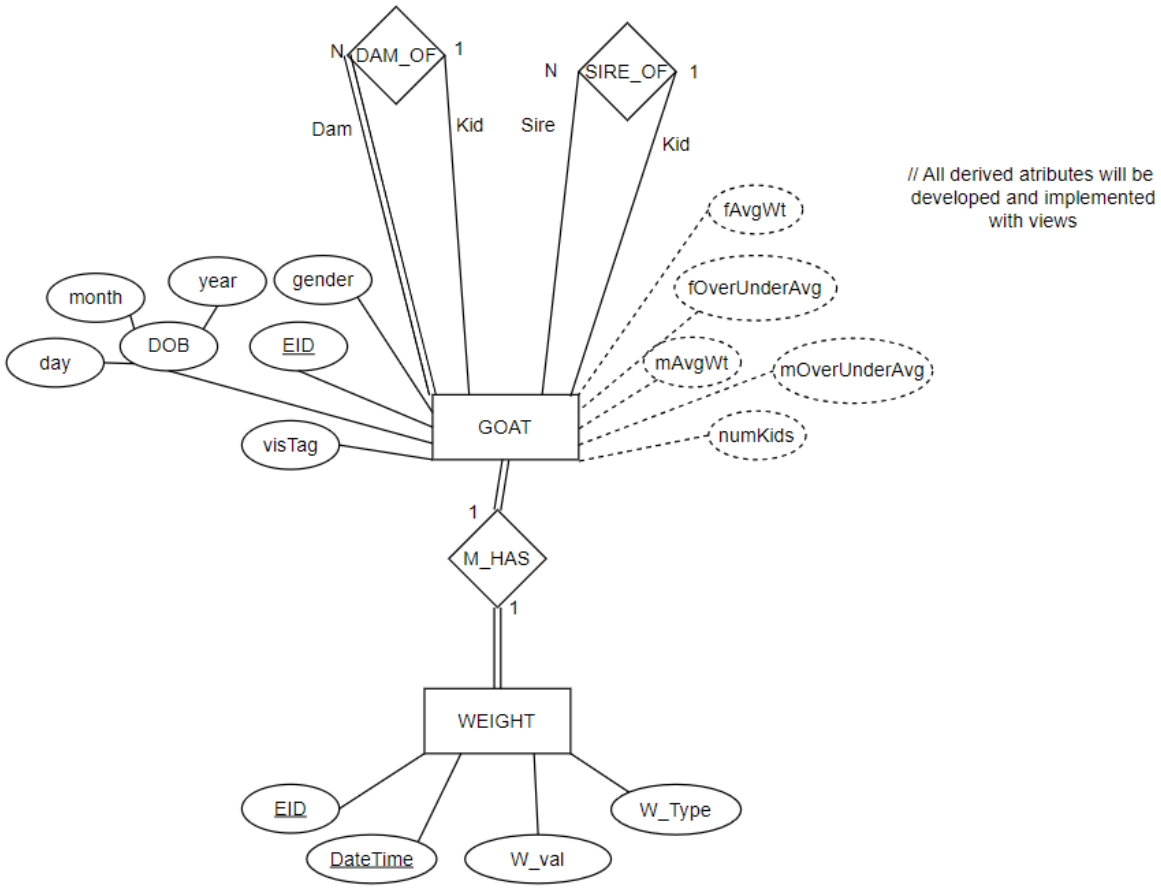
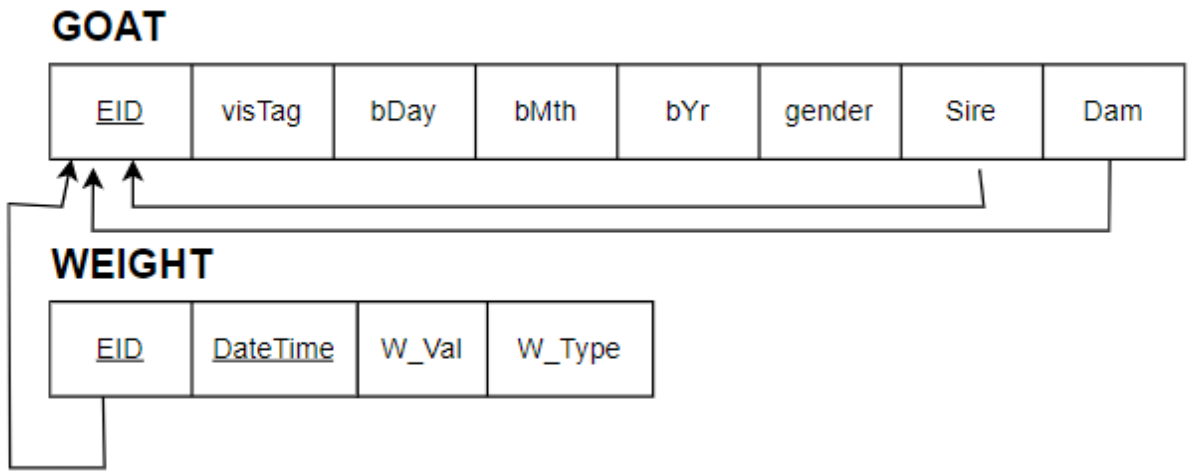
ER Diagram



Relational Schema

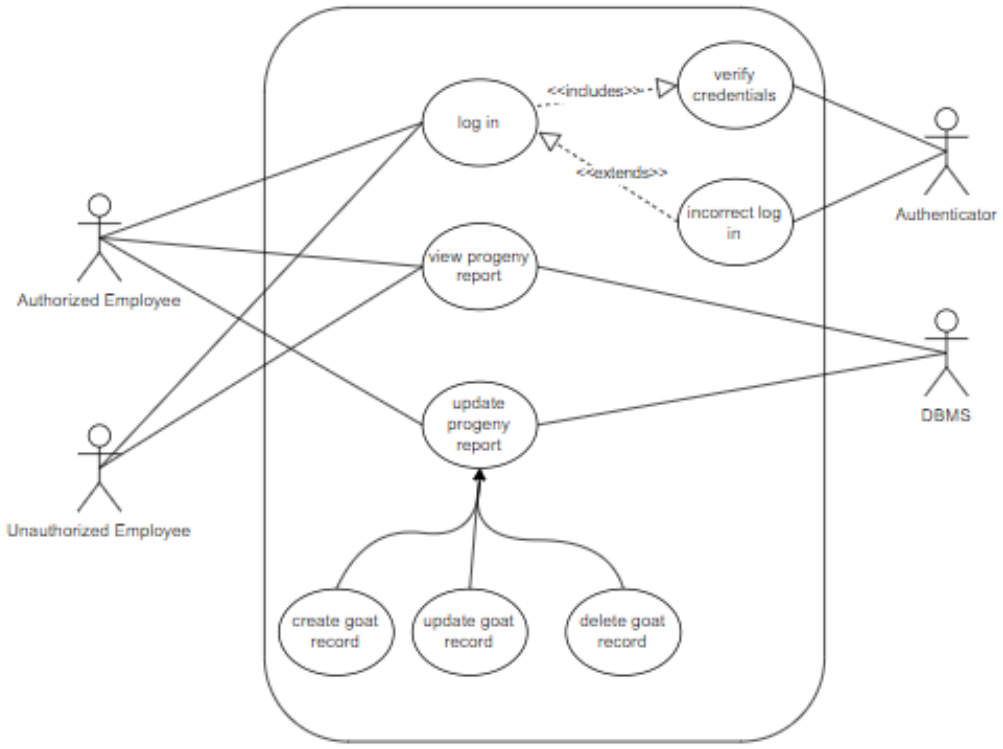


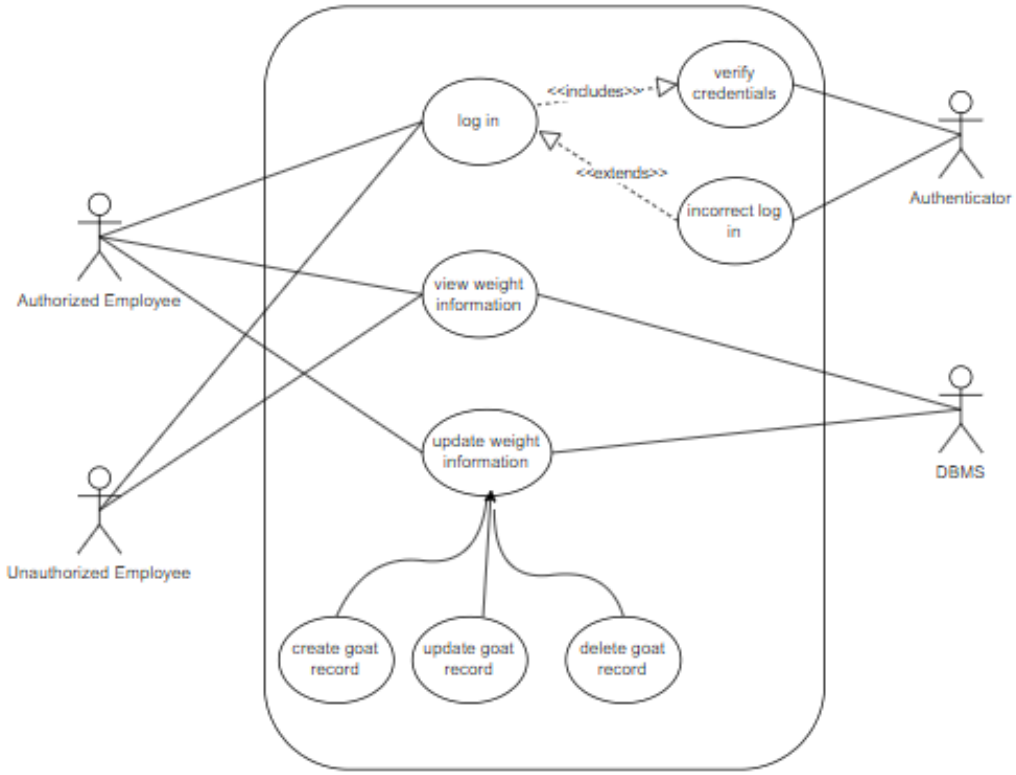
Estimations

To estimate the initial database size, each entity must be considered separately. For the Goat entity, the size will be roughly 208,000 bytes. This is because the attributes have a total of 26 bytes, and there are about 8,000 goat records in the existing database (26 * 8000 = 208,000). For the weight database, there will be approximately 1,430,000 bytes. This is because the attributes have a total of roughly 22 bytes, and there are about 65,000 weights in the existing database (22 * 65000 = 1,430,000).

For the number of search types per query, we first look at numKids. This would take about 1 reference to the relation of dam to kid, as we know not every sire has a kid. For mAvgWeight, we want to take the average weight of all the male goats, from these 65,000 weights, we will say about half the amount of weight to each goat with the average function counting all winter weights. Including all current weights, we find that the average function gives us an estimated weight per the amount of about 4000 goats. These same functions would apply to the dams, just with the search type gender applicable only to the dam. Each of these averages are referenced to compare to their most recent weight, whether it is their sale weight or winter weight, with about 4 references per 8000 goats, which would be about 32000 references to the goats being over or underweight.

UML Use Cases





Use case specification:

Use Case #1 employee view to add a goat to the progeny report:

1. The employee logs in
2. The log in verifies and the employee is now in the system
3. They click update goat information
4. They will click create goat record
5. They will then enter the relevant information for the goat
6. They can then back out and view the progeny report
7. They will be given a list of all goats and all relevant information, including the dams and any known sires that our database provides

Alternate scenarios:
2a. The log in fails, and asks to enter in valid credentials
4a. They could update a goat's information, to overwrite some piece of information about a goat relating to the progeny report.
4b. They could delete a particular goat from the database
7a. If the system encounters an issue retrieving data from the database, it will inform the user of the error and ask the user to try again.

Use Case #2 employee view to add a goat to the average weights of parents and kids:

1. The user logs in
2. The login is verified
3. They click update goat information
4. They will click create goat record
5. They will then enter the relevant information for the goat
6. They can then back out and view all weight information
7. They will be given a list of all goats with their weight information that our database provides, and also whether a goat is above, below, or of the average weight

Alternate scenarios:
2a. The log in fails, and asks to enter in valid credentials
4a. They could update a goat's information, to overwrite some piece of information, namely a weight for a goat.
4b. They could delete a particular goat from the database
7a. If the system encounters an issue retrieving data from the database, it will inform the user of the error and ask the user to try again.

Our database design and its sustainability:

Through the use of effective data management techniques customized for goat breeding and management, the database design shown above supports the presented sustainability objectives. By centralizing goat-related data, such as identity numbers, parentage information, and different weight measurements, the database simplifies access to critical information

needed to make well-informed decisions. The database gives users the ability to analyze data and find significant patterns and relationships between parent and child birth weights, which is an essential component of sustainable breeding methods. Stakeholders are able to prioritize productivity and herd health while reducing waste and potential dangers through the reference of this analytical functionality. In addition, the database's user-friendly interfaces guarantee accessibility and ease of use, creating a space that is favorable for moral decision-making and encouraging ethical animal farming methods.