Zoo Database Management System

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Section I: Project Description

This zoo database management system project will focus on managing and keeping track of the animals, employees, time sheets of the employees, visitors, tickets, reservations, upcoming events, special experience, food inventory, diets, the medical records, medicine inventory of the animals in the zoo. The visitors will be able to create accounts, log in to the created account, buy the tickets, get the information about the animals, upcoming events at the zoo, make reservations and get refunds. After purchasing the tickets, the visitors will be able to view their ticket information, receipts, and the time of the events they plan to go. The manager and the employees at the zoo will be able to create accounts, record, view the amount of time they work, their schedule, receive announcements, messages and have access to all kinds of information about animals at the zoo. The manager will have access to the expenses around the zoo, the time sheets of all the employees and see if they come in to work on time or if they fulfilled the amount of time they are scheduled to work. The system will show the performance of the each of the employees and calculate the total payments of all the employees based on the amount of time they work. The system

will also inform the manager to order more food and medicine when they are about to be expired or short in supply.

Section II: Use Cases

Use Case 1:

This use case beings when the zoo manager, James, suspects that some of the employees at the zoo are not showing up to work on time, so he logs in to the system and checks the time sheets of the employees. He later found out that three of the employees, Jonny from cleaning department, animal trainer, Alex, and Mary who works as a visitor guide are leaving work early or showing up late to work. Using the system's message feature, James sent out a warning message to them about being late and noted down one warning has been given for being late under their performance. When Jonny, Alex and Mary log in to the system when they come to work, they saw that the warning message from James, the manager. After receiving the warning message, Jonny, Alex, and Mary shows up on time, leave work on time and work as they are scheduled to work.

Use Case 2:

This use case begins when Kevin wants to experience and do something fun with his family. Kevin and his family that includes his wife, Annie, his two kids, Mike who is 10 years old and William who is 13 years old, decided that they all want to visit to a zoo during the summer break. When Kevin goes on to zoo website, the zoo database system shows that there are many special experiences such as “Animal in Action Experience”, “Crazy About Cats”, “Exclusive VIP Experience” and “Early Morning Cheetah Experience” with the prices ranges from the lowest $50 to the highest $85 per person. The system’s database also shows the ticket prices and ticket options such as 1-day pass and 2-day pass with the prices of $40 to $100 per person. Kevin and his family decided to buy the 2-day pass tickets and “Animal in Action Experience” tickets for their visit to zoo. Before Kevin was able to purchase the tickets, the system asked Kevin to create an account or log in if he already has one. After creating the account and adding the tickets to the shopping cart, the system shows the total amount of $280. After that, the systems prompted Kevin to put in his debit/credit card information to purchase the tickets. He was able purchase the tickets after putting in the correct debit/credit card information. In his account, Kevin is able view his receipts, edit his profile and card information and change his password.

Use Case 3:

This use case beings when one of the zookeepers named Dennis noticed that one of the baby monkeys (Animal ID: BM12) that is normally very playful has been unusually quiet and has been eating little to none for a few days. Dennis informed James, the manager, using system's messaging feature about the baby monkey's condition, animal id and have it checked out by a veterinarian. James called the veterinary clinic and a veterinarian named John arrived a few hours later. James looked up the baby monkey in the database system by its id and showed all its information including its breed, age, and previous medical records to John. John looked at the previous medical records in the database system, examined the baby monkey. John concluded that one of the baby monkey's hands was hurt while playing, the reason it was not eating the normal amount of food is because of the pain and the lack of the food was weakening the baby monkey. John recorded the baby monkey's condition in the database and left the notes in the database system on how to take care of the baby monkey, what kind of food to feed, what medicine to give at what time. The fee charged by John was also added to the database under expenses by James. Dennis and other zookeepers were able to look at the notes left from John in the database when they log into their accounts. Under the guidelines from John and the care from the zookeepers, the baby monkey finally recovered and back to its playful self again.

Use Case 4:

This use case beings when one of the visitor guides, Amy, has been feeling unwell and decided that she is going stay home for two days and rest. Amy logged in to the system and informed the manager, James, that she is not feeling well using system's messaging feature and sent a request to take two days off. When James logged in to system, he saw the message and time-off request from Amy and approved the request. James later sent out a message to all the visitor guides that works at the zoo to see if anyone can work on the days Amy was taking the time off. Carlos replied to James' message and let him know that he can work on the days Amy is missing from work. James added two more days to Carlos's schedule in the database system. After that, Carlos can now see the two extra days in his schedule when he logged into his employee account.

Use Case 5:

This use case begins on when the storage clerk, Ryan, noticed that some of the animal food supply such as corn, vegetables and ground beef are running low, and medicines such as antibiotics from last year are expired. He later updated in the database that which foods are low in supply and which medicines are expired. As soon as Ryan updated the food supplies are running low and medicines are expired

in the database, the system notified James, the manager, to order more food and medicine supplies. James ordered required food and medicine supplies and updated in the database that food and medicine supplies have been ordered and added the estimate delivery date for those supplies so that Ryan is prepared to manage and store those supplies when they arrived. James also added the food supplies and medicines supplies cost to the database and the system will show the total expenses around the zoo from the start of the year and the start of the month to the present day.

Section III: Database Requirements

1. Zoo

    1.1 A zoo shall have many animals.

    1.2 A zoo shall have at least one employee.

    1.3 A zoo shall have at least one manager.

    1.4 A zoo shall have many visitors.

    1.5 A zoo shall have many special events.

    1.6 A zoo shall have many programs.

    1.7 A zoo shall have many members.

    1.8 A zoo shall take many donations.

    1.9 A zoo shall have many volunteers.

    1.10 A zoo shall at least one restaurant.

    1.11 A zoo shall have at least one garden.

    1.12 A zoo shall have at least one shop.

2. Visitor

    2.1 A visitor shall create only one account.

    2.2 A visitor shall be able to buy multiple tickets.

    2.3 A visitor shall be able to add multiple debit/credit card information.

2.4 A visitor shall be able to view multiple receipts.

2.5 A visitor shall be able to view their purchased tickets.

2.6 A visitor shall be able to request refunds for many tickets.

2.7 A visitors shall be able to join memberships.

2.8 A visitors shall be able reserve tickets.

2.9 A visitors shall be able to reserve tables at many restaurants.

3. Employee

3.1 An employee shall create only one account.

3.2 An employee shall have at least one role.

3.3 An employee shall have only one unique id.

3.4 An Employee shall be able to view their schedule.

3.5 An Employee shall be able to view the information of the animals.

3.6 An Employee shall be able to message zero or many other employees.

3.7 An Employee shall be able to view the food and medicine data in the database.

4. Manager

4.1 A manager shall create only one account.

4.2 A manger shall have only one unique id.

4.3 A manger is an employee.

4.4 A manager shall have access to one or more schedules.

4.5 A manager shall be able to edit one or more schedules.

4.6 A manager shall have one or more roles.

4.7 A manager shall have access to food and medicine data in the database.

4.8 A manager shall be able to edit or update the food and medicine data in the database.

4.9 A manger shall be able to add many expenses to database.

5. Account

5.1 An account shall be created by only one visitor.

5.2 An account shall be created by only one employee.

5.3 An account shall have one or more credit/debit card information.

5.4 An account shall have zero or more receipts.

5.5 An account shall have zero or more tickets.

5.6 An account shall be able to refund one or more tickets.

6. Ticket

6.1 A ticket shall be able bought by many visitors.

6.2 A ticket shall be refundable.

6.3 A ticket shall be reserved by many visitors.

6.4 A ticket shall have only one unique ticket number.

7. Credit/Debit information

7.1 One or more credit/debit information shall be linked to only one visitor.

61. One or more credit/debit information shall be edited by one visitor.

8. Receipt

8.1 A receipt shall be in one or many accounts.

8.2 A receipt can be viewed by only one visitor.

9. Refund

9.1 A Refund shall be requested by many visitors.

10. Role

10.1 A role shall be linked to many employees.

11. Schedule

11.1 Many schedules shall be created by only manager.

11.2 Many schedules shall be edited by only manger.

11.3 A schedule shall be viewed by only one employee.

11.4 Many schedules shall be accessed by only one manager.

12. Animal

12.1 An animal shall have one or many medical records.

12.2 An animal shall have only one unique id.

12.3 An animal shall have zero or many medicine it is taking.

12.4 An animal shall have one or many diets.

12.5 An animal shall have many pieces of information about them.

12.6 An animal shall be in many special events.

13. Message

13.1 A message shall be sent by zero or many employees.

14. Id

14.1 An id shall be linked to only one employee.

14.2 An id shall be linked to only one animal.

15. Food

15.1 A certain kind of food shall be consumed by one or many animals.

15.2 A certain kind of food shall have only one unique id.

15.3 A certain kind of food shall have at least one expiration date.

15.4 A certain kind of food shall have zero or many delivery dates.

16. Medicine

16.1 A medicine shall be for one or many animals.

16.2 A medicine shall have only one unique id.

16.3 A medicine shall have at least one expiration date.

16.4 A medicine shall have zero or many delivery dates.

17. Expiration date

17.1 An expiration date shall be linked to at least one kind of food.

17.2 An expiration date shall be linked to at least one medicine.

18. Delivery date

18.1 A delivery date shall be linked to at least one kind of food.

18.2 A delivery date shall be linked to at least one medicine.

19. Medical Record

19.1 A medical record shall be linked to at least one animal.

19.2 A medicine record shall be edited by many veterinarians.

20. Diet

20.1 A diet will be linked to at least one animal.

21. Special Events

21.1 A special event shall be held at many zoos.

21.2 A special event shall have at least one animal.

22. Program

22.1 A program shall be created by zoo.

22.2 A program shall belong to the zoo.

23. Member

23.1 A member shall have only one unique id.

23.2 A member shall be able to create account.

23.3 A member shall have access to at least one discounts.

23.4 A member shall have access to at least one exclusive program.

23.5 A member shall have at least one priority reservations.

23.6 A member shall be able to add multiple credit/debit card information.

23.7 A member shall be able to view multiple receipts.

23.8 A member shall be able to buy multiple tickets.

23.9 A member shall be able to request refund for at least one ticket.

23.10 A member shall be able reserve tables at least one restaurant.

23.11 A member shall be able to cancel a membership.

23.12 A member shall be able to rejoin/renew a membership.

24. Volunteer

24.1 A volunteer shall be able to create account

24.2 A volunteer shall have only one unique id.

24.3 A volunteer shall be able to create one account.

24.4 A volunteer shall be able to view one schedule.

24.5 A volunteer shall be able to get many discounts.

25. Donation

25.1 A donation shall be able to be made by many visitors.

25.2 A donation shall be able to be made by many members.

25.3 A donation shall be able to be made by many volunteers.

26. Donor

2.6.1 A donor can be a visitor.

26.2 A donor can be a member.

26.3 A donor can be a volunteer.

26.4 A donor can be a non-visitor or non-member or non-volunteer.

27. Restaurant

27.1 A restaurant shall be owned by a zoo.

27.2 A restaurant shall have at least one employee.

27.3 A restaurant shall have only one manager.

27.4 A restaurant shall have many customers.

28. Customer at a restaurant

28.1 A customer at a restaurant can be a visitor or a volunteer or a member.

29. Garden

29.1 A garden shall belong to zoo.

29.2 A garden shall have at least one kind of plant.

29.3 A garden shall be at least one gardener.

30. Shop

30.1 A shop shall belong to zoo.

30.2 A shop shall sell at least one item.

30.3 A shop shall have only one manager.

30.4 A shop shall have at least one employee.

31. Item

31.1 An item at the shop shall have a price.

31.2 Many items can be purchased by many visitors, members, and volunteers.

Section IV: Detailed List of Main Entities, Attributes and Keys

1. Visitor (Strong)
    - Visitor_id : key , numeric
    - name: composite, alphanumeric
    - dob: multivalve, timestamp
    - address: composite, alphanumeric
2. Ticket (Strong)
    - ticket_number: key, alphanumeric
    - ticket type: alphanumeric
    - ticket price: numeric
    - ticket_produced_date: composite, alphanumeric
3. Role (Strong)
    - role_id: key, numeric
    - description: alphanumeric
    - role_department: alphanumeric
4. Account (Weak)
    - Acc_ id: key,numeric
    - visitor: key, numberic
    - role: key, numeric
5. Animal (Strong)

- Animal_ id: key, numeric
- type: composite, alphanumeric
- name: composite,alphanumeric
- medical_record: key, numeric

6. Employee (Strong)
    - Employee_Id: key, numeric
    - SSN: key, numeric
    - name: composite, alphanumeric
    - dob: multivalue, timestamp
    - address: multivalue, alphanumeric
    - performance: key, numeric
    - role: key, numeric
7. Manager (Strong)
    - Manager_Id: key, numeric
    - name: composite, alphanumeric
    - SSN: key, numeric
    - role: key, numeric
    - dob: multivalue, timestamp
    - address: multivalue, alphanumeric
8. Items (Strong)

Item_Id: key, numeric

name: composite, alphanumeric

price: numeric

9. Receipts (Weak)
    - Receipt_id: key, numeric
    - Account: key, numeric
    - Visitor: key, numeric
    - Credit/debit: key, numeric
10. Credit/Debit Card information (Weak)
    - Visitor: key, numeric
    - Account: key, numeric
    - Card_number: numberic
    - Expiration_date: multivalue, timestamp
    - security_code: numeric
11. Medical Record (Weak)

    Animal: key, numeric

    Description: alphanumeric

    Date: multivalue, timestamp
12. Food (Strong)
    - Food_id: key, numeric

- Food_type: composite, alphanumeric
- Expiration_date: mulitvale, timestamp
- Delivery_date: key, numeric

13. Medicine (Strong)
    - medicine_id: key, numeric
    - medicine_type: alphanumeric
    - expiration_date: multivalue, timestamp
    - delivery_date: key, numeric
14. Restaurant (Strong)
    - Restaurant_id key, numeric
    - name: composite, alphanumeric
    - manager: key, numeric
15. Shop (Strong)
    - Shop_id : key, numeric
    - Shop_name: alphanumeric
    - Manager: key,numeric
16. Donation (Weak)
    - Donor: key, numeric
    - Donation_amount: numeric
    - Description: alphanumeric

17. Donor (Strong)

- donor_id: key,numeric
- name: composite, alphanumeric
- address: multivalue, alphanumeric

18.Member (Strong)

- Member_id: key, numeric
- Name: composite, alphanumeric
- Dob: mulitvalue, timestamp
- Address: multivalue, alphanumeric

19. Volunteer (Strong)

- Voluenteer_id: key, numeric
- Name: composite, alphanumeric
- Dob: multivalue, timestamp
- Address: multivalue, alphanumeric

20. Program (Strong)

- Program_id: key, numeric
- Program_name: composite, alphanumeric
- start_date: multivalue, timestamp
- start_time: multivalue, timestamp
- end_time: multivalue, timestamp

21.Special Events (Strong)

- Event_id: key, numeric
- Event_name: composite, alphanumeric
- start_date: multivalue, timestamp
- start_time: multivalue, timestamp
- end_time: multivalue, timestamp

22. Refunds (Weak)

- Visitor: key, numeric
- Account: key numeric
- Credit/debit card: key, numeric

23.Schedules (Weak)

- Employee: key, numeric
- work_hour: numeric
- start_time: numeric
- end_time: numeric
- date: mulitvalue,timestamp

24. Delivery Date (Weak)

- Medicine: key, numeric
- Food: key, numeric
- Date: mulitvalue, timestamp

25.Plant (Strong)

26. Expense (Strong)

- expense_id: key, numeric
- Amount: numeric
- Description: alphanumeric

27. Performance (Weak)

- Employee: key, numeric
- Description: alphanumeric
- Warning_total: numeric
- Award_total: numeric

Section V: Entity Relationship Diagram (ERD)