INTRODUCTION

A brief introduction about the project and how its made use of.Also a short inrtoduction about Chennai Metro Rail Ltd.

INSTALLATION

Step by Step process on installing the webapp in both server and localhost and creating models for use inside by the company.

USING WEBSITE

Clear Detailed picture on how to use the website in a step by step manner with each query or button stated.

USING APP

Starting from Login, all the procedures to execute a query in an app is being explained.

CONCLUSION

Stating the work done in CMRL and the experience i gained from it.

INTRODUCTION

The Government of Tamil Nadu created a Special Purpose Vehicle (SPV) for implementing the Chennai Metro Rail Project. This SPV named as “Chennai Metro Rail Limited” was incorporated on 03.12.2007 under the Companies Act. It has now been converted into a Joint Venture of Government of India and Government of Tamil Nadu with equal equity holding. It is functioning at the following address.

This report provides guidance for smart phone based App Development for asset maintenance of Tunnel Ventilation System (TVS) of Chennai Metro Rail (CMRL) Project (Phase-1).

The Chennai Metro Rail Project has been designed with a high degree of reliability in order to provide dependable service to the public. Best current practices from International Metro standards & Design have been adopted with particular emphasis on life safety systems and necessary inbuilt electrical plant redundancy to support these.

The Tunnel Ventilation System provided for the Station as well as for Tunnel comprises of Tunnel Ventilation Fans, Trackway Exhaust Fans, Trackway Supply Fan, Jet Fans Tunnel Ventilation Dampers, MCC Panels, LCP Panels, IBP Panels and Sound Attenuators.

The main aim of this report is to provide guidance to the App Developers on the requirements of the TVS assent maintenance.

A smart phone based app needs to be developed for record and update all periodic maintenance of the TVS equipment installed at all underground stations.
In general the app should have following functionalities:

1. To scan/read the Quick Response (QR) code of every equipment.
2. To display checklist for periodic maintenance.
3. To aid fault reporting and closing out existing faults.
4. To send SMS/email alerts.
5. To store and update data from the cloud based database.
6. To upload and download data from the database.
7. Store history on the smart phone.
8. Generate short reports.

The Detailed guide on how to use the app and website will be given in the following pages.

INSTALLATION

We'll start with how to install the webapp on the server. If you want to test the webapp ,and i've classified this part into two steps. Either way i would start off with one main thing, that is the github repository.

Username : cmrlweb

Both Web and Android : https://github.com/cmrlweb/CMRL_ALL.git
Only Web : https://github.com/cmrlweb/CMRL_LARAVEL.git

Now to install the Webapp,there are 2 ways.
1.Localhost
2.Web Server (Cloud)

LocalHost: (tested on Ubuntu 14.04)

1.Open Terminal.
2.Run the following commands in the same order. (From ~ directory (cd ~))

```
$sudo apt-get update
//Updates the Ubuntu to Latest Version
```

```
$sudo apt-get install apache2
//Installing Apache
```

```
$sudo apt-get install php5 libapache2-mod-php5 php5-mcrypt php5-curl
//php , type yes if necessary
```

```
$sudo apt-get install mysql-server php5-mysql
//Installing Mysql Server specify username-root , password your wish
```

```
$sudo apt-get install git-core
//installing git
```

```
$sudo apt-get install curl
//Installing curl
```

```
$git clone https://github.com/cmrlweb/CMRL_ALL.git CMRL_ALL
//Cloning to your Host.
```

```
$curl -sS https://getcomposer.org/installer | php
//Installing Composer

$sudo mv composer.phar /usr/local/bin/composer
//Making composer Global.
```

3.Now you have to import Mysql into your Localhost.
4.Install Mysqlworkbench

```
$sudo apt-get install mysql-workbench
```

5.Now connect to localhost by clicking + option.
6.When you install Mysql , you must have specified username and password , now specify that here and connect.
7.Now go to your FileManager and go to Home Directory and find CMRL_ALL directory
8.Now go to CMRL_ALL ->Work File->MYSQLBACKUP->MAINSQL->MAINMYSQL.
9.Open CMRL.sql
10.Copy all and go to workbench.
11.Create Database called CMRL.
12.Now run Copied queries and paste in query window. (Click on Thunderbolt icon to run ALL queries)
13.Now You need to create an admin.This is tricky.I have made that the first register in the name of email will have permission to be admin.Ill explain you that.

14.Go back to terminal and type these.

```
$cd ~

$cd CMRL_ALL/Work\ File/web/

$composer install
//installing the webapp

$vim .env
//To set DB Credentials. Set the DB_HOST to 127.0.0.1 and DB_USERNAME to root and other details needed. This is main file to connect to db.

$php artisan serve
//Now your webapp will be ready in firefox.
```

15.Now go to Firefox or Chrome and type http://localhost:8000/
16.Youll see login , Go to Register and register with this credential to be admin

Name : ***ANY***
email : cmrlweb@gmail.com
password : ***ANY***

17.No Go to terminal ahain and hit Ctrl+c
18.Now run this command

```
$php artisan db:seed.
//To populate the ROLE of admin in roles and permissions table.

$php artisan serve
```

19.Now Login to your Webapp.

Cloud Server: (tested on Ubuntu 14.04)

1.Same steps until level 2 of installing composer global.

2.Note : Since you cannot see mysql workbench on Cloud Server , you can use mysqldump to put the file.

```
$cd ~

$sudo apt-get libapach2-mod-auth-mysql

$sudo mysql_install_db

$sudo nano /etc/apache2/mods-enabled/dir.conf
// Add index.php infront of index.html and after Directory Index.
//itll look like this

<IfModule mod_dir.c>
DirectoryIndex index.php index.html index.cgi index.pl
index.php index.xhtml index.htm
</IfModule>


$mysql -u root -p
//give password

sql>CREATE DATABASE CMRL;
sql>exit;

$cd CMRL_ALL/Work\ File/MYSQLBACKUP/MAINMYSQL/

$mysqldump -u root -p --databases CMRL > CMRL.sql
```

```
$cd ~

$rm -rf CMRL_ALL
//Since we’ll clone into apache directory ( if you followed localhost setup)
//If no such file exists , no problem.

$cd /var/www

$git clone https://github.com/cmrlweb/CMRL_LARAVEL.git laravel

$cd laravel

$composer install

$nano /etc/apache2/sites-available/000-default.conf
// Change the Document Root to the following and add the following lines below it. The
File will look like this

DocumentRoot /var/www/laravel/public
<Directory /var/www/laravel/public>
        AllowOverride All
        Require all granted
</Directory>

$sudo a2enmod rewrite

$sudo nano /etc/apache2/apache2.conf
//Add the lines after <Directory />...........</Directory> Listing

<Directory /var/www/laravel/public>
        Options Indexes FollowSymLinks MultiViews
        AllowOverride All
        Order allow,deny
        allow from all
        Require all granted
</Directory>

$sudo service apache2 restart

$cd /var/www/laravel/public

$vim .htaccess
//New File
```

```
Options +FollowSymLinks
RewriteEngine On

RewriteCond %{REQUEST_FILENAME} !-d
RewriteCond %{REQUEST_FILENAME} !-f
RewriteRule ^ index.php [L]

//Save file.

$cd /var/www/


$chmod -R 777 laravel
//644 if you want

$cd laravel

$composer install

$vim .env
//Change the DB config. Given in Localhost Setup.
```

3.Now Follow the same for creating an admin as in LocalHOST. using php artisan db:seed

Done. You will now have the webapp running on your IP address.

Installing Android App.

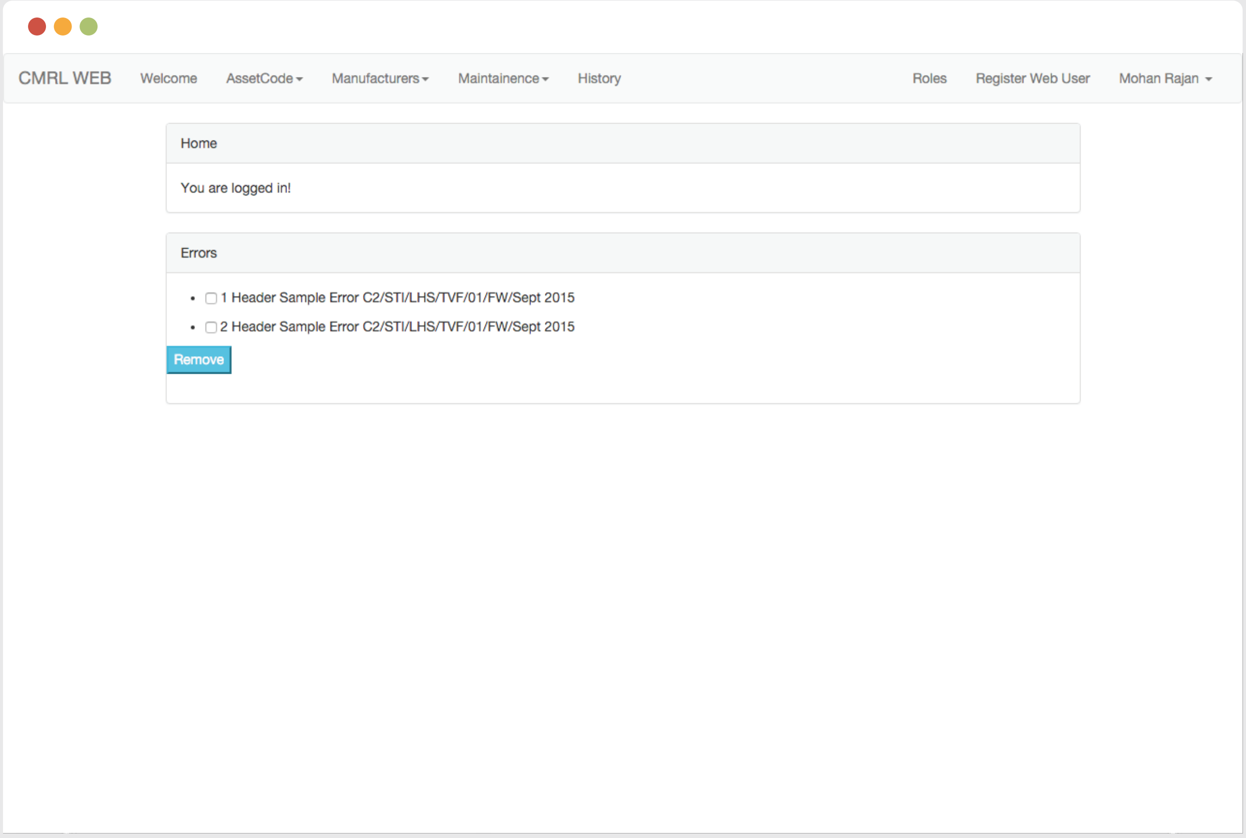
1.Install the APK.
2.Only if the user in registered in webapp , the user can login.
Everything done in the apk will revolve around the logged in user.
3.Follow the tutorial given to the course co-ordinator for use.

Using Webapp (Laravel Framework):

Laravel is an open source PHP Framework, Hence the website is done so that you can resolve any errors by asking the community.

First of all. The website is very simplistic and easy to understand. No complications.

1.Login Page.
2.Asset Codes
3.Maintainence
4.Manufacturers
5.History
6.Report
7.Roles
8.Register Web User.



Home

You are logged in!

Errors

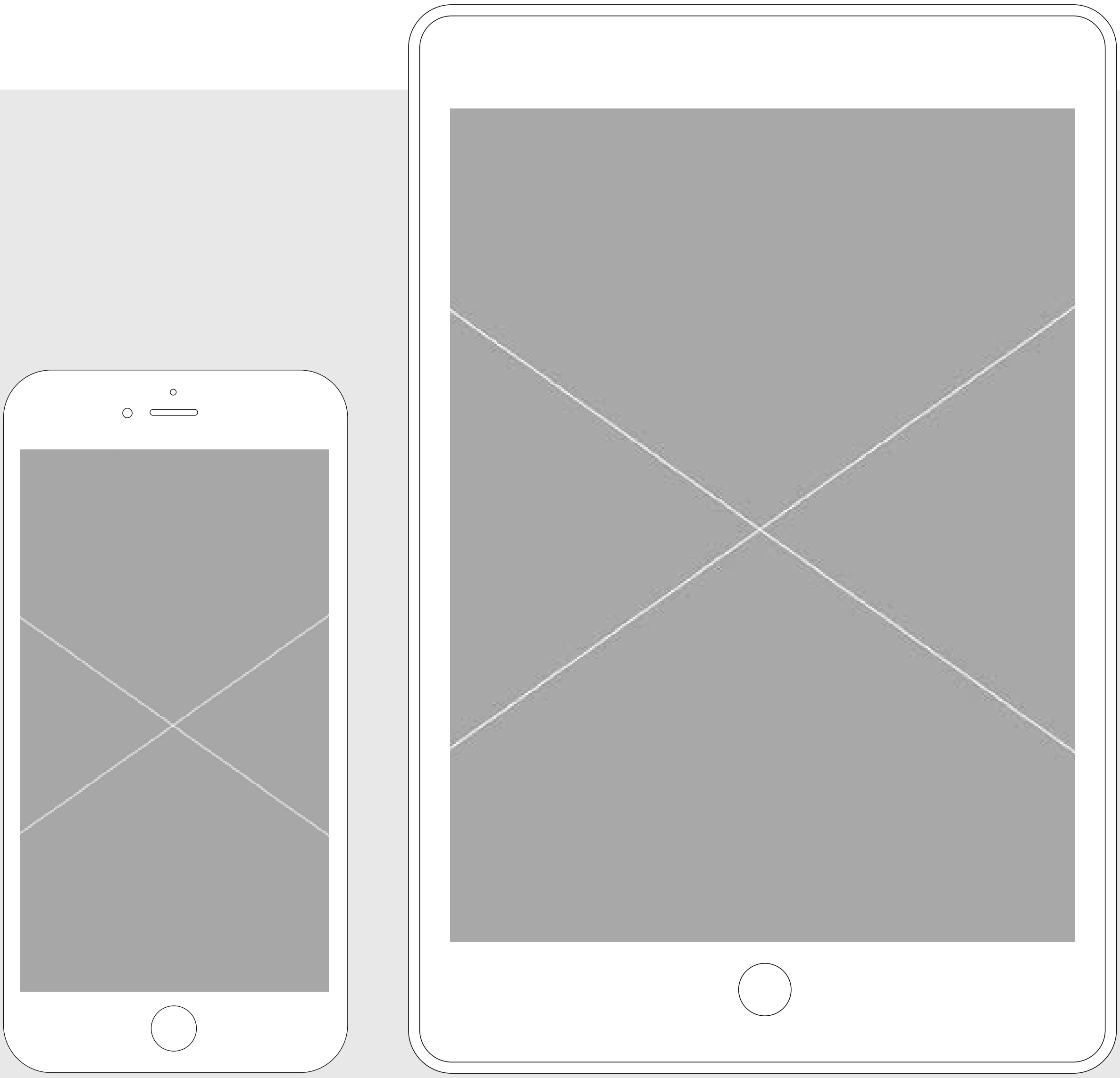
- □ 1 Header Sample Error C2/STI/LHS/TVF/01/FW/Sept 2015
- □ 2 Header Sample Error C2/STI/LHS/TVF/01/FW/Sept 2015

Similiar idea goes for App , Which will be explained later.

Login Page:

The users can be registered in the register page and login in the main page. It is self embedded with laravel so the security is inbuilt. If you want to see the no of customers, you can see it in the database. This page doesnt have soo much history into it.

You can register users and add roles to them by just registering a user in the login page.



Asset Codes Page:

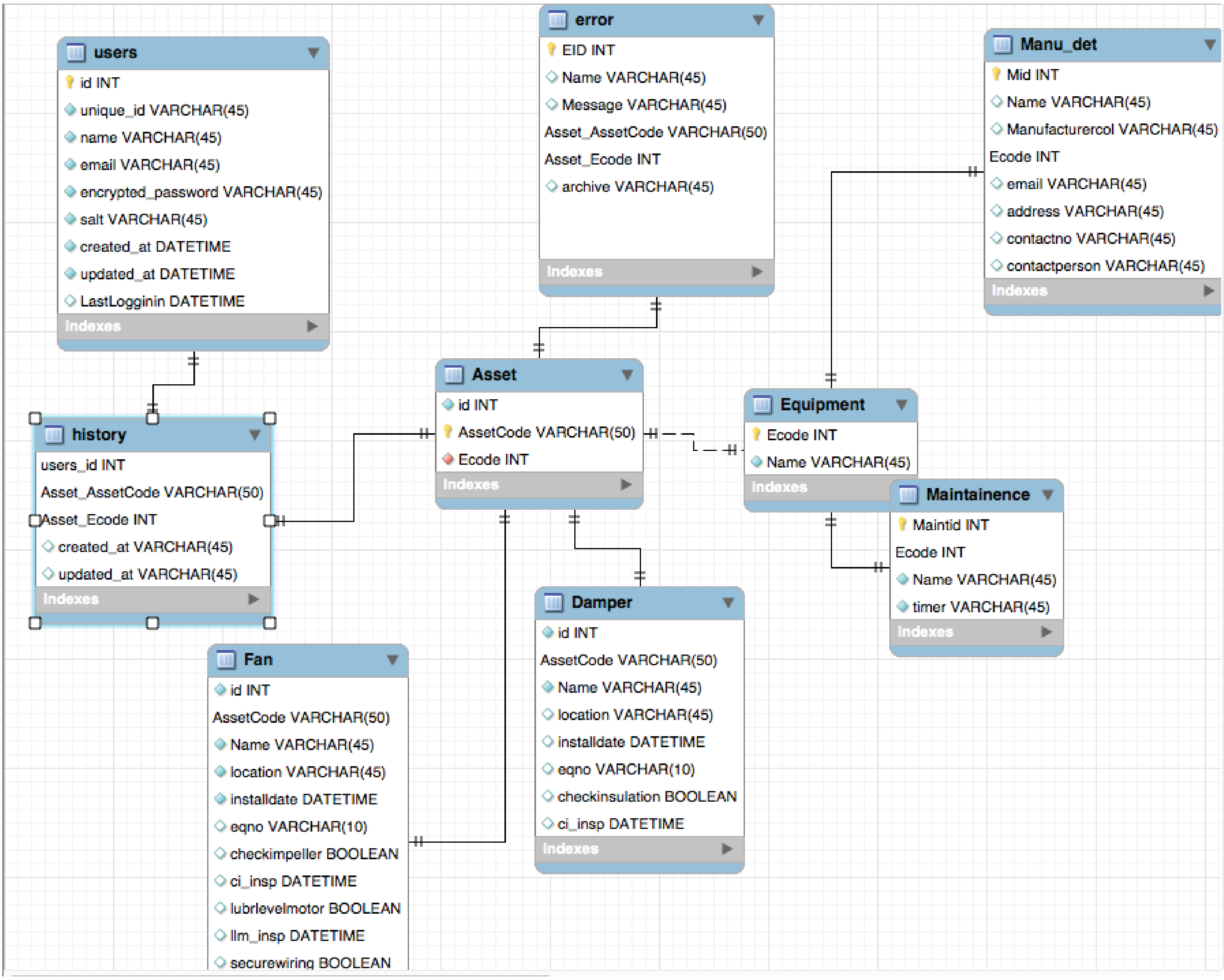
The AssetCodes sets the mark of being an Unique code which is exclusively around which this whole webapp and Android App revolves around. Hence it is Important to Add edit and Maintain them.

Each Assetcode has a unique request to be added. They have to be one of the Equipment. The SQL Workbench Map is listed Below.

So if you need to add an Assetcode. First add Equipment. You can see if there is any pre existing equipments.

Also You can see and Delete Equipments in Mysql Connection from Your Local Machine using Workbench.

You can then add Assetcode. And Note that , it should not have any spelling mistake.



users
id INT
unique_id VARCHAR(45)
name VARCHAR(45)
email VARCHAR(45)
encrypted_password VARCHAR(45)
salt VARCHAR(45)
created_at DATETIME
updated_at DATETIME
LastLogginin DATETIME
Indexes

error
EID INT
Name VARCHAR(45)
Message VARCHAR(45)
Asset_AssetCode VARCHAR(50)
Asset_Ecode INT
archive VARCHAR(45)
Indexes

Manu_det
Mid INT
Name VARCHAR(45)
Manufacturercol VARCHAR(45)
Ecode INT
email VARCHAR(45)
address VARCHAR(45)
contactno VARCHAR(45)
contactperson VARCHAR(45)
Indexes

history
users_id INT
Asset_AssetCode VARCHAR(50)
Asset_Ecode INT
created_at VARCHAR(45)
updated_at VARCHAR(45)
Indexes

Asset
id INT
AssetCode VARCHAR(50)
Ecode INT
Indexes

Equipment
Ecode INT
Name VARCHAR(45)
Indexes

Maintainence
Maintid INT
Ecode INT
Name VARCHAR(45)
timer VARCHAR(45)
Indexes

Damper
id INT
AssetCode VARCHAR(50)
Name VARCHAR(45)
location VARCHAR(45)
installdate DATETIME
eqno VARCHAR(10)
checkinsulation BOOLEAN
ci_insp DATETIME
Indexes

Fan
id INT
AssetCode VARCHAR(50)
Name VARCHAR(45)
location VARCHAR(45)
installdate DATETIME
eqno VARCHAR(10)
checkimpeller BOOLEAN
ci_insp DATETIME
lubrlevelmotor BOOLEAN
llm_insp DATETIME
securewiring BOOLEAN

Adding Equipments First:

For Each Equipment, You have to create table and create certain Checkbox Functions. This part of the report is very important because the models and tables are all connected. I have attached a SQL File in CMRL_ALL>Work File>cmrlmai.sql for reference with data for seeing how a model exists.

Basic Things needed in a Equipment table is :
1.id
2.AssetCode

```
CREATE TABLE `Model_Name` (
  `id` int(100) NOT NULL AUTO_INCREMENT,
  `AssetCode` varchar(100) NOT NULL,
  //Your Checkboxes.
  PRIMARY KEY (`id`)
) ENGINE=MyISAM AUTO_INCREMENT=2 DEFAULT CHARSET=latin1;
```

```
ex:
CREATE TABLE `Tunnel_Ventilation_Damper` (
  `id` int(100) NOT NULL AUTO_INCREMENT,
  `AssetCode` varchar(100) NOT NULL,
  `Clean_Blades` tinyint(1) DEFAULT '0',
  `Clean_Blades_d` varchar(5) NOT NULL,
  `Check_Linkages` tinyint(1) DEFAULT '0',
  `Check_Linkages_d` varchar(5) NOT NULL,
  `Manual_closeopen` tinyint(1) DEFAULT '0',
  `Manual_closeopen_d` varchar(5) NOT NULL,
  `Frame_Tightness` tinyint(1) DEFAULT '0',
  `Frame_Tightness_d` varchar(5) NOT NULL,
  `Actuator_Wiring` tinyint(1) NOT NULL DEFAULT '0',
  `Actuator_Wirig_d` varchar(5) NOT NULL,
  PRIMARY KEY (`id`)
) ENGINE=MyISAM AUTO_INCREMENT=2 DEFAULT CHARSET=latin1;
```

Note that for each Checkbox you have to do this.
1.Add it in Maintainence table Checkbox_Name.
2.Add 2 fields in the Equipment table i) CheckBox_Name ii)CheckBox_Name_d

Maintainence table and equipment table are interlinked. CASE SENSITIVE.

1.Checkbox_Name : (BOOLEAN)Name of the Checkbox.
2.Checkbox_Name : (varchar{5})Days before its expiry. (1 Month - 30 Days.).

It'll Keep on decreasing everyday and we schedule and cron job in your server that will run a POST url to decrease the day Checkbox and Make the boolean go to NULL.

Adding Maintainence List:

For Each Checkbox you have to create a Maintainence List. You can do this through the webapp . You just have to create the equipment model , Then Create an equipment through web , You dont worry about linking db and your webapp creation. Now you have to create Checkboxes exactly same to what you did in db in your webapp. And make sure they are linked to the same Equipment. Theyll Create the Ecode Depending on what Information you Provide.

Adding Manufacturers List:

Its pretty easy considered with Equipments and AssetCodes. You just go to the webapp , select the equipment and add the manufacturer.

The main thing in the webapp is the AssetCode -> Equipment -> Maintainence.