Project Design

University of British Columbia – Okanagan Campus
COSC 304 – Introduction to Databases – Prof. Dr. Ramon Lawrence – 2018

Names revoed

Table of Contents

1 Introduction 3

1.1 Mission Statement 3

1.2 Executive Summary 3

2 Domain Assumptions 4

2.1 User 4

2.2 Products (Animals) 4

2.3 Storage / Warehouses 4

2.4 Shipping 4

2.5 Payment 4

2.6 Legal 4

3 Data Model 5

3.1 UML Diagram 5

3.2 Entity Descriptions 6

3.3 Relational Assumptions 7

5 Known Issues 9

6 User Walkthrough 9

7 Implemented Features 18

1 Introduction

1.1 Mission Statement

Our vision is to provide people all over the world with animals from all over the world; to build a web-based store where people can discover any animal that they might want to buy. Users should be able to create and manage their accounts. The system should also provide administrative functions for managing animals, customers, and orders. We also aspire to provide extensive reporting capabilities that will help managers make great business decisions.

1.2 Executive Summary

ZooBC is a web-based store which sells animals that come from all over the world. We hope to achieve in satisfying our customers by delivering animals in a timely manner and in a humane method. We facilitate purchases by ensuring that the deliveries are secured because we work only one shipping company to avoid any complications that may arise in working with multiple companies.

The *ZooBC* store provides a simple navigation for customers to peruse through the available contents. While shopping, customers can filter by animal classification, type, size or price range. Providing a value in the search bar allows for a direct search by animal name or further refining of the search filters. The search results include a list of animals with an animal image, name, classification, type, size, and price; with the ability to add the animal to the cart.

A more detailed animal profile can be access by clicking on the animal image or animal name. The animal profile provides the same information as the search results, plus the animal's diet, origin, and description. Customer reviews and ratings of the animal can also be found on the animal profile.

Upon checkout, orders are populated using the default information from the user profile. The orders can be processed by entering their credit card information; the format is validated.

An account section provides all users with the ability to update their personal profile, view their orders, and review animals that they have purchased before.

Administrators are also provided with a series of reports and maintenance related functions. The objective here is to provide the administrator with reports that clearly indicate which animals are most popular, or which animals are bringing in the most revenue. The wide range of administrative functions are intended to allow most administrative tasks to be performed

2 Domain Assumptions

2.1 User

- A user will log in using a unique email address.
- A customer cannot have more than one shopping cart at a time.

2.2 Products (Animals)

- Animals will be the only product ever sold by ZooBC.
- An “Animal” refers to a product model.
- The animals for sale are mass-produced and not unique to the buyer.

2.3 Storage / Warehouses

- Animals are stored and stocked in 3rd party warehouses unrelated to this domain.
- Each warehouse maintains a large supply of every animal offered.

2.4 Shipping

- Animal pickups at warehouses is not permitted; they can be delivered only.
- Orders are shipped to the same user who placed the order.
- The user’s profile address will be used as the default shipping address but can be edited.
- The animals are delivered directly to the order’s shipping address.
- Shipments are handled by one 3rd party shipping company for all countries.
- Ground and air transportation options are available for all animals of all sizes.
- Shipping costs are based solely on the transportation type.
- The health of the animals is maintained by the shipping provider.

2.5 Payment

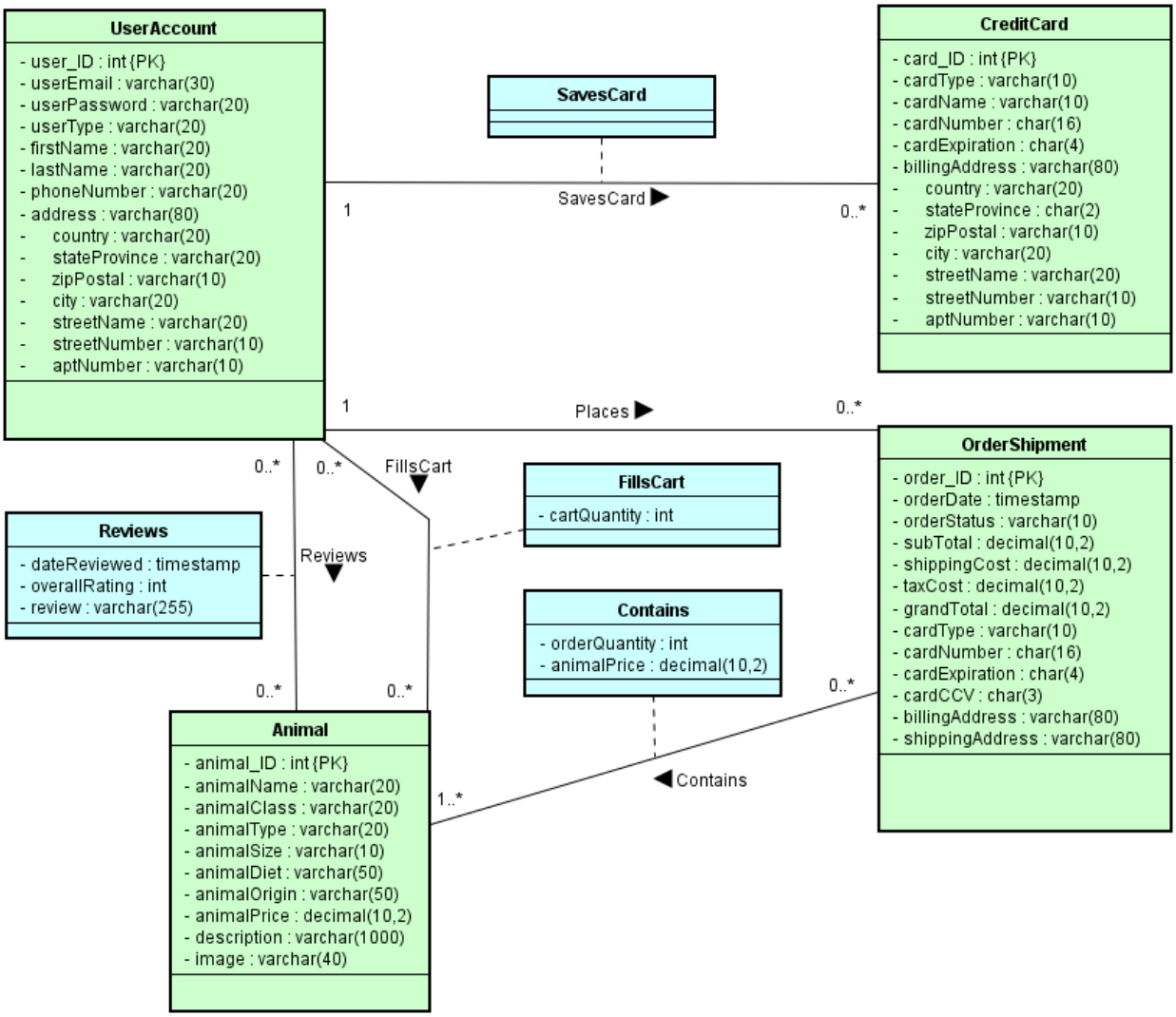
- All transactions will be processed using a credit card (VISA, Mastercard, AMEX).
- VISA and Mastercard numbers must be 16 digits. Amex number must be 15 digits.
- All transactions are advertised and processed using CAD currency.
- A blanket tax rate of five percent is used for all orders.
- Returns or refunds will not be accepted.

2.6 Legal

- Verification of government permits for importing or exporting animals is not required.

3 Data Model

3.1 UML Diagram



3.2 Entity Descriptions

UserAccount	
Attribute	**Description**
user_ID (Primary Key)	Uniquely identifies a user. Auto-increments during account creation.
userEmail	Used for account access. Should match a@a.com format.
userPassword	Used for account access. Should be at least 5 characters long.
userType	Identifies the user account type. [Administrator, Customer]
firstName	First name of the user. First letter should be stored as upper case.
lastName	Last name of the user. First letter should be stored as upper case.
phoneNumber	Phone number of the user. Stored as a string. Should match ### - ### - #### format.
address	The address of the user. Composite key containing the sub-attributes below.
country	The country that the user lives in. Used as default for shipping.
stateProvince	The state or province that the user lives in. Used as default for shipping.
zipPostal	The zip or postal code for the user's address. Used as default for shipping.
city	The city, town, or village that the user lives in. Used as default for shipping.
streetName	The name of the street that the user lives on. Used as default for shipping.
streetNumber	The house or building number of the user's address. Used as default for shipping.
aptNumber	The suite, condo, or apartment number for the user's address. Optional.

Animal	
Attribute	**Description**
animal_ID (Primary Key)	Uniquely identifies an animal name (model). Auto-increments when adding to Animal.
animalName	The name of the animal (model). [Frog, Eagle, Piranha, Starfish, Mammoth, Chameleon]
animalClass	Defines the type of animal. [Amphibians, Aves, Fish, Mammals, Reptiles]
animalType	Defines the type of the animal.
animalSize	Defines the size of the animal. [Tiny, Small, Medium, Large, Giant]
animalDiet	Defines what the animal primarily eats.
animalOrigin	Defines where the animal originally lives or can be found.
animalPrice	The pre-tax price of the animal for the customer.
description	A lengthy description (up to 1000 characters) of the animal.
image	File path to the animal image.

CreditCard	
Attribute	**Description**
card_ID (Primary Key)	Uniquely identifies a credit card stored by a user.
cardType	Defines the type of credit card. [VISA, Mastercard, AMEX]
cardName	The nick name of the card as specified by the user.
cardNumber	The credit card account number. Entered as #### #### #### #### but trimmed after.
cardExpiration	The expiration year and month of the credit card. Stored in MMYY format.
billingAddress	The credit card's billing address. Composite key containing the sub-attributes below.
country	The country for the credit card's address. Used to help determine the tax rate.
stateProvince	The state or province for the credit card's address. Used to help determine the tax rate.
zipPostal	The zip or postal code for the credit card's address.
city	The city, town, or village for the credit card's address.
streetName	The name of the street for the credit card's address.
streetNumber	The house or building number for the credit card's address.
aptNumber	The suite, condo, or apartment number for the credit card's address. Optional.

OrderShipment	
Attribute	**Description**
order_ID (Primary Key)	Uniquely identifies an order. Auto-incremented when adding to Order.
orderDate	The date and time that the order was placed. Determined by server at time of purchase.
orderStatus	The status of the order. Administrators can modify. [In Process, Shipped, Delivered]
subTotal	The total cost of the order before taxes and shipping costs.
shippingCost	The shipping cost determined by the shipping method selected by the customer.
taxCost	The cost of taxes for the order. Calculated by multiplying the tax rate with the sub-total.
grandTotal	The overall cost of the product (animal) sub-total, shipping cost, and taxes.
cardType	Defines the type of credit card. [VISA, Mastercard, AMEX]
cardNumber	The credit card account number. Entered as #### #### #### #### but trimmed after.
cardExpiration	The expiration year and month of the credit card. Stored in MMYY format.
cardCCV	The **C**ard **V**erification **V**alue number found on the back of the credit card in ### format.
billingAddress	The billing address for the order. **Stored at the time of purchase**.
shippingAddress	The shipping address for the order. **Stored at the time of purchase**.

FillsCart	
Attribute	**Description**
cartQuantity	The quantity of a specific animal (model) added to the user's shopping cart.

OrderContains	
Attribute	**Description**
orderQuantity	The quantity of a specific animal (model) added to the order.
animalPrice	The price of the animal at the time of order.

Reviews	
Attribute	**Description**
dateReviewed	The date and time that the user left a review on the animal (model) received.
overallRating	A rating between 1 and 5 (lowest to highest) of the animal (model) received. [1, 2, 3, 4,5]
review	A descriptive review of the animal. One review per an animal, per a user - after purchase.

3.3 Relational Assumptions

Relationship	Description
UserAccount **FillsCart** → Animal	A user can have zero to many animals in their shopping cart. An animal can be in zero to many users' shopping carts.
UserAccount **Reviews** → Animal	A user can review zero to many animals. An animal can have zero to many reviews.
UserAccount **SavesCard** → CreditCard	A user can save zero to many credit cards. A credit card can only belong to one user.
UserAccount **Places** → OrderShipment	A user can place zero to many orders / shipments. An order / shipment can only be placed by one user.
OrderShipment **Contains** → Animal	An order / shipment must contain at least one animal. An animal may be on zero to many orders / shipments.

4 Relational Schema – DDL

```
DROP TABLE IF EXISTS SavesCard;
DROP TABLE IF EXISTS CreditCard;
DROP TABLE IF EXISTS FillsCart;
DROP TABLE IF EXISTS Reviews;
DROP TABLE IF EXISTS OrderContains;
DROP TABLE IF EXISTS OrderShipment;
DROP TABLE IF EXISTS UserAccount;
DROP TABLE IF EXISTS Animal;

CREATE TABLE Animal (
        animal_ID INTEGER IDENTITY,
        animalName VARCHAR(20),
        animalClass VARCHAR(20),
        animalType VARCHAR(20),
        animalSize VARCHAR(10),
        animalDiet VARCHAR(50),
        animalOrigin VARCHAR(50),
        animalPrice DECIMAL(10,2),
        description VARCHAR(1000),
        animalImage VARCHAR(40),
        PRIMARY KEY (animal_ID)
);

CREATE TABLE UserAccount (
        user_ID INTEGER IDENTITY,
        userEmail VARCHAR(30),
        userPassword VARCHAR(20),
        userType VARCHAR(20),
        firstName VARCHAR(20),
        lastName VARCHAR(20),
        phoneNumber VARCHAR(20),
        address VARCHAR(80),
        country VARCHAR(20),
        stateProvince VARCHAR(20),
        zipPostal VARCHAR(10),
        city VARCHAR(20),
        streetName VARCHAR(20),
        streetNumber VARCHAR(10),
        aptNumber VARCHAR(10),
        PRIMARY KEY (user_ID),
        UNIQUE (userEmail)
);

CREATE TABLE OrderShipment (
        order_ID INTEGER IDENTITY,
        orderDate DATETIME,
        orderStatus VARCHAR(10),
        subTotal DECIMAL(10,2),
        shippingCost DECIMAL(10,2),
        taxCost DECIMAL(10,2),
        grandTotal DECIMAL(10,2),
        cardType VARCHAR(10),
        cardNumber CHAR(16),
        cardExpiration CHAR(4),
        cardCCV CHAR(3),
        billingAddress VARCHAR(80),
        shippingAddress VARCHAR(80),
        user_ID INTEGER,
        PRIMARY KEY (order_ID),
        FOREIGN KEY (user_ID)
           REFERENCES UserAccount(user_ID)
           ON DELETE NO ACTION ON UPDATE CASCADE,
);

CREATE TABLE OrderContains (
        order_ID INTEGER,
        animal_ID INTEGER,
        orderQuantity INTEGER,
        animalPrice  DECIMAL(10,2),
        PRIMARY KEY (order_ID, animal_ID)
);

CREATE TABLE Reviews (
        user_ID INTEGER,
        animal_ID INTEGER,
        dateReviewed DATETIME,
        overallRating INTEGER,
        review VARCHAR(255),
        PRIMARY KEY (user_ID, animal_ID),
        FOREIGN KEY (user_ID)
           REFERENCES UserAccount(user_ID)
           ON DELETE NO ACTION ON UPDATE CASCADE,
        FOREIGN KEY (animal_ID)
           REFERENCES Animal(animal_ID)
           ON DELETE NO ACTION ON UPDATE CASCADE
);

CREATE TABLE FillsCart (
        user_ID INTEGER,
        animal_ID INTEGER,
        cartQuantity INTEGER,
        PRIMARY KEY (user_ID, animal_ID),
        FOREIGN KEY (user_ID)
           REFERENCES UserAccount(user_ID)
           ON DELETE NO ACTION ON UPDATE CASCADE,
        FOREIGN KEY (animal_ID)
           REFERENCES Animal(animal_ID)
           ON DELETE NO ACTION ON UPDATE CASCADE
);

CREATE TABLE CreditCard (
        card_ID INTEGER IDENTITY,
        cardType VARCHAR(10),
        cardName VARCHAR(10),
        cardNumber CHAR(16),
        cardExpiration CHAR(4),
        billingAddress VARCHAR(80),
        country VARCHAR(20),
        stateProvince CHAR(2),
        zipPostal VARCHAR(10),
        city VARCHAR(20),
        streetName VARCHAR(20),
        streetNumber VARCHAR(10),
        aptNumber VARCHAR(10),
        user_ID INTEGER,
        PRIMARY KEY (card_ID)
);

CREATE TABLE SavesCard (
        user_ID INTEGER,
        card_ID INTEGER,
        PRIMARY KEY (user_ID, card_ID),
        FOREIGN KEY (user_ID)
           REFERENCES UserAccount(user_ID)
           ON DELETE NO ACTION ON UPDATE CASCADE,
        FOREIGN KEY (card_ID)
           REFERENCES CreditCard(card_ID)
           ON DELETE NO ACTION ON UPDATE CASCADE
);
```

5 Known Issues

- The login page did not get finished. Although the site is set up for multiple users. The user is fixed as user_ID = 1
- The ability to store user credit cards for quick use during checkout is incomplete.
- The Manage Animals page can add an animal but the ability to update or delete is existing animals incomplete.
- When adding new animals, images cannot be uploaded. Also, the description box is not ideal for long strings.
- The Manage Users page does not properly retrieve the profile of other users.
- All users can see the administrative functions.
- When reviewing an animal, the animal name is placed in an input box to pass it as a parameter in the URL. The name should be fixed. The review will not succeed.
- The restore database link is not working properly.
- SQL script should be used for all the filters in the Shop Animals page to accommodate for new animals being added.
- The arrow buttons on the shop animals page were placed there as triggers for sorting the animal list. That feature is incomplete.

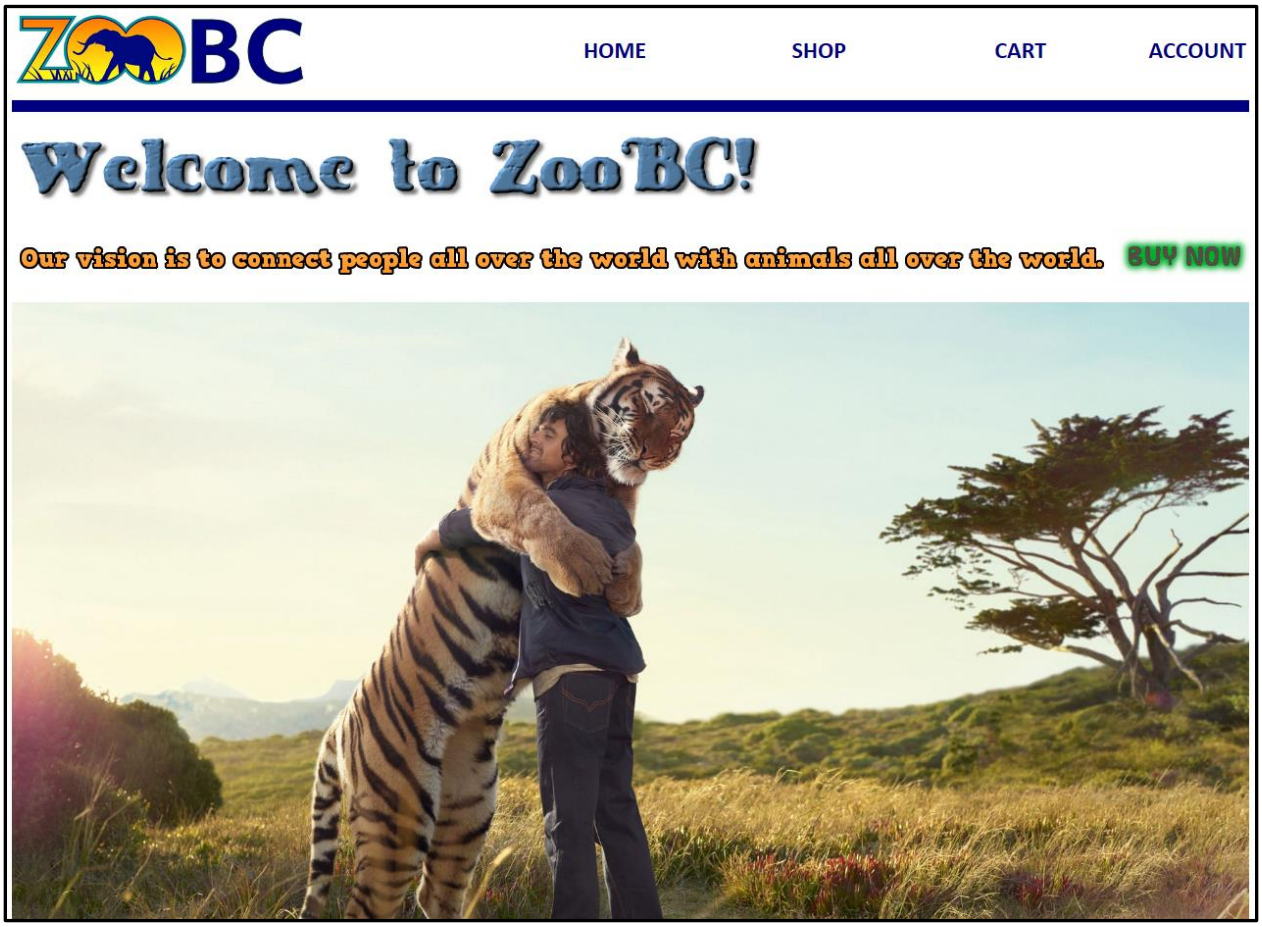
6 User Walkthrough

Visit the link http://cosc304.ok.ubc.ca/29164977/tomcat/ZooBC/WebContent/ZooBC.jsp

Below is the list of users pre-loaded into the database using inserts with the DDL:

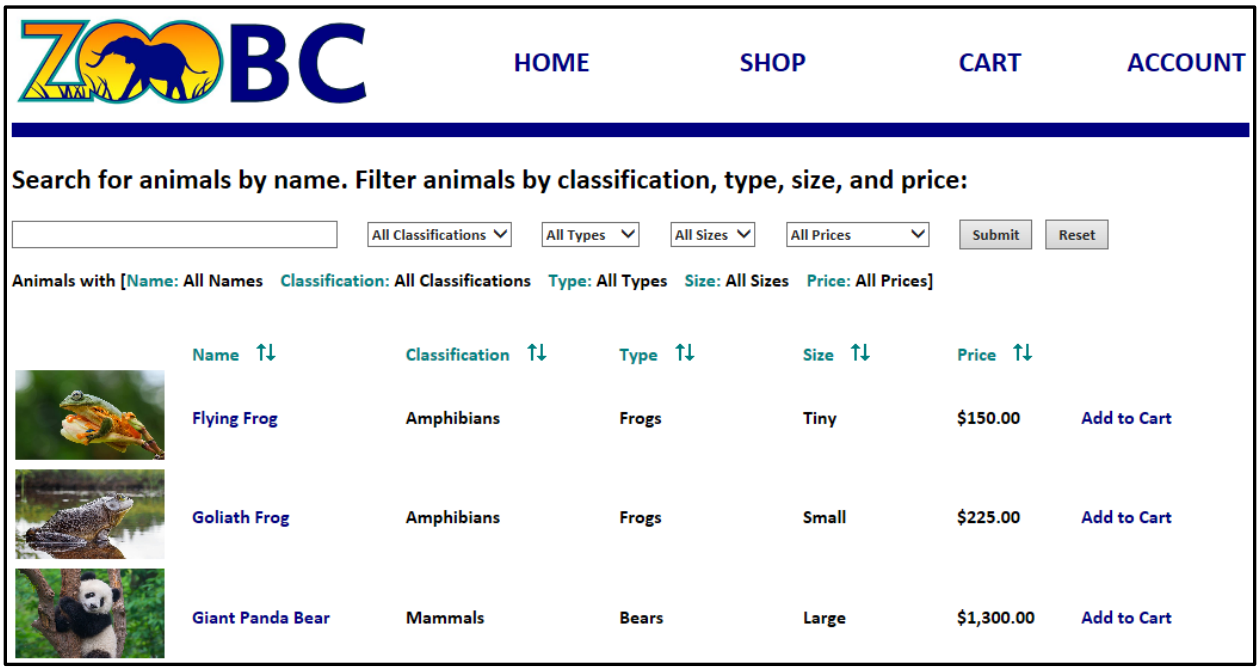
User ID	Email	Password	User Type	First Name	Last Name
1	admin@zoobc.ca	adminpass	Administrator	Paying	Administrator
2	customer@zoobc.ca	customerpass	Customer	Paying	Customer
3	keeper@zoobc.ca	keeperpass	Customer	Zoo	Keeper

Below is a screenshot of the website home page (ZooBC.jsp):



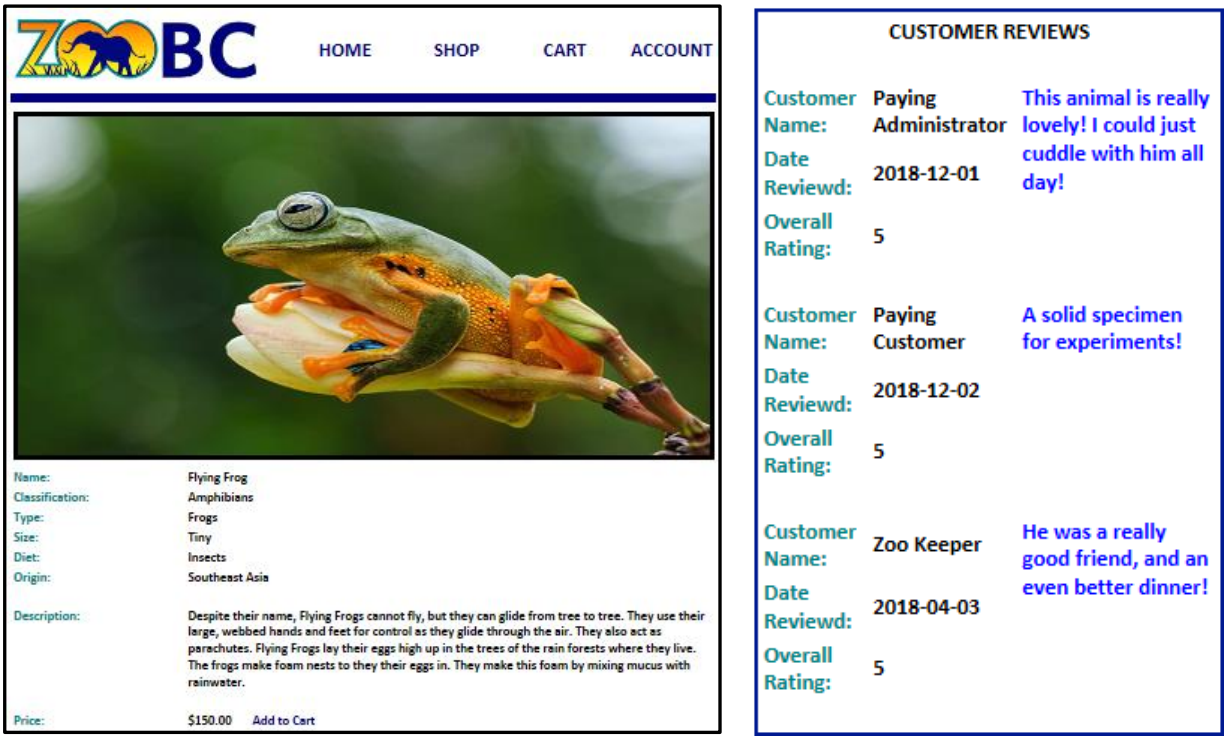
To begin shopping, click on either the "**SHOP**" link in the header, or on the "**BUY NOW**" image.

Below is a screenshot of the page used for browsing or searching for animals (ShopAnimals.jsp):



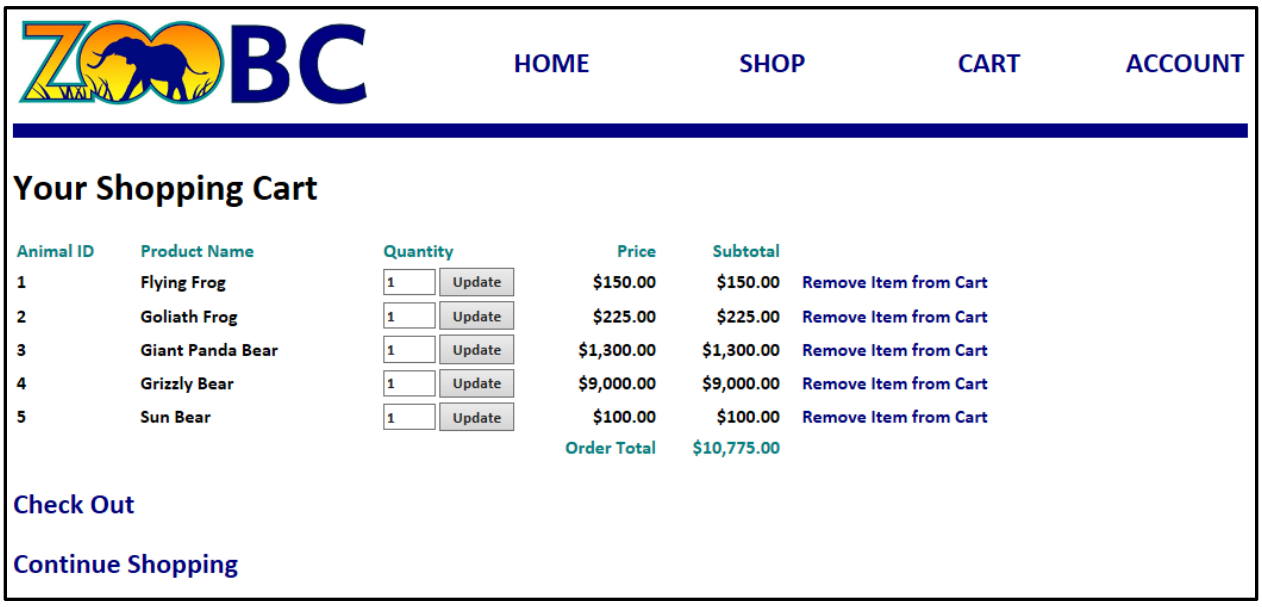
An animal can be searched by **name** and filtered by **classification**, **type**, **size**, or **price range**.
An animal can be added to the shopping cart by clicking on the "**Add to Cart**" link.
More details about an animal can be accessed by clicking on the "**Animal Name**" or its image.

Below is a screenshot of the animal profile page (Product.jsp):



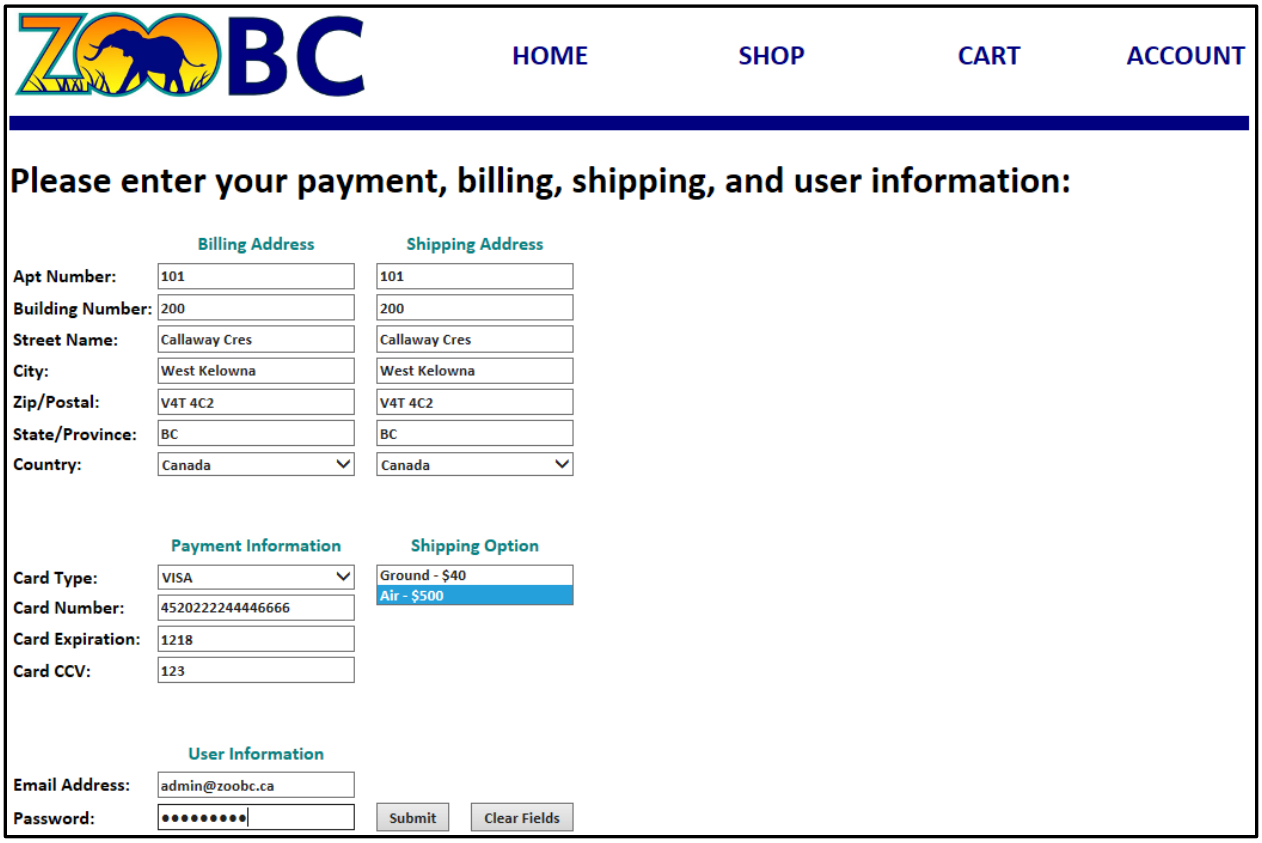
An animal can also be added to the shopping cart here by clicking on the "**Add to Cart**" link.
Adding an animal to the shopping cart will immediately redirect the user to view the cart.

Below is a screenshot of the shopping cart page (ViewCart.jsp):



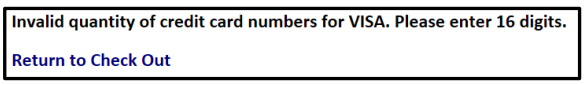
From here, the quantity of each animal on the order can be updated by adjusting the value in the quantity field and clicking on the "**Update**" button next to it. Alternatively, the animals can be removed from the shopping cat by clicking on the "**Remove Item from Cart**" link.

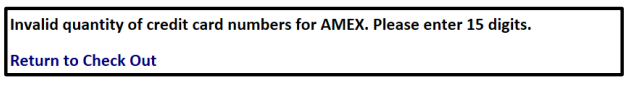
Below is a screenshot of the checkout page (Checkout.jsp):

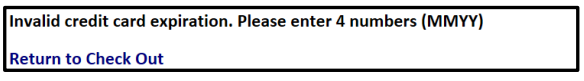


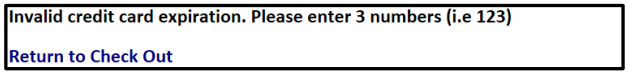
The billing address and shipping address are automatically populated based on the address found in the user's profile. They can be manually updated here by replacing the existing values.

The credit card information is validated for number of digits in the credit card number, the format of the expiration, and the format of the CCV number. Additionally, a check is done to ensure a shipping option has been selected. If validations are passed, clicking on the "Submit" button will process the order.

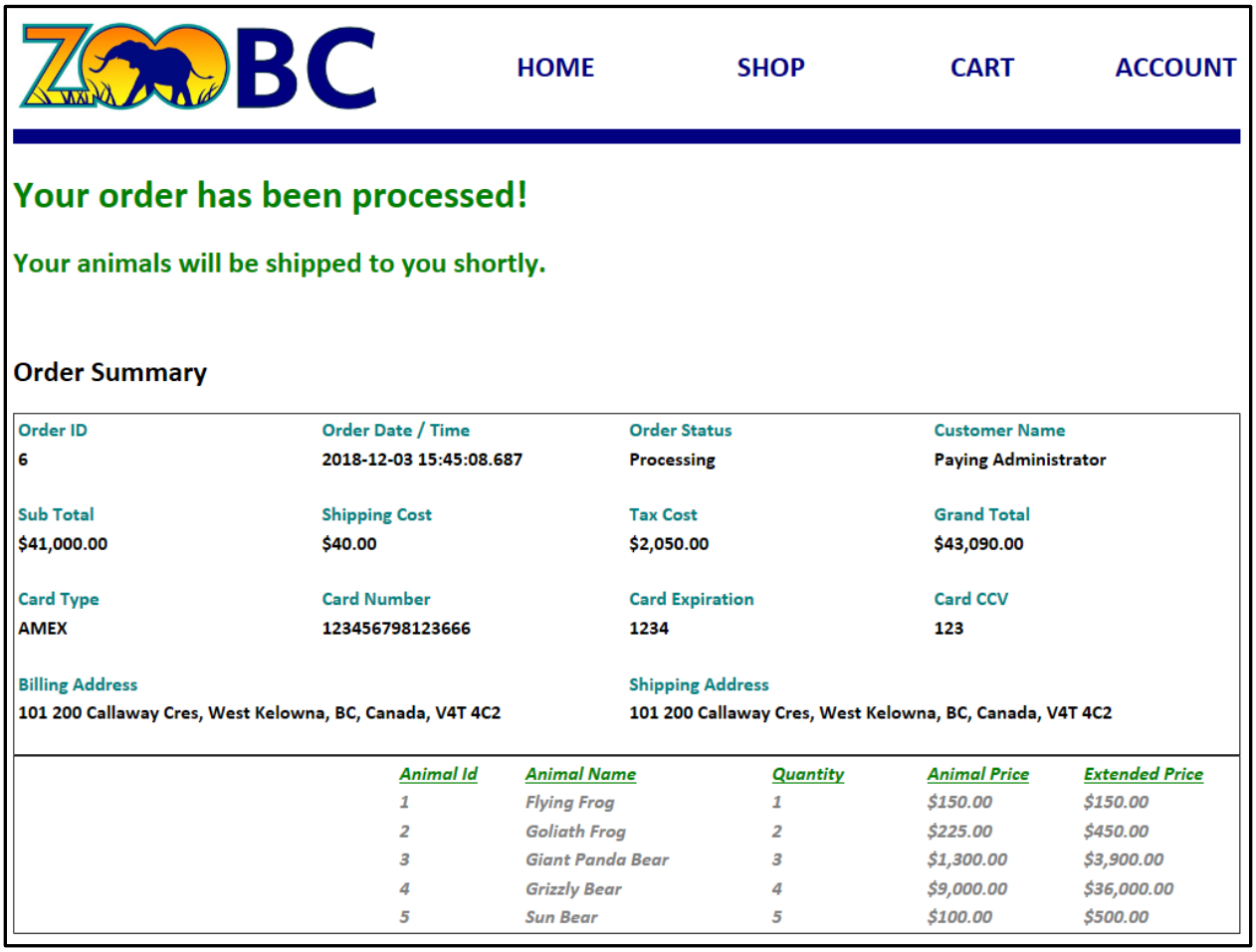




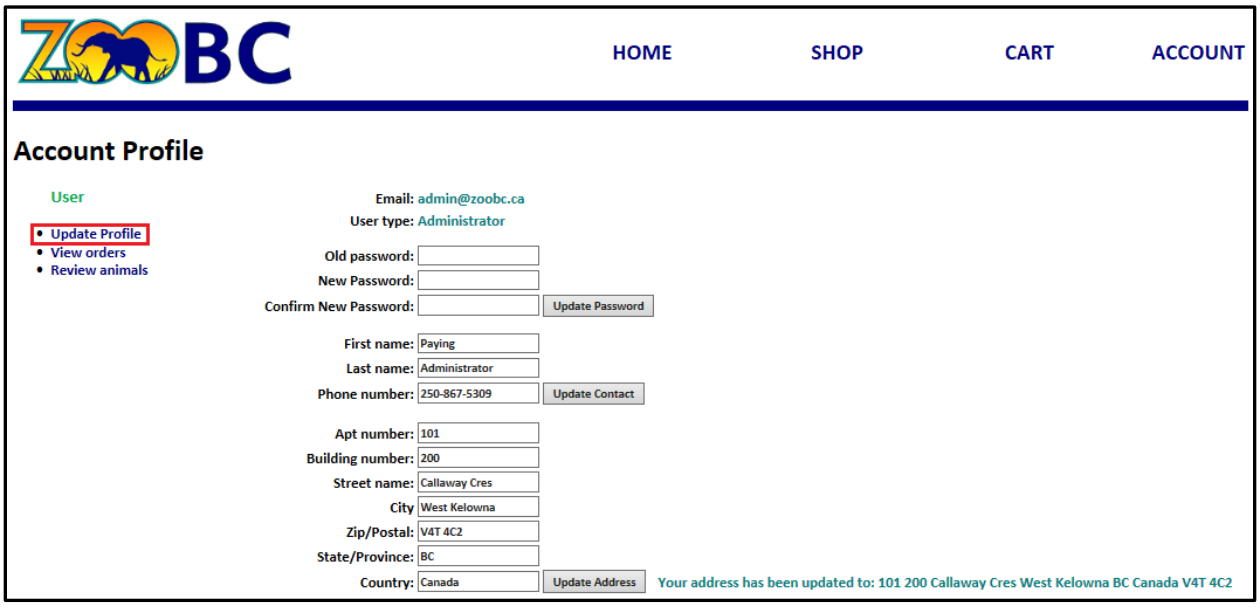




Below is a screenshot of the order summary (Order.jsp):

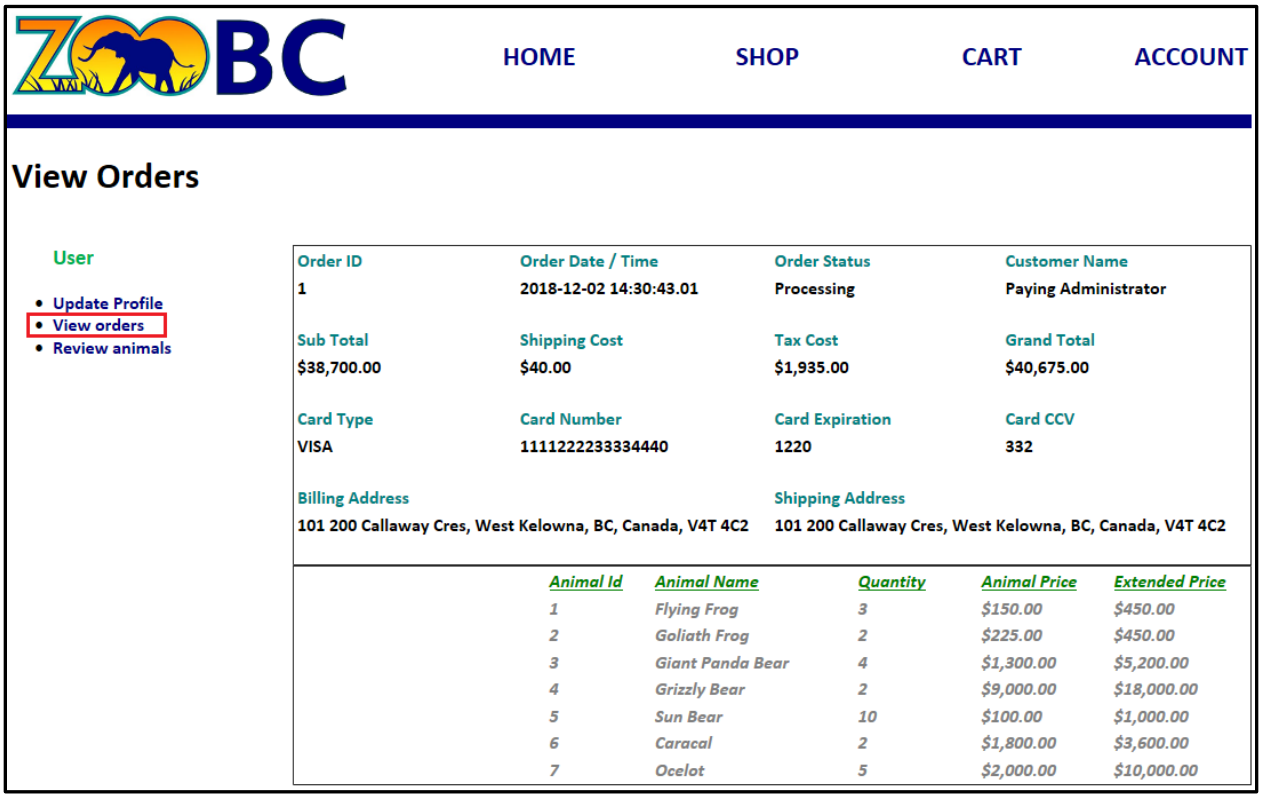


Clicking on the "**ACCOUNT**" link will redirect the user to a page with account related functions. Below is a screenshot of the default screen for the account page (UserProfile.jsp):

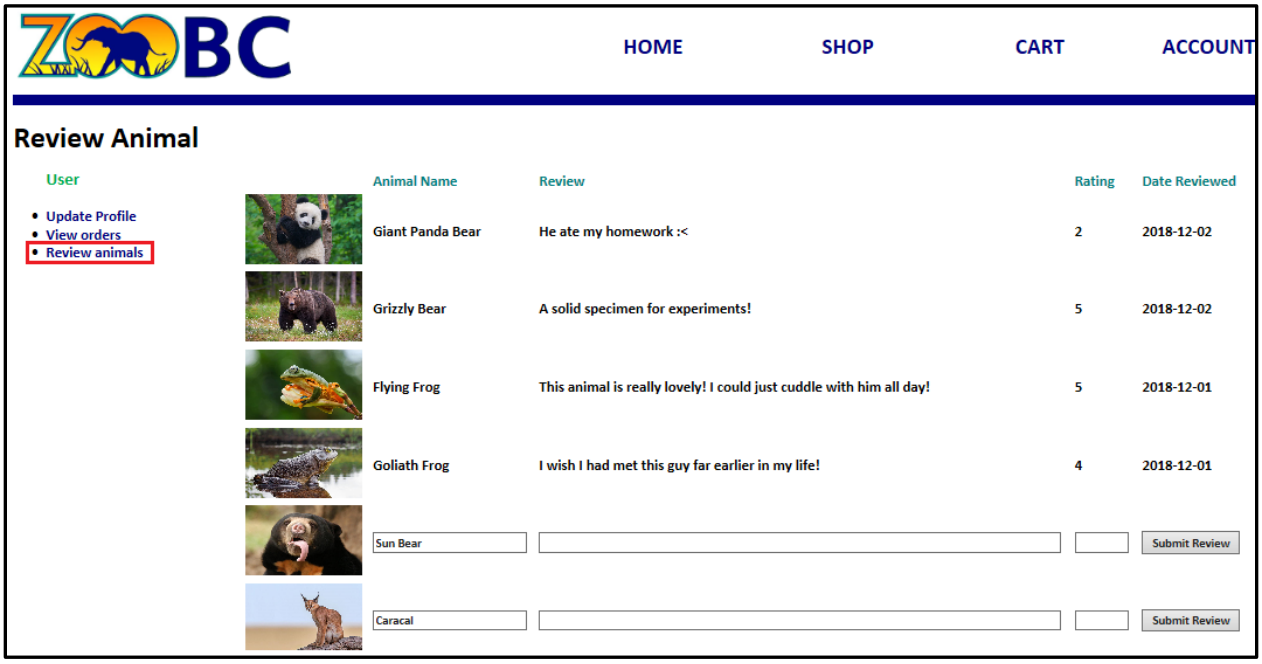


The user can update their password, contact information, or address.

Below is a screenshot of the page where the user can view their orders (ViewOrders.jsp):



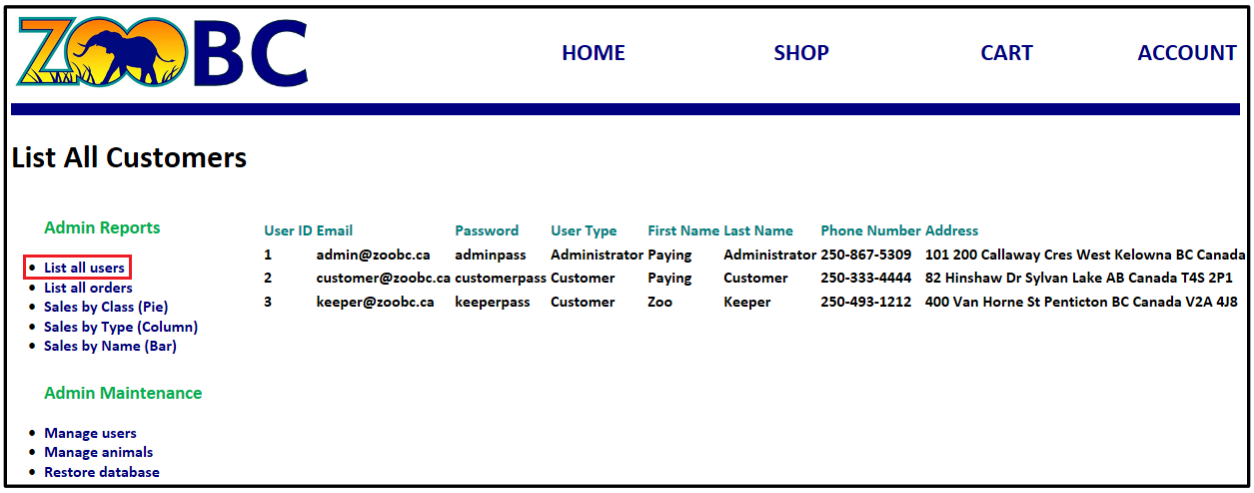
Below is a screenshot of the page where users can review animals (ReviewAnimal.jsp):



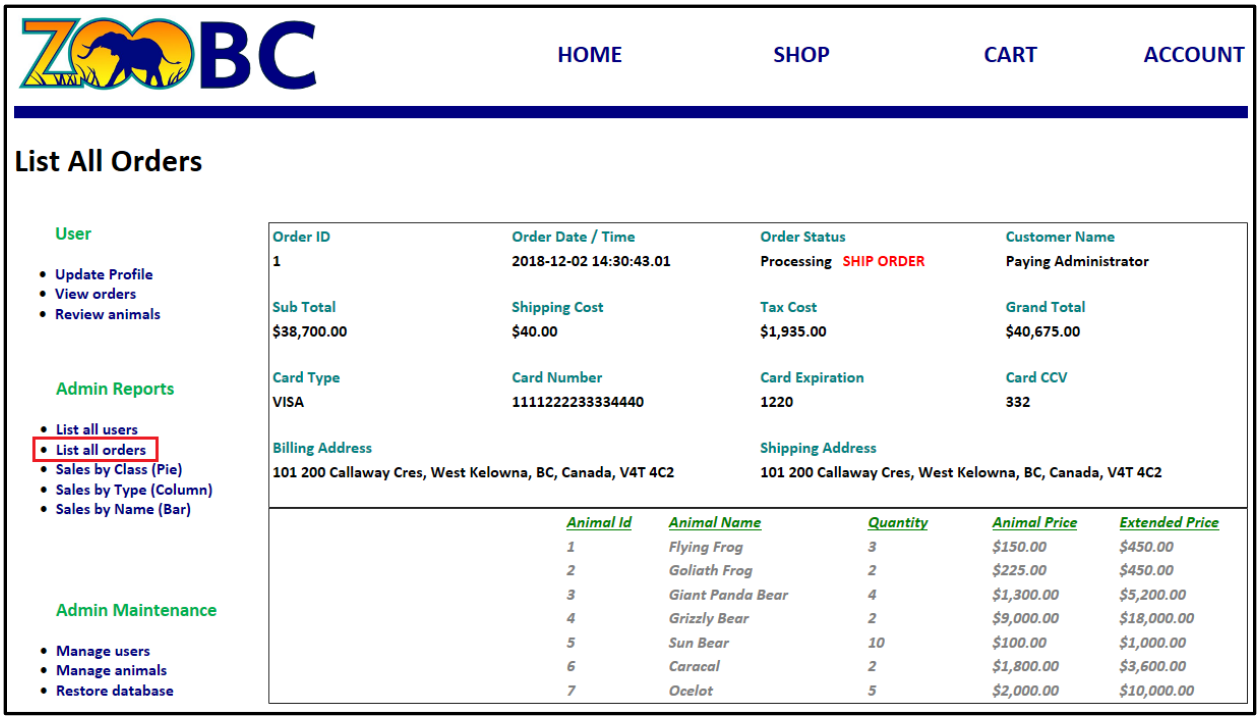
Only animals that the user has purchased are displayed on this page. As the user is only able to review an animal once, fields to enter a review only appear on the animals they have not already reviewed. The list is sorted by date reviewed.

Administrator Portal

Below is a screenshot of the page where an administrator can see a list of users (ListUsers.jsp):

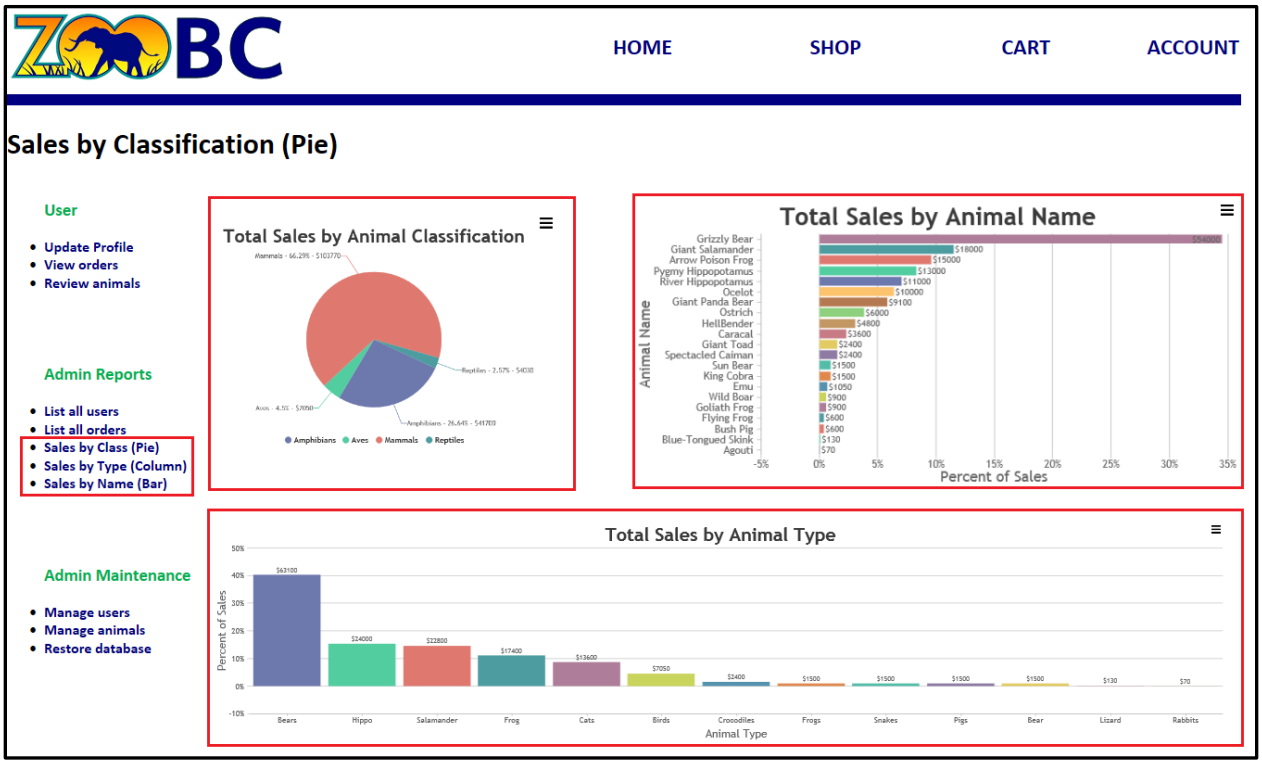


Below is a screenshot of the page where the admin can see a list of all orders (ListOrders.jsp):

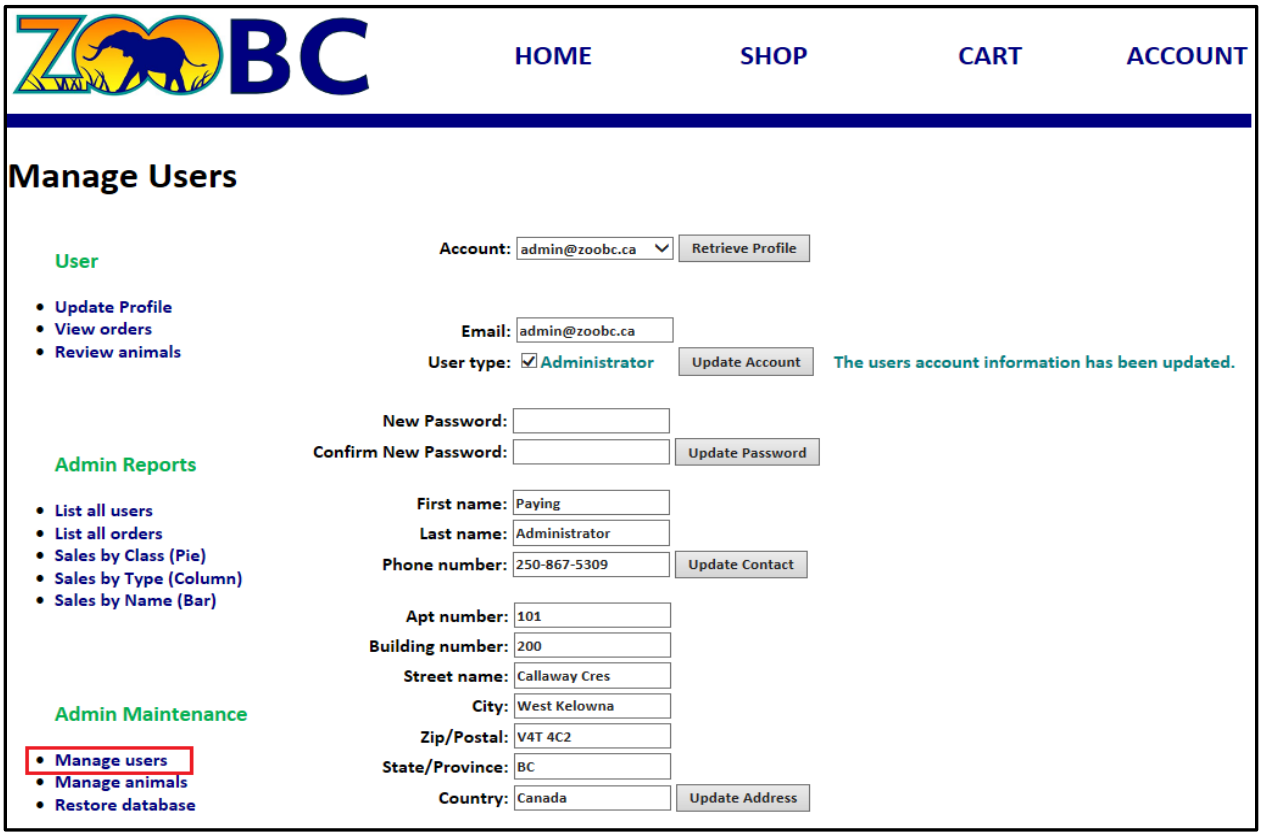


The order status can be set to “shipped” by clicking on the “SHIP ORDER” link.

Below is a **combined** screenshot of the sales reports that are available to the admin → (ReportSalesByClass.jsp, ReportSalesByType.jsp, ReportSalesByName,jsp):



Below is a screenshot of the page where the admin can manage users (ManageUsers.jsp)



A SQL statement is used to populate the list of all users. In addition, to the functions available in the individual user profile, the admin can also modify a user's email address or account type.

Below is a screenshot of the page where an admin can add new animals (ManageAnimals.jsp):

Below is a screenshot of the page where an admin can add new animals (ManageAnimals.jsp):

This feature is for invoking a fresh start. *Only advanced users should press that button!* INSERT commands within the DDL will restore some customers, orders, and reviews.

7 Implemented Features

Final Overall System Features	Points	Complete	Code Files
Hosting			
Running on cosc304 server	2	✓	
Main/Home Page			
Search for a product by name	1	✓	ShopAnimals.jsp
Browse products by category	1	✓	ShopAnimals.jsp
List products (by search/browse)	1	✓	ShopAnimals.jsp
List products with image	2	✓	ShopAnimals.jsp
Page header with menu	1	✓	includes/header.html
Shopping Cart			
Add to shopping cart	1	✓	AddCart.jsp
View shopping cart	1	✓	ViewCart.jsp
Update item quantity in shopping cart	2	✓	ViewCart.jsp
Remove item from shopping cart	1	✓	ViewCart.jsp
Improved formatting/UI (e.g. in header bar)	1	✓	ViewCart.jsp
Checkout			
Checkout with customer id	1	✓	Checkout.jsp
Checkout with payment/shipment info	2	✓	Checkout.jsp
Checkout with data validation	3	✓	Order.jsp
Calculate taxes and shipping cost	2	✓	Order.jsp
Product Detail Page			
Product detail page and item description	3	✓	Product.jsp
Product detail has an image	1	✓	Product.jsp
User Accounts and Login			
Page listing all orders for user	1	✓	ViewOrders.jsp
Product Reviews			
Ability to enter a review on a product	2	✓	ReviewAnimal.jsp
Display product review on product detail	1	✓	Product.jsp
Restrict to one review per user on item purchased	2	✓	ReviewAnimal.jsp
Administrator Portal			
List all customers	1	✓	ListCutomers.jsp
List report showing total sales/orders	1	✓	ListOrders.jsp
Report with a graph (Column)	3	✓	ReportSalesByType.jsp
Add new product	2	✓	ManageAnimals.jsp
Change order status/ship order	1	✓	ListOrders.jsp
Database restore with SQL script	2	50%	RestoreDatabase.jsp
Add/update customer	2	✓	ManageUsers.jsp
Database System/General			
Bonus – User interface and navigation/usability	5	✓	includes/sidemenu.html
Bonus – Additional chart for sales reporting (Pie)	2	✓	ReportSalesByClass.jsp
Bonus – Additional chart for sales reporting (Bar)	2	✓	ReportSalesByName.jsp
Bonus – User can manage own profile (not admin)	2	✓	UserProfile.jsp
Bonus – Use of SQL to populate selectable list.	2	✓	ManageUsers.jsp