



School *of* Computing

CS2102 Database Systems



Online Classifieds

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Table of Contents

Contents

Table of Contents	2
Introduction	4
Software used:	4
Entity Relationship Diagram	5
Schema	6
'user' table.....	6
'item' table	6
'category' table.....	7
'tagged' table.....	7
'views' table.....	7
Screenshots & Related SQL Code	8
Homepage.....	8
Hottest Items.....	9
Latest Items	9
Recently Viewed Items.....	9
Accounts	10
Create a new user account page	10
Sign in page	11
Edit user account page.....	11
Viewing of profile page	12
Items	13
Inserting item	13
Editing Items.....	14
Deleting Items	14
View all items	15
Searching and sorting items.....	15
Search items based on keywords	15
Sort items	16
Viewing of each individual item	17

Viewing of list of own posted items	18
Tagged.....	19
Retrieving categories	19
Inserting Tagged	19
Deleting Tagged.....	19
Administration Panel	20
Viewing of all items.....	20
Viewing of all categories	21
Viewing of all users	21
Adding a category	21
Special features	22
Triggers	22
Prevent spaces in the username	22
Disallow negative pricing	22
Conclusion.....	23

Introduction

The purpose of our classifieds system is for sellers to advertise their product to the masses. In the main page, potential buyers will see the most viewed items and the recently added items. A facility to search for desired products is also available.

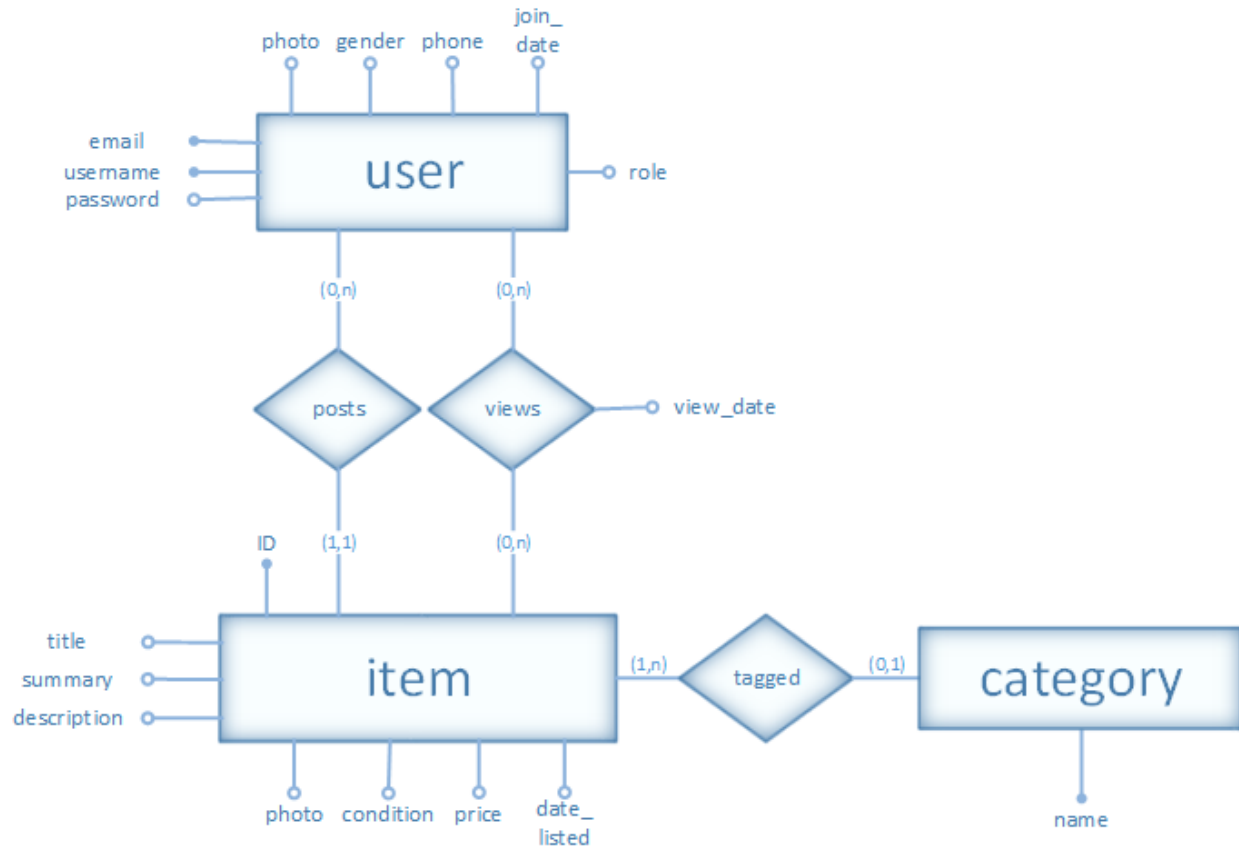
Our system has very open access; sellers only need to create an account before they start using the system. To sell an item, they can post a photo and describe the features and condition of their item. If necessary, a facility is provided to edit both their profile and item description.

Admins have more administrative rights than normal users. These include the ability to add categories, modify and delete user's posts if necessary (such as removing improper content or censoring foul language). They are also able to remove users if necessary. Aside from these abilities, admins are also normal users and may post their own items to sell.

Software used

1. MySQL
2. Apache HTTP Server
3. PHP

Entity Relationship Diagram



Schema

'user' table

To hold the accounts of all the sellers in our system - however accounts are not needed if the user is not selling anything (just browsing)

```
CREATE TABLE IF NOT EXISTS `user` (  
  `email` varchar(256) NOT NULL,  
  `username` varchar(32) NOT NULL,  
  `password` varchar(32) NOT NULL,  
  `photo` varchar(32) DEFAULT NULL,  
  `gender` varchar(16) NOT NULL,  
  `phone` varchar(32) NOT NULL,  
  `join_date` datetime NOT NULL DEFAULT CURRENT_TIMESTAMP,  
  `role` varchar(16) NOT NULL DEFAULT 'user',  
  PRIMARY KEY (`username`),  
  UNIQUE KEY `email` (`email`)  
)
```

'item' table

To contain the all the details items posted in the system.

```
CREATE TABLE IF NOT EXISTS `item` (  
  `id` int(11) NOT NULL AUTO_INCREMENT,  
  `user` varchar(32) NOT NULL,  
  `title` text NOT NULL,  
  `summary` text NOT NULL,  
  `description` text NOT NULL,  
  `photo` varchar(32) DEFAULT NULL,  
  `cond` varchar(64) NOT NULL,  
  `price` double NOT NULL,  
  `date_listed` datetime NOT NULL DEFAULT CURRENT_TIMESTAMP,  
  PRIMARY KEY (`id`),  
  KEY `user` (`user`),  
  FOREIGN KEY (`user`) REFERENCES `user` (`username`) ON DELETE CASCADE ON  
  UPDATE CASCADE  
)
```

'category' table

To hold the list of all the categories of items. This list can only be adjusted by the administrator.

```
CREATE TABLE IF NOT EXISTS `category` (  
  `name` varchar(32) NOT NULL,  
  PRIMARY KEY (`name`)  
)
```

'tagged' table

To hold the categories associated with each item as set by the buyer.

```
CREATE TABLE IF NOT EXISTS `tagged` (  
  `item_id` int(11) NOT NULL,  
  `cat_name` varchar(32) NOT NULL,  
  PRIMARY KEY (`item_id`, `cat_name`),  
  KEY `cat_name` (`cat_name`),  
  FOREIGN KEY (`cat_name`) REFERENCES `category` (`name`) ON DELETE CASCADE  
ON UPDATE CASCADE,  
  FOREIGN KEY (`item_id`) REFERENCES `item` (`id`) ON DELETE CASCADE ON  
UPDATE CASCADE  
)
```

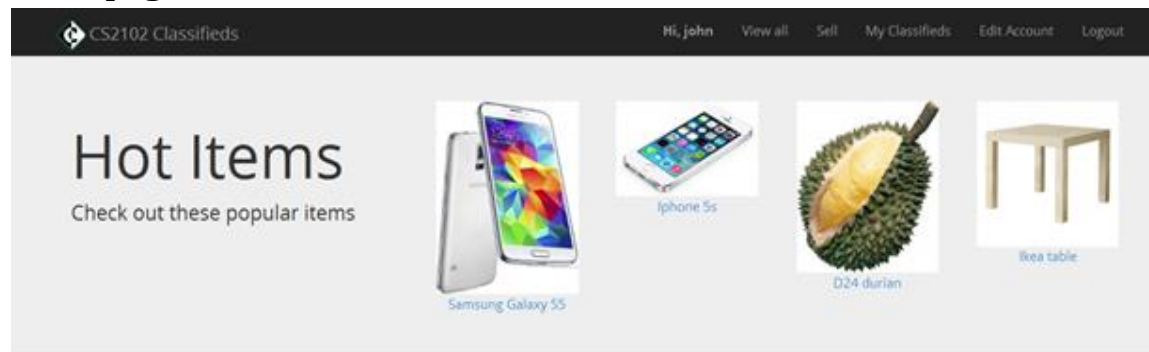
'views' table

To hold who has viewed which item. This is primarily used to determine the popularity of each item.

```
CREATE TABLE IF NOT EXISTS `views` (  
  `item_id` int(11) NOT NULL,  
  `user_id` varchar(32) NOT NULL,  
  `view_date` datetime NOT NULL,  
  PRIMARY KEY (`item_id`, `user_id`),  
  FOREIGN KEY (`item_id`) REFERENCES `item` (`id`) ON DELETE CASCADE ON  
UPDATE CASCADE,  
  FOREIGN KEY (`user_id`) REFERENCES `user` (`username`) ON DELETE CASCADE ON  
UPDATE CASCADE  
)
```

Screenshots & Related SQL Code

Homepage



Latest Items



Recently Viewed Items



Hottest Items

Gets the 4 most popular items viewed on the site

```
SELECT i.title, i.photo, i.id, COUNT(v.item_id) as count FROM item i, views v
WHERE i.id = v.item_id GROUP BY v.item_id ORDER BY count DESC LIMIT 0, 4
```

Latest Items

Gets the 6 newest listings on the sites

```
SELECT * FROM item i ORDER BY date_listed DESC LIMIT 0, 6
```

Recently Viewed Items

Gets the 6 most recently viewed items that the logged-in user has viewed (only works when logged in)

```
SELECT i.title, i.photo, i.id, i.summary FROM item i, views v WHERE v.user_id
= ? AND i.id = v.item_id ORDER BY v.view_date LIMIT 0, 6
```

Accounts

Create a new user account page

The screenshot shows the 'Create account' page of the CS2102 Classifieds website. The page features a dark header bar with the site logo on the left and 'Sign In' and 'Register' links on the right. The main content area is light gray and contains a 'Create account' form. The form has the following fields and labels:

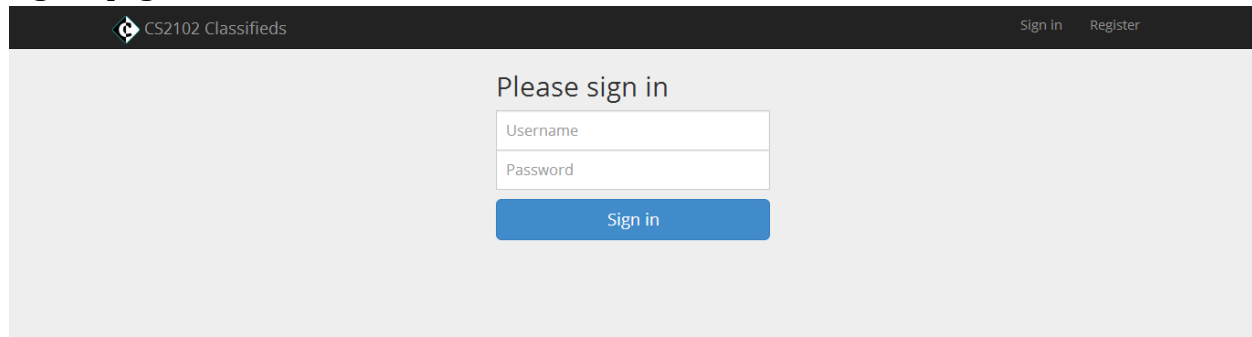
- Username:** A text input field with the placeholder text 'Username'.
- Password:** A text input field with the placeholder text 'Password'.
- Retype password:** A text input field with the placeholder text 'Retype Password'.
- Email:** A text input field with the placeholder text 'Email Address'.
- Phone:** A text input field with the placeholder text 'Contact Number'.

Below the input fields is a blue button labeled 'Create account'.

```
SELECT * FROM user WHERE username = $username AND password = $password
```

If the response is not an empty set, the user is allowed to log in.

Sign in page



CS2102 Classifieds

Sign in Register

Please sign in

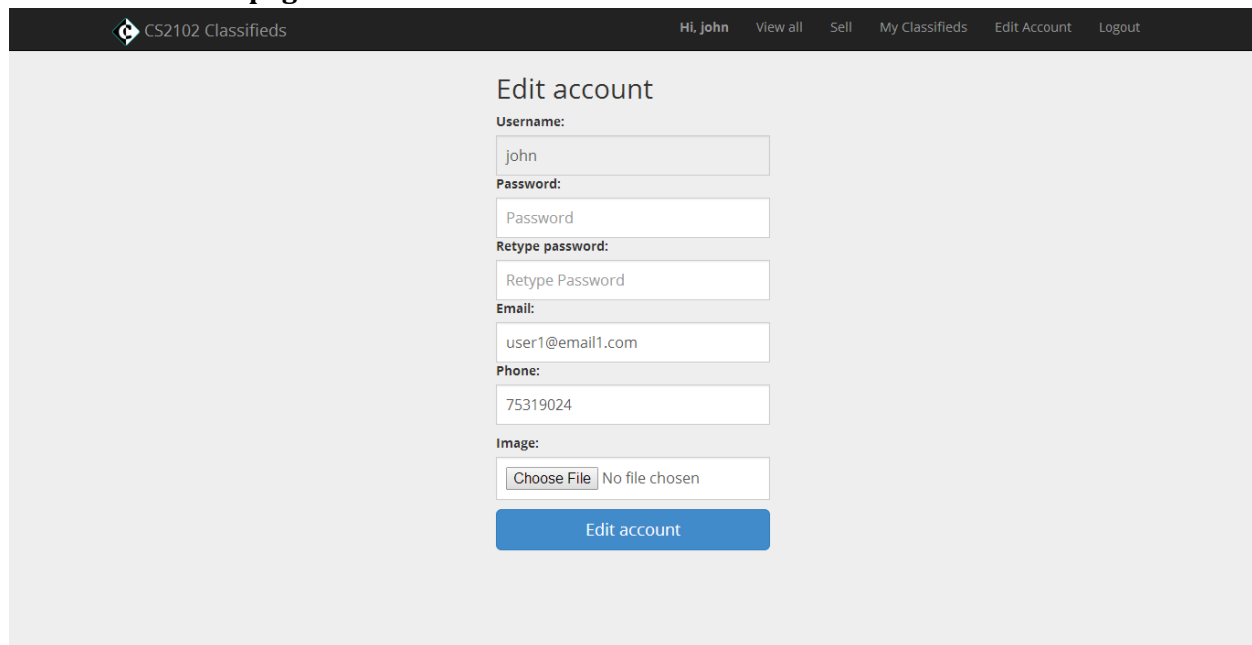
Username

Password

Sign in

```
SELECT * FROM user WHERE username = 'username' AND password = 'password'
```

Edit user account page



CS2102 Classifieds

Hi, john View all Sell My Classifieds Edit Account Logout

Edit account

Username:

john

Password:

Password

Retype password:

Retype Password

Email:

user1@email1.com

Phone:

75319024

Image:


Choose File No file chosen

Edit account

```
UPDATE user SET email = 'email', phone = 'phoneNo', gender = 'gender', password = 'password', photo = 'photo' WHERE username = 'username'
```


Password and photo field will only be present when the new password is keyed in and the a photo image is upload respectively.

Viewing of profile page

 CS2102 Classifieds

Hi, johnView allSellMy ClassifiedsEdit AccountLogout

Viewing User: john [Edit your profile](#)




Gender
male

Contact No
75319024

User since
2014-03-08 14:10:29

Item(s) Posted:



Iphone 5s


- **Date Listed:** 2014-03-08 14:16:06
- **Summary:** Still rather new. Includes case.

SELECT * FROM user WHERE username = username

Users browsing an item can click on the username presented in the “Posted by:” field.

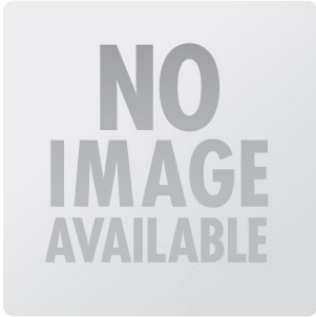
Logged in users can access his own profile page by clicking on his username at the nav bar at the top. If the profile page belongs to that of the logged-in user, he will similarly be presented with a button to edit his own account. Clicking on that will take him to his the “Edit Account” page as well.

Items

 CS2102 Classifieds

Hi, JohnView allSellMy ClassifiedsEdit AccountLogout

Add Item



Change Photo
 No file selected.

Title

Summary

Description

Category

☐ Fruits

☐ Furniture

☐ Household

☐ Mobile Devices

Condition

Price

Inserting item

```
INSERT INTO item (user, title, summary, description, cond, price, photo)
VALUES ($user, $title, $summary, $description, $condition, $price, $photo)
```

Editing Items

Updating an item and its attributes (excluding photo)

UPDATE item set title = \$title, summary = \$summary, description = \$description,
cond = \$condition, price = \$price WHERE id = \$id and user = \$user;

Updating an item's photo

```
UPDATE item
SET title = $title, summary = $summary, description = 'description',
cond = $condition, price = $price, photo = $photo
WHERE id = $id and user = 'user'
```

We create an item before processing the photo since it is not compulsory for our users to post a picture.

The condition “`user = $user`” is used to ensure that an item can only be modified by the user who posted them. The only exception to this rule is admins. The processing for admins is done similarly, the only difference is that the “`user = $user`” condition is rendered ineffective.

Deleting Items

*Refer to same screen shot as in Editing Items. Delete option is available next to the ‘Edit’ button.

```
DELETE FROM item where id = $id
```

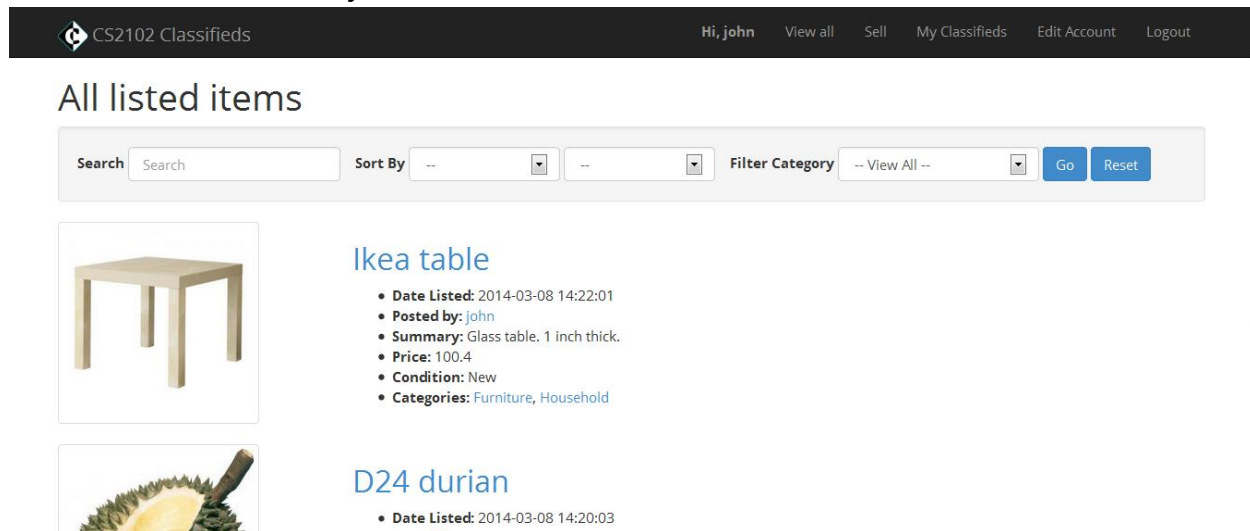
View all items

```
SELECT * FROM item i
ORDER BY i.date_listed DESC
```

This allows the user to view all the current listing. Default ordering is by newest posting (latest date) first.

Searching and sorting items

Search items based on keywords



The screenshot shows the CS2102 Classifieds website. The header includes the site name and user navigation links. Below the header, there's a section titled "All listed items" with a search bar, sort options, and a filter category dropdown. Two items are listed: "Ikea table" and "D24 durian".

Search Interface:

- Search:
- Sort By:
- Filter Category:
- Buttons: Go, Reset

Item Listings:

- Ikea table**
 - Date Listed: 2014-03-08 14:22:01
 - Posted by: john
 - Summary: Glass table, 1 inch thick.
 - Price: 100.4
 - Condition: New
 - Categories: Furniture, Household
- D24 durian**
 - Date Listed: 2014-03-08 14:20:03

```
SELECT * FROM item i
WHERE (i.title LIKE '%query%' OR i.summary LIKE '%query%' OR i.description
LIKE '%query%' OR i.cond LIKE '%query%')
ORDER BY i.date_listed DESC
```

This allows the user to search using queries for keywords found in the title, summary, description or the condition of the items. Default ordering is by newest posting (latest date) first.

Sort items

The first screenshot shows the initial state of the application. The 'Sort By' dropdown menu is open, displaying options: 'Date Listed', 'Title', 'Price', and 'Condition'. The 'Filter Category' dropdown menu is also open, displaying options: '-- View All --', 'Fruits', 'Furniture', 'Household', and 'Mobile Devices'. The 'Go' and 'Reset' buttons are visible.


The second screenshot shows the 'Sort By' dropdown menu with 'Descending' selected. The 'Filter Category' dropdown menu is still open, showing the same options as before.

The third screenshot shows the 'Filter Category' dropdown menu with '-- View All --' selected. The 'Go' and 'Reset' buttons are visible. The application displays a search bar, a 'Sort By' dropdown menu, and a 'Filter Category' dropdown menu. The search results show an 'Ikea table' with a 'Date Listed' of '2014-03-08 14:22:01'.

```
SELECT * FROM item i, tagged t
WHERE t.cat_name='Mobile Devices' AND t.item_id=i.id
ORDER BY i.title DESC
```

For sorting, we allow users to sort by 4 different attributes (date listed, price, title and condition), and in either ascending or descending order. They can also choose to filter by category. In the example query above, the user chose to sort by name, in descending order, and order items from items tagged with category “Mobile Devices”


Viewing of each individual item

 CS2102 Classifieds

Hi, [john](#) [View all](#) [Sell](#) [My Classifieds](#) [Edit Account](#) [Logout](#)

Viewing Item: Samsung Galaxy S5

Edit



Posted by:
[john](#)

Date Listed
2014-03-08 14:18:35

Summary
Won in contest! Get this before anyone else!




Description
Unopened. Comes with full accessories pack like charger and cable.

Condition
New

Price
1000

Categories
[Mobile Devices](#)


Users who viewed this item also viewed:



```
SELECT * FROM item WHERE id = id
```


If user is logged in, and the item is posted by him, he will be able to see an edit icon directly below the title of the posting. He can click on that to go to the “Edit item” page.

Viewing of list of own posted items

 CS2102 Classifieds


Hi, John View all Sell My Classifieds Edit Account Logout

Viewing your listed items




iPhone 5s

- **Date Listed:** 2014-03-08 14:16:06
- **Summary:** Still rather new. Includes case.
- **Price:** 599.99
- **Condition:** Used but still good.
- **Categories:** [Mobile Devices](#)



Samsung Galaxy S5

- **Date Listed:** 2014-03-08 14:18:35
- **Summary:** Won in contest! Get this before anyone else!
- **Price:** 1000
- **Condition:** New
- **Categories:** [Mobile Devices](#)



Ikea table

- **Date Listed:** 2014-03-08 14:22:01

```
SELECT * FROM item WHERE user =username
```

Users browsing an item can click on the username presented in the “Posted by:” field, to view the public profile page of the user who posted that item.

If the profile page belongs to that of the logged-in user, he will similarly be presented with a button to edit his own account. Clicking on that will take him to his the “Edit Account” page as well.

Tagged

Retrieving categories

```
SELECT * FROM category;
```

We retrieve the categories and make them available for selection

Inserting Tagged

```
INSERT INTO tagged (item_id, cat_name)
VALUES ($item_id, $cat_name)
```

This inserts a record storing the paired relation of an item with a category


Deleting Tagged

```
DELETE FROM tagged WHERE item_id = $item_id
```

Conversely, if a previously selected category is deselected, remove it from the table.

The same applies to the deletion of items as in only the owners of the item, or the admins may delete an item. These checks of ownership are done separately before the deletion is done. Deleting of Tagged is unnecessary since we have ON DELETE CASCADE defined in the table definition of Tagged.

Administration Panel

 CS2102 Classifieds

Hi, adminAdminView allSellMy ClassifiedsEdit AccountLogout

Summary

All Classifieds

All Categories

All Users

Site Summary

Total number of users: 5


Total number of categories: 4

Total number of classifieds: 4

```
SELECT COUNT(*) FROM user;  
SELECT COUNT(*) FROM category;  
SELECT COUNT(*) FROM item
```

Users logged in as administrators would be able to access the admin panel. The admin panel gives a summary of the site's content. Administrator would be able to add/edit/delete items posted by users, users and categories.

Viewing of all items

 CS2102 Classifieds

Hi, adminAdminView allSellMy ClassifiedsEdit AccountLogout

Summary

All Classifieds

All Categories

All Users

All Classifieds


Add

ID	Title	User	Date posted	Price	Summary
1	Iphone 5s	john	2014-03-08 14:16:06	\$599.99	Still rather new. Includes case.
2	Samsung Galaxy S5	john	2014-03-08 14:18:35	\$1000	Won in contest! Get this before anyone else!
3	D24 durian	mary	2014-03-08 14:20:03	\$20	Best in Malaysia and Singapore
4	Ikea table	john	2014-03-08 14:22:01	\$100.4	Glass table. 1 inch thick.

```
SELECT i.id, i.user, i.title, i.summary, i.price, i.date_listed FROM item i
```

Administrators can click on a row to edit or delete that item.

Viewing of all categories

 CS2102 Classifieds
 Hi, admin
Admin
View all
Sell
My Classifieds
Edit Account
Logout

[Summary](#)
[All Classifieds](#)
[All Categories](#)
[All Users](#)


All Categories

Add

#	Title
1	Fruits
2	Furniture
3	Household
4	Mobile Devices

```
SELECT * FROM category
```

Viewing of all users

 CS2102 Classifieds
 Hi, admin
Admin
View all
Sell
My Classifieds
Edit Account
Logout

[Summary](#)
[All Classifieds](#)
[All Categories](#)
[All Users](#)


All Users

Add

Username	Email address	Gender	Date joined	Phone number	Role
admin	admin@admin.com	male	2014-03-15 14:13:55	1234567	admin
david	david@david.com	male	2014-03-15 14:42:18	1245203	user
john	user1@email1.com	male	2014-03-08 14:10:29	75319024	user
mary	mary@mary.com	female	2014-03-08 14:12:22	1902446	user
peter	peter@email2.com	male	2014-03-08 14:11:44	864202	user

```
SELECT u.email, u.username, u.gender, u.phone, u.join_date, u.role
FROM user u
```

Adding a category

 CS2102 Classifieds
 Hi, admin
Admin
View all
Sell
My Classifieds
Edit Account
Logout

Add/Edit Category

Category name:

Title

Add

```
INSERT INTO category (name) VALUES ('category')
```

Special features

Triggers

Prevent spaces in the username

This helps to ensure that accounts are created with valid usernames. Valid usernames are defined as a string containing only alphanumeric (A-Z,a-z,0-9).

```
CREATE TRIGGER `username_no_space`  
BEFORE INSERT ON `user` FOR EACH ROW  
IF new.username NOT REGEXP '^[[:alnum:]]+$' THEN  
    SIGNAL SQLSTATE '12345'  
    SET MESSAGE_TEXT = 'Username must be alphanumeric only with no spaces.';  
END IF
```

Disallow negative pricing

This helps to ensure that items are created with valid pricing. Valid pricings are defined as non-negative doubles.

```
CREATE TRIGGER `positive_price` BEFORE INSERT ON `item`  
FOR EACH ROW IF new.price < 0 THEN  
    SIGNAL SQLSTATE '12345'  
    SET MESSAGE_TEXT = 'Item price cannot be negative';  
END IF
```

Conclusion

In this project, we have learnt how to develop a basic web application involving an SQL database, and how using a database would simplify the development of the website.

We have also learnt about some quirks of the different implementations of SQL, for example with MySQL not having the CHECK constraints as used in class. To overcome that issue, we employed interesting database features like triggers to enforce certain business rules in the database.

In addition, during the development of our classifieds website, we realised that what we are tasked to do was in fact, only a small fragment of what is required for a full-fledged application. Such other features include the need for storing the hash of passwords instead of in clear text, as well as sanitizing input to enhance security. In addition, we currently have no means in place for users to recover their passwords should they have forgotten them.

All in all, our web page CS2102 Classifieds demonstrates a basic classified ads website. A lot of work is still needed for it to be useful site for NUS staff and students to advertise the items they have for sale or search for items of interest to them.