



## **CS 319 - Object-Oriented Software Engineering**

### **Final Report**

#### ***ZooMaster***

#### **Group 3**

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## **1. Changes of the Design**

One of the most important design decisions was the removal of the DataStructure class. We have decided that rather than creating a data structure class, using database indexes such as a hash index on the allowed search keys, would save a lot of implementation time. This way, we are still able to implement fast search on our database and we have more time to enhance the remaining parts of the application. In addition to time efficiency, we also save from the runtime memory. Since database indexes do not use runtime memory, and the data structure would have been created in the runtime and maintain memory during the runtime, as number of tuples in the database grow, the memory which the data structure use would increase as well. This would lead to low performance and also security threats as an attacker could overload the system with high number of additions.

Second of the most important design decision was the removal of the weekly time table because we thought that plants and animals have to be feed and watered in a daily basis. So that we only keep their hour:minute work time. On the other hand, plants have also light time so that zookeepers can control their daily light circle during the day. Lastly we have changed our GUI based on these changes.

## **2. Complications during the Implementation**

One of the challenges is that store images into the database. In the beginning the database manager didn't work properly due to the problems related to the pictures. Then we solved the problem by storing the image as bufferedImage. Other problem is working on GUI in different IDEs because we divided the work. NetBeans has forms for easier GUI design and Eclipse has windowbuilder which is use only java code for the GUI. It is solved by adding screens written in Eclipse into NetBeans.

Another complication was that the GUI builder of NetBeans auto created all of the components into the same main form. This was defeating the entire purpose of object oriented design and causing 5 of our classes to be merged into one. So, we had to figure out a way which allowed us to use the GUI builder of the IDE at the same time as being able to split the components into different classes and be able to customize those classes at our own will. This combination of having control over our software while being able to benefit from automated features was eventually achieved by utilizing the beans feature of NetBeans.

Since, there were multiple developers of zoomaster, each of whom did their parts of the development process on their computers, it caused some problems when it came to combining those parts into one application. One such problem was that there was a difference of resolution on the computers of developers. This led to their GUI's developed been of different sizes. Hence, the sizes of GUI components needed to be changed to match each other.

### **3. User's Guide**

Zoomaster is a helper for zookeepers to store information about species and learn their feeding, water and light schedule from the database manager. It is simple, easy to learn how to use and it can store all the species information even their images. In order to run Zoomaster, the user needs to have Java Runtime Environment installed in his/her system along with the client version of mySQL. The rest of the libraries used in the development of the application will come packed in the jar file. So, all the user would have to do is to double click on the file to run the Zoomaster application. The user can perform the following actions in the application, once he/she has verified his/her identity at the password page. The default password of the application is "12345".

**Change Password:** The user can easily change the default password of the application by going to the "Change password" tab and filling in the required information their. This protects the database of the species against unauthorized tempering.

**Add Species:** Zookeeper can add new species into the database. Zoomaster supports 2 types of species. These are plants and animals. In order to add a new specie, all the user has to do is to click on the "Add" tab in the application, fill in the required data in the form displayed, and click on the "Add Specie" button. The user may choose to fill partial data of a particular specie.

**Plant Data:** Zoomaster holds the name, latin name, age, country of origin, gender, image, watering time, start light time, and end light time data of a plant. The user can choose which of this data he/she wants to store in the database. The unused data fields will be filled with default fields such as "NA".

**Animal Data:** Zoomaster holds the name, latin name, age, country of origin, gender, image, and feeding time data of an animal being added to the database. As with plants, the user can choose to fill in partial data for animals as well.

**Remove Species:** Zoomaster gives the user the ability to remove species from the database. This can be achieved by going to the search tab of the application, searching in the specie to be deleted, and clicking on the delete button right in front of that particular specie.

**Modify Species:** Zookeeper can also modify the species which have already been added to the database by going to the search tab of the application, typing in the name of the specie, clicking the edit button in front of the search result of the application, and then filling in the form which gets displayed.

**Search Species:** Zookeeper can further search the species in the database and get their information by going to the search tab and typing in the name of the specie in the search box.

**Detailed Information about Species:** In order to get the detailed information about any specie, the user has to go to the search tab, enter in the name of the specie, and then click on the information icon in front of the name of the specie to get its detailed information.

**Notify Zookeeper:** When Feeding, Watering, Begin-End of light time of plants is approximately 5 min away, Zoomaster notifies the zookeeper about it.