**DATABASE SYSTEMS**

PROJECT 1 REPORT

TITLE: TEXAS A&M BUS MANAGEMENT SYSTEM

URL: www.spiritaggie.site11.com

SUBMITTED BY:

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**TITLE:** TEXAS A&M BUS MANAGEMENT SYSTEM

**INTRODUCTION:**

The web application on Texas A&M Bus Management System can be used either by students or by administration. Students use the system to view information on bus routes whereas the administration use this system to mange bus routes and drivers database i.e. add/remove routes or drivers. The URL to this web application is: www.spiritaggie.site11.com.

**GUIDE THROUGH THE WEBSITE:**

The index page has a link for Route Info and login for the admin. More links come up in the left side menu once you login using **email: admin@tamu.edu** and **password: admin.**

Route info link takes you to a page where you will find three sub-sections on right side. First sub-section lets you select a bus route and shows information from database. Second section lets you select source and destination stops and shows the buses running between these stops. The third section lets you choose a stop and shows which buses go from that particular stop.

Update Routes page lets the admin to add a new route or delete existing one.

Add/Remove Drivers page lets the admin to either add a new driver or view the list of drivers on a particular route.

**DATABASE DESIGN:**

* ***TABLE STRUCTURE***:

stops(**stop\_id,** stop\_name);

route(**number**, name, **stop\_id**, no\_of\_buses, intervals, starting\_point) with FOREIGN KEY stop\_id REFRENCING stops(stop\_id);

drivers(**driver\_id**, route\_number, firstname, lastname) with FOREIGN KEY route\_number REFERENCING route(number);

drivers\_audit(**id**, driver\_id, route\_number, lastname, firstname, action);

* ***FOREIGN KEY CONSTRAINT***:

1. In route table:

CONSTRAINT route\_ibfk\_1

FOREIGN KEY stop\_id

REFERENCES stops(stop\_id)

ON DELETE CASCADE

ON UPDATE CASCADE

2. In drivers table:

CONSTRAINT drivers\_ibfk\_1

FOREIGN KEY route\_number

REFERENCES route(number)

ON DELETE CASCADE

ON UPDATE CASCADE

* ***TRIGERS:***

1. In route table:

CREATE  TRIGGER `before\_route\_insert`

BEFORE INSERT

ON `route`

FOR EACH ROW

[IF](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcontrol-flow-functions.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b#function_if)(NEW.stop\_id [NOT](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Flogical-operators.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b#operator_not) [IN](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcomparison-operators.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b#function_in) ([SELECT](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fselect.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b)stop\_id FROM stops WHERE stop\_id=NEW.stop\_id)) THEN SIGNAL sqlstate '45006' [SET](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fset.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b) message\_text = "stop does not exist in stops table";

END [IF](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcontrol-flow-functions.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b#function_if);

2. In drivers table:

[CREATE](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcreate-trigger.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b) [TRIGGER](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcreate-trigger.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b) `after\_drivers\_insert`

AFTER [INSERT](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Finsert.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b)

ON `drivers`

FOR EACH ROW

[INSERT](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Finsert.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b) INTO drivers\_audit [VALUES](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fmiscellaneous-functions.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b#function_values) (NULL, NEW.driver\_id, NEW.route\_number, NEW.lastname, NEW.firstname, "Insert")

[CREATE](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcreate-trigger.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b) [TRIGGER](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcreate-trigger.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b) `after\_drivers\_delete`

AFTER [DELETE](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fdelete.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b)

ON `drivers`

FOR EACH ROW

[INSERT](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Finsert.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b) INTO drivers\_audit [VALUES](http://localhost/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fmiscellaneous-functions.html&server=0&token=4a6e991f5a50a6ee4a883aa933dda26b#function_values) (NULL, OLD.driver\_id, OLD.route\_number, OLD.lastname, OLD.firstname,"Delete")

**QUERIES USED IN APPLICATION:**

1. **DISTINCT**:

"SELECT DISTINCT(number) FROM route" to show the distinct route numbers in drop down list.

2. **JOIN**:

"SELECT \* FROM route JOIN stops ON route.stop\_id=stops.stop\_id WHERE number= '".$\_POST['route']."'" to show the route information of the route number entered by the user

"SELECT number, name FROM route JOIN stops ON stops.stop\_id=route.stop\_id WHERE stop\_name='".$\_POST['route3\_dest']."'" to show the buses which pass through a particular stop entered by the user.

3. **UNION**:

"SELECT number, name, stop\_name FROM route JOIN stops ON stops.stop\_id=route.stop\_id WHERE stop\_name='".$\_POST['route2\_source']."'

UNION

SELECT number, name, stop\_name FROM route JOIN stops ON stops.stop\_id=route.stop\_id WHERE stop\_name='".$\_POST['route2\_dest']."'" to show the buses between source and destination entered by the user.

4. **INSERT**:

"INSERT INTO route VALUES('$number', '$name', '$stop\_result', '$no\_of\_bus', '$intervals', '$starting\_point')" to insert new route into the database.

"INSERT INTO drivers VALUES(NULL,'$number','$firstname','$lastname')" to insert driver information into database.

5. **DELETE**:

"DELETE FROM route WHERE number='".$\_POST['del\_route']."'" to delete the route selected by the admin.

**DATA COLLECTION:**

The data required for bus routes and stops was collected from transport.tamu.edu/busroutes/. The data in drivers table was entered using a script. The stops table contains 43 rows, route table contains 67 rows, drivers table contains 2160 rows and drivers audit contains 5075 rows.

**DIFFICULTIES FACED AND SOLVED:**

Designing database to meet the requirements of the web application was a challenging task. Another challenging task was to create an interface for queries to act on. Integrating php and MySQL was an interesting part of the project. I learned a lot about triggers and foreign key constraints and the correct way to use them along with the applications. One of the outcome of triggers was to create drivers\_audit table which helps the admin to track what updates were performed on drivers table. Overall I enjoyed and learned a lot from this project.