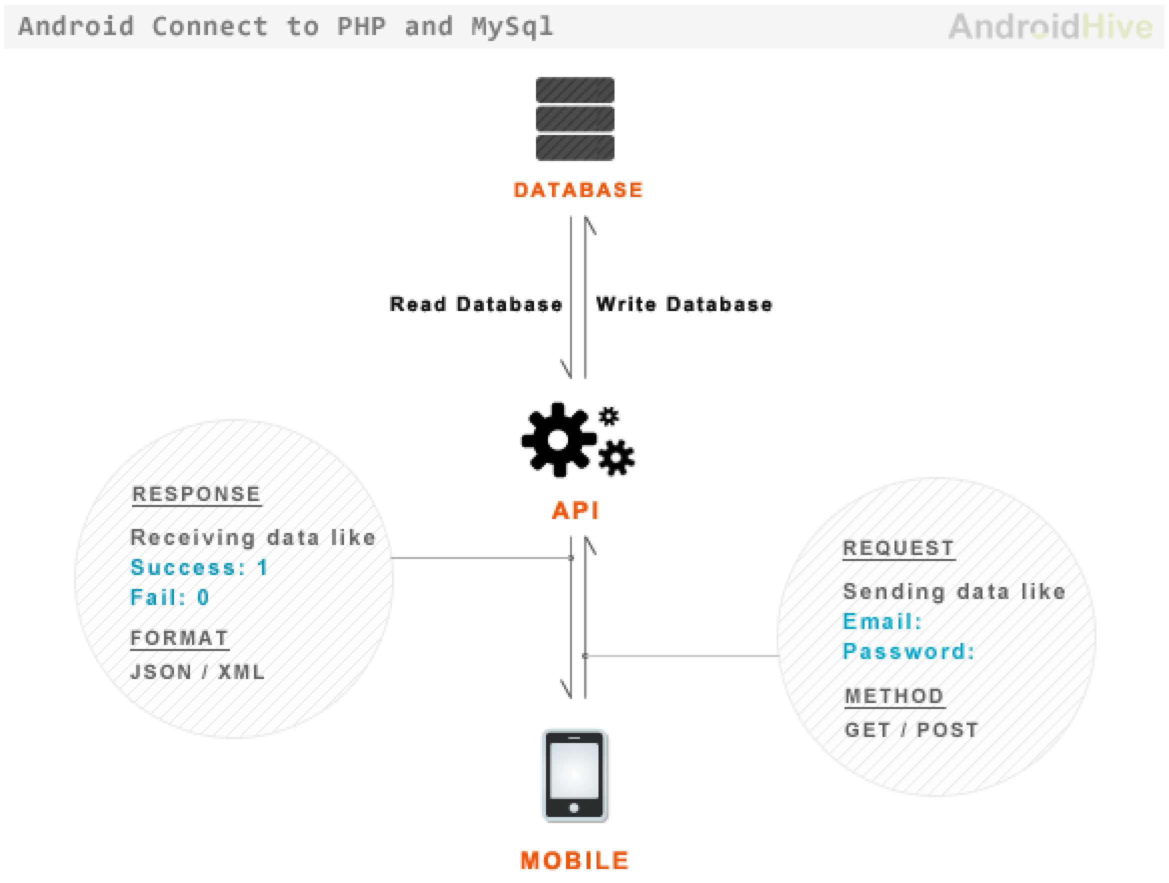
## Prerequisites

This tutorial is combination of some of my previous tutorials. I hope you covered these tutorials before.
Android making HTTP Requests
Android JSON Parsing Tutorial
Android SQLite Database Tutorial
Android Login and Registration Screen Design

## API (Application Programming Interface)

⇒ Accepting requests by GET/POST methods
⇒ Interact with PHP classes to get data from database or store in database
⇒ Finally will give output in JSON format



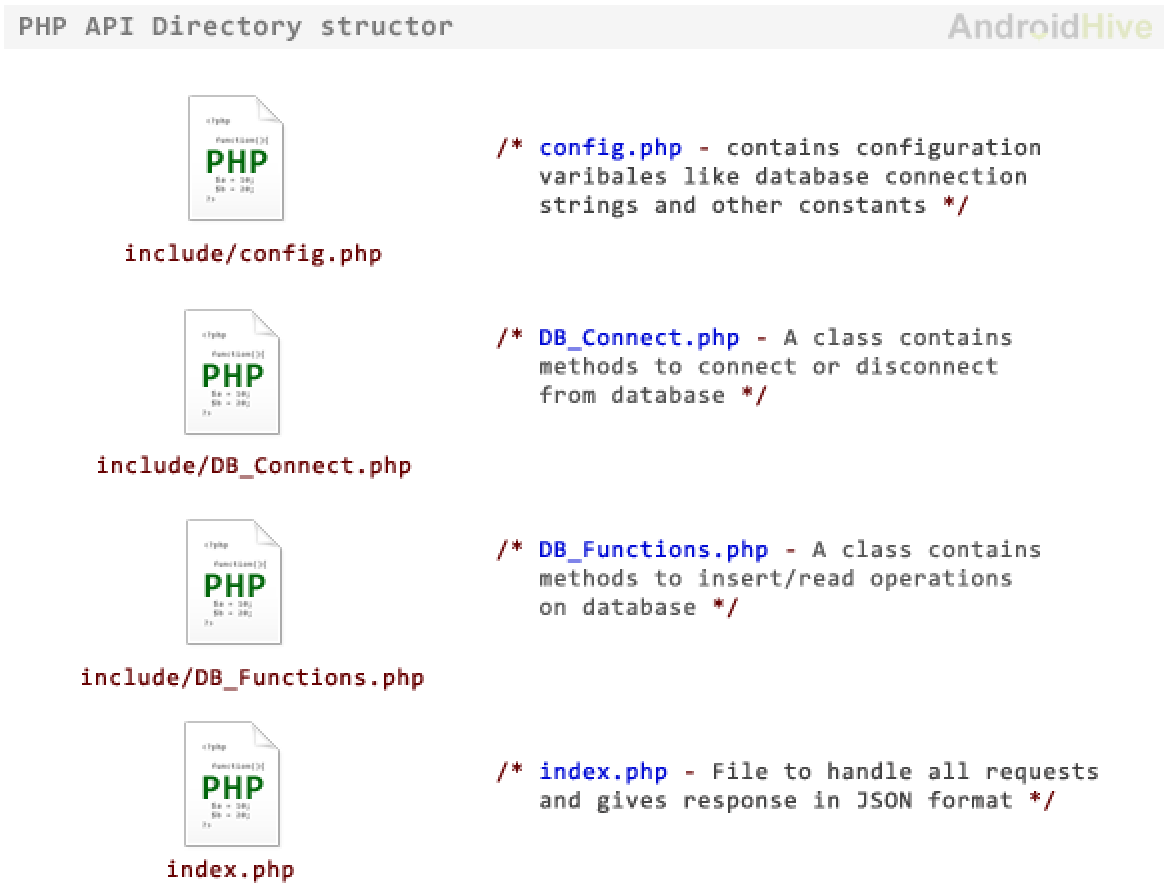
## 1. Creating MySQL Database and Tables

As I am writing API in PHP I selected MySql database to maintain users and other related information. Open your **mysql console** or **phpmyadmin** and run following query to create database and users table.

```
create database android_api /** Creating Database **/

use android_api /** Selecting Database **/

create table users(

   uid int(11) primary key auto_increment,

   unique_id varchar(23) not null unique,

   name varchar(50) not null,

   email varchar(100) not null unique,

   encrypted_password varchar(80) not null,

   salt varchar(10) not null,

   created_at datetime,

   updated_at datetime null

); /** Creating Users Table **/
```

## 2. Building PHP API Classes

To make it minimum i tried to use less number of php files. Following are the files are required to build API in php. You can find description of each file in the below image.



```
PHP API Directory structor                                AndroidHive

include/config.php          /* config.php - contains configuration
                               varibales like database connection
                               strings and other constants */

include/DB_Connect.php      /* DB_Connect.php - A class contains
                               methods to connect or disconnect
                               from database */

include/DB_Functions.php    /* DB_Functions.php - A class contains
                               methods to insert/read operations
                               on database */

index.php                   /* index.php - File to handle all requests
                               and gives response in JSON format */
```

**config.php** – This file contains constant variables to connect to database.

```php
<?php

/**

 * Database config variables

 */

define("DB_HOST", "localhost");

define("DB_USER", "root");

define("DB_PASSWORD", "");

define("DB_DATABASE", "android_api");

?>
```

**DB_Connect.php** – This file is used to connect or disconnect to database.

```
<?php

class DB_Connect {

    // constructor
    function __construct() {

    }

    // destructor
    function __destruct() {
        // $this->close();
    }

    // Connecting to database
    public function connect() {
        require_once 'config.php';
        // connecting to mysql
        $con = mysql_connect(DB_HOST, DB_USER, DB_PASSWORD);
        // selecting database
        mysql_select_db(DB_DATABASE);

        // return database handler
        return $con;
    }

    // Closing database connection
    public function close() {
        mysql_close();
    }

}

?>
```

**DB_Functions.php –** This file contains functions to store user in database, get user from database. You can also add methods like update user, delete user.

**user unique id –** I am generating unique user id in php using **uniqid(”, true)** function. Sample user id will be like **4f074eca601fb8.88015924**

**Encrypted Password –** This password is stored using **base64_encode** method. Each password will need two columns to store in database. One is to store **encrypted password**and second column is to store **salt** used to encrypt the password.

```
<?php

class DB_Functions {

    private $db;

    //put your code here
    // constructor
    function __construct() {
        require_once 'DB_Connect.php';
        // connecting to database
        $this->db = new DB_Connect();
        $this->db->connect();
    }
    // destructor
    function __destruct() {


    }


    /**
     * Storing new user
     * returns user details
     */
    public function storeUser($name, $email, $password) {
        $uuid = uniqid('', true);
        $hash = $this->hashSSHA($password);
        $encrypted_password = $hash["encrypted"]; // encrypted password
        $salt = $hash["salt"]; // salt
        $result = mysql_query("INSERT INTO users(unique_id, name, email, encrypted_passwor
'$email', '$encrypted_password', '$salt', NOW())");
        // check for successful store
        if ($result) {
            // get user details
            $uid = mysql_insert_id(); // last inserted id
            $result = mysql_query("SELECT * FROM users WHERE uid = $uid");
            // return user details
            return mysql_fetch_array($result);
        } else {
            return false;
        }
    }
```

```
/**
 * Get user by email and password
 */
public function getUserByEmailAndPassword($email, $password) {
    $result = mysql_query("SELECT * FROM users WHERE email = '$email'") or die(mysql_er
    // check for result
    $no_of_rows = mysql_num_rows($result);
    if ($no_of_rows > 0) {
        $result = mysql_fetch_array($result);
        $salt = $result['salt'];
        $encrypted_password = $result['encrypted_password'];
        $hash = $this->checkhashSSHA($salt, $password);
        // check for password equality
        if ($encrypted_password == $hash) {
            // user authentication details are correct
            return $result;
        }
    } else {
        // user not found
        return false;
    }
}

/**
 * Check user is existed or not
 */
```

```
    public function isUserExisted($email) {
        $result = mysql_query("SELECT email from users WHERE email = '$email'");
        $no_of_rows = mysql_num_rows($result);
        if ($no_of_rows > 0) {
            // user existed
            return true;
        } else {
            // user not existed
            return false;
        }
    }

    /**
     * Encrypting password
     * @param password
     * returns salt and encrypted password
     */
    public function hashSSHA($password) {

        $salt = sha1(rand());
        $salt = substr($salt, 0, 10);
        $encrypted = base64_encode(sha1($password . $salt, true) . $salt);
        $hash = array("salt" => $salt, "encrypted" => $encrypted);
        return $hash;
    }

    /**
```

```
     * Decrypting password

     * @param salt, password

     * returns hash string

     */

    public function checkhashSSHA($salt, $password) {


        $hash = base64_encode(sha1($password . $salt, true) . $salt);


        return $hash;

    }


}


?>
```

**index.php** – This file plays role of accepting requests and giving response. This file accepts all GET and POST requests. On each request it will talk to database and will give appropriate response in JSON format.

```
<?php

/**

 * File to handle all API requests

 * Accepts GET and POST

 *

 * Each request will be identified by TAG

 * Response will be JSON data


  /**

 * check for POST request

 */
```

```
if (isset($_POST['tag']) && $_POST['tag'] != '') {

    // get tag

    $tag = $_POST['tag'];


    // include db handler

    require_once 'include/DB_Functions.php';

    $db = new DB_Functions();


    // response Array

    $response = array("tag" => $tag, "success" => 0, "error" =>
0);


    // check for tag type

    if ($tag == 'login') {

        // Request type is check Login

        $email = $_POST['email'];

        $password = $_POST['password'];


        // check for user

        $user = $db->getUserByEmailAndPassword($email,
$password);

        if ($user != false) {

            // user found

            // echo json with success = 1

            $response["success"] = 1;

            $response["uid"] = $user["unique_id"];

            $response["user"]["name"] = $user["name"];

            $response["user"]["email"] = $user["email"];
            $response["user"]["created_at"] =
$user["created_at"];

            $response["user"]["updated_at"] =
$user["updated_at"];

            echo json_encode($response);

        } else {

            // user not found

            // echo json with error = 1

            $response["error"] = 1;

            $response["error_msg"] = "Incorrect email or
password!";

            echo json_encode($response);

        }

    } else if ($tag == 'register') {

        // Request type is Register new user

        $name = $_POST['name'];

        $email = $_POST['email'];

        $password = $_POST['password'];


        // check if user is already existed

        if ($db->isUserExisted($email)) {

            // user is already existed - error response

            $response["error"] = 2;

            $response["error_msg"] = "User already existed";

            echo json_encode($response);

        } else {

            // store user

            $user = $db->storeUser($name, $email, $password);

            if ($user) {
                // user stored successfully

                $response["success"] = 1;

                $response["uid"] = $user["unique_id"];

                $response["user"]["name"] = $user["name"];

                $response["user"]["email"] = $user["email"];

                $response["user"]["created_at"] =
$user["created_at"];

                $response["user"]["updated_at"] =
$user["updated_at"];

                echo json_encode($response);

            } else {

                // user failed to store

                $response["error"] = 1;

                $response["error_msg"] = "Error occured in
Registartion";

                echo json_encode($response);

            }

        }

    } else {

        echo "Invalid Request";

    }

} else {

    echo "Access Denied";

}

?>
```

## Types of API JSON Responses

The following are the different types of JSON responses generated by API.
**Registration Success Response – Success Code = 1 (User Successfully Stored)**

```
{
    "tag": "register",
    "success": 1,
    "error": 0,
    "uid": "4f074ca1e3df49.06340261",
    "user": {
        "name": "Ravi Tamada",
        "email": "ravi8x@gmail.com",
        "created_at": "2012-01-07 01:03:53",
        "updated_at": null
    }
}
```

**Registration Error Response – Error Code = 1 (Error in storing)**

```
{
    "tag": "register",
    "success": 0,
    "error": 1,
    "error_msg": "Error occured in Registartion"
}
```

**Registration Error Response – Error Code = 2 (User Already Existed)**

```
{
    "tag": "register",
    "success": 0,
    "error": 2,
    "error_msg": "User already existed"
}
```

**Login Success Response – Success Code = 1 (User Logged in)**

```
{

    "tag": "login",

    "success": 1,

    "error": 0,

    "uid": "4f074eca601fb8.88015924",

    "user": {

        "name": "Ravi Tamada",

        "email": "ravi8x@gmail.com",

        "created_at": "2012-01-07 01:03:53",

        "updated_at": null

    }

}
```

**Login Error Response – Error Code = 1 (Login Error – Incorrect username/password)**

```
{

    "tag": "login",

    "success": 0,

    "error": 1,

    "error_msg": "Incorrect email or password!"

}
```

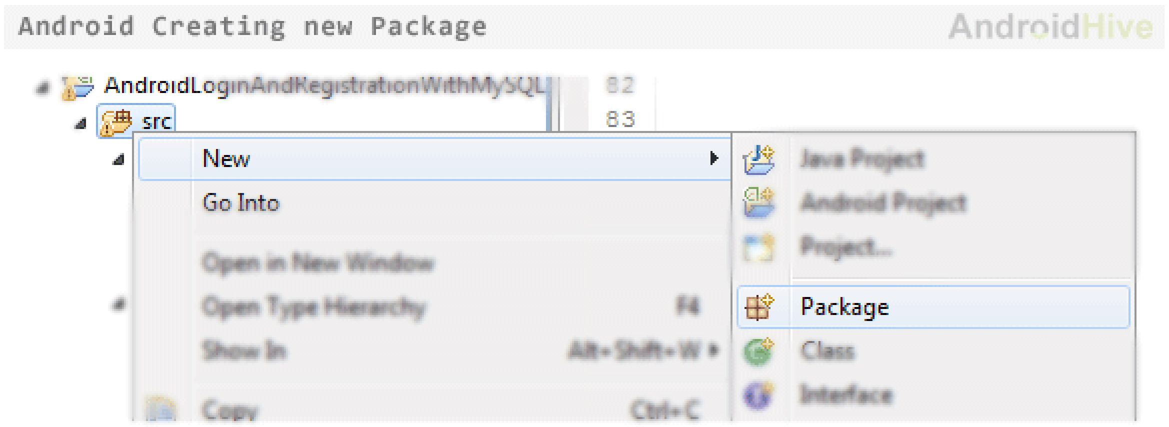
Here it completes the API part and start the Android Project.

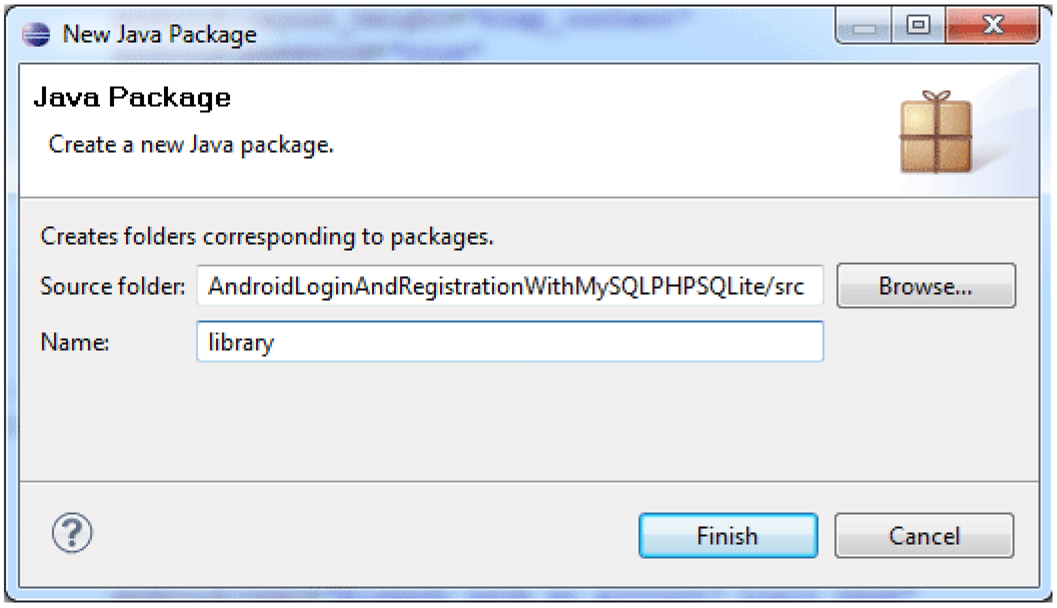
## 3. Starting Android Project

Until now we wrote server side programming to build simple api. Next thing is build android app to interact with the API. In this project i am coding simple app which will have three screens **Login Screen**, **Registration Screen** and a welcome **Dashboard Screen**. So let's get started by creating new project in you Eclipse IDE.

1. Create a new project by going to **File ⇒ New Android Project**. Fill all the details and name your activity as *DashboardActivity*.

2. Next step is to create a new package to store all our library files. **Right Click on ⇒ src ⇒ New ⇒ Package** and name it as **library**.





Creates folders corresponding to packages.

Source folder: AndroidLoginAndRegistrationWithMySQLPHPSQLite/src

Name: library

## JSON Parser Class

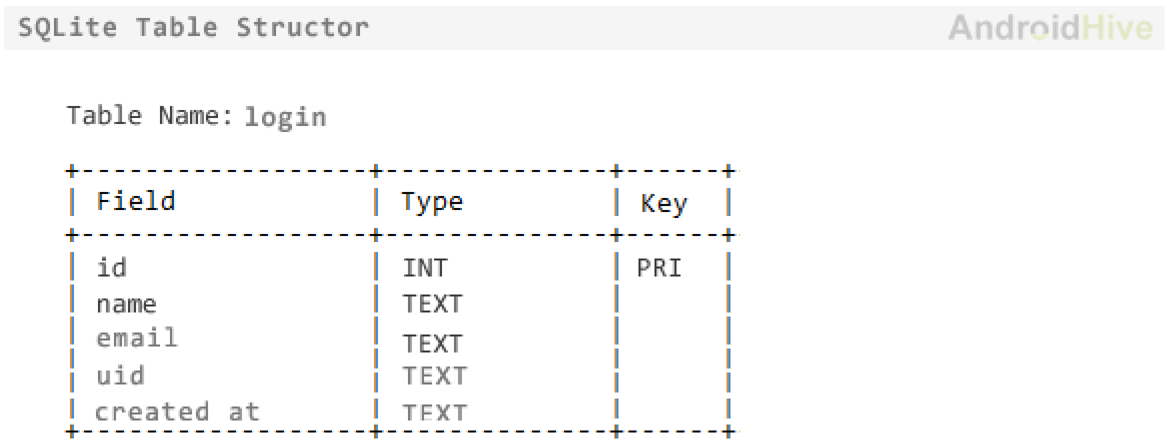
3. Next we need parser class to parse api response JSON. So create a new class in your library package name it as **JSONParser.java** and fill it with following code.

JSONParser.java

```
package com.example.androidhive.library;



import java.io.BufferedReader;

import java.io.IOException;
import java.io.InputStream;

import java.io.InputStreamReader;

import java.io.UnsupportedEncodingException;

import java.util.List;


import org.apache.http.HttpEntity;

import org.apache.http.HttpResponse;

import org.apache.http.NameValuePair;

import org.apache.http.client.ClientProtocolException;

import org.apache.http.client.entity.UrlEncodedFormEntity;

import org.apache.http.client.methods.HttpPost;

import org.apache.http.impl.client.DefaultHttpClient;

import org.json.JSONException;

import org.json.JSONObject;


import android.util.Log;


public class JSONParser {


    static InputStream is = null;

    static JSONObject jObj = null;

    static String json = "";


    // constructor

    public JSONParser() {


    }
    public JSONObject getJSONFromUrl(String url,
List<NameValuePair> params) {


        // Making HTTP request

        try {

            // defaultHttpClient

            DefaultHttpClient httpClient = new
DefaultHttpClient();

            HttpPost httpPost = new HttpPost(url);

            httpPost.setEntity(new
UrlEncodedFormEntity(params));


            HttpResponse httpResponse =
httpClient.execute(httpPost);

            HttpEntity httpEntity = httpResponse.getEntity();

            is = httpEntity.getContent();


        } catch (UnsupportedEncodingException e) {

            e.printStackTrace();

        } catch (ClientProtocolException e) {

            e.printStackTrace();

        } catch (IOException e) {

            e.printStackTrace();

        }


        try {

            BufferedReader reader = new BufferedReader(new
InputStreamReader(
                    is, "iso-8859-1"), 8);
            StringBuilder sb = new StringBuilder();
            String line = null;
            while ((line = reader.readLine()) != null) {
                sb.append(line + "n");
            }
            is.close();
            json = sb.toString();
            Log.e("JSON", json);
        } catch (Exception e) {
            Log.e("Buffer Error", "Error converting result " +
e.toString());
        }

        // try parse the string to a JSON object
        try {
            jObj = new JSONObject(json);
        } catch (JSONException e) {
            Log.e("JSON Parser", "Error parsing data " +
e.toString());
        }

        // return JSON String
        return jObj;

    }
}
```

## SQLite Database Handler Class

**4**. In the application to store user information i am using SQLite Database. So create new class in you library package folder and name it as **DatabaseHandler.java** and fill the class with following code. This class file has functions to handle database operations like storing user and getting user.



SQLite Table Structor AndroidHive

Table Name: login

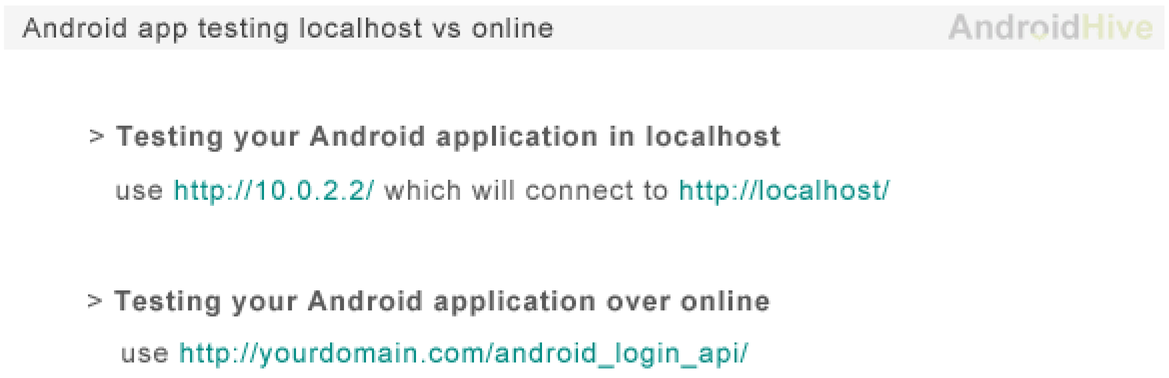
| Field | Type | Key |
|---|---|---|
| id | INT | PRI |
| name | TEXT | |
| email | TEXT | |
| uid | TEXT | |
| created at | TEXT | |

DatabaseHandler.java

```
package com.example.androidhive.library;


import java.util.HashMap;


import android.content.ContentValues;

import android.content.Context;

import android.database.Cursor;

import android.database.sqlite.SQLiteDatabase;

import android.database.sqlite.SQLiteOpenHelper;


public class DatabaseHandler extends SQLiteOpenHelper {


    // All Static variables

    // Database Version
    private static final int DATABASE_VERSION = 1;


    // Database Name

    private static final String DATABASE_NAME = "android_api";


    // Login table name

    private static final String TABLE_LOGIN = "login";


    // Login Table Columns names

    private static final String KEY_ID = "id";

    private static final String KEY_NAME = "name";

    private static final String KEY_EMAIL = "email";

    private static final String KEY_UID = "uid";

    private static final String KEY_CREATED_AT = "created_at";


    public DatabaseHandler(Context context) {

        super(context, DATABASE_NAME, null,
DATABASE_VERSION);

    }



    // Creating Tables

    @Override

    public void onCreate(SQLiteDatabase db) {

        String CREATE_LOGIN_TABLE = "CREATE TABLE " +
TABLE_LOGIN + "("

                + KEY_ID + " INTEGER PRIMARY KEY,"

                + KEY_NAME + " TEXT,"

                + KEY_EMAIL + " TEXT UNIQUE,"
                + KEY_UID + " TEXT,"

                + KEY_CREATED_AT + " TEXT" + ")";

        db.execSQL(CREATE_LOGIN_TABLE);

    }



    // Upgrading database

    @Override

    public void onUpgrade(SQLiteDatabase db, int oldVersion, 
int newVersion) {

        // Drop older table if existed

        db.execSQL("DROP TABLE IF EXISTS " + TABLE_LOGIN);


        // Create tables again

        onCreate(db);

    }



    /**

     * Storing user details in database

     * */

    public void addUser(String name, String email, String uid, 
String created_at) {

        SQLiteDatabase db = this.getWritableDatabase();


        ContentValues values = new ContentValues();

        values.put(KEY_NAME, name); // Name

        values.put(KEY_EMAIL, email); // Email

        values.put(KEY_UID, uid); // Email

        values.put(KEY_CREATED_AT, created_at); // Created At
        // Inserting Row
        db.insert(TABLE_LOGIN, null, values);
        db.close(); // Closing database connection
    }

    /**
     * Getting user data from database
     * */
    public HashMap<String, String> getUserDetails(){
        HashMap<String,String> user = new
HashMap<String,String>();
        String selectQuery = "SELECT  * FROM " + TABLE_LOGIN;

        SQLiteDatabase db = this.getReadableDatabase();
        Cursor cursor = db.rawQuery(selectQuery, null);
        // Move to first row
        cursor.moveToFirst();
        if(cursor.getCount() > 0){
            user.put("name", cursor.getString(1));
            user.put("email", cursor.getString(2));
            user.put("uid", cursor.getString(3));
            user.put("created_at", cursor.getString(4));
        }
        cursor.close();
        db.close();
        // return user
        return user;
    }


    /**
     * Getting user login status
     * return true if rows are there in table
     * */
    public int getRowCount() {
        String countQuery = "SELECT  * FROM " + TABLE_LOGIN;
        SQLiteDatabase db = this.getReadableDatabase();
        Cursor cursor = db.rawQuery(countQuery, null);
        int rowCount = cursor.getCount();
        db.close();
        cursor.close();

        // return row count
        return rowCount;
    }


    /**
     * Re crate database
     * Delete all tables and create them again
     * */
    public void resetTables(){
        SQLiteDatabase db = this.getWritableDatabase();
        // Delete All Rows
        db.delete(TABLE_LOGIN, null, null);
        db.close();
        }
}
```

## User Functions Class

5. Create a new class file under library package and name it as **UserFunctions.java**. This class will have functions to handle all user events like
**loginUser()**
**registerUser()**
**getLoginStatus()**
**logoutUser()**.



Android app testing localhost vs online AndroidHive

> **Testing your Android application in localhost**

use http://10.0.2.2/ which will connect to http://localhost/

> **Testing your Android application over online**

use http://yourdomain.com/android_login_api/

In this class all the functions will interact with JSONParser, DatabaseHandler classes. I am testing API in localhost using xampp software. Normally localhost will run on port http://127.0.0.1 or http://localhost/. In AVD to connect to localhost you need to use url**http://10.0.2.2/** instead of **http://localhost/**. If you want deploy your api on website the use the url http://yoursite.com/api/

UserFunctions.java

```
package com.example.androidhive.library;


import java.util.ArrayList;

import java.util.List;


import org.apache.http.NameValuePair;

import org.apache.http.message.BasicNameValuePair;

import org.json.JSONObject;
import android.content.Context;

public class UserFunctions {

    private JSONParser jsonParser;

    // Testing in localhost using wamp or xampp
    // use http://10.0.2.2/ to connect to your localhost ie
http://localhost/
    private static String loginURL =
"http://10.0.2.2/ah_login_api/";
    private static String registerURL =
"http://10.0.2.2/ah_login_api/";

    private static String login_tag = "login";
    private static String register_tag = "register";

    // constructor
    public UserFunctions(){
        jsonParser = new JSONParser();
    }

    /**
     * function make Login Request
     * @param email
     * @param password
     * */
    public JSONObject loginUser(String email, String
password){

        // Building Parameters

        List<NameValuePair> params = new
ArrayList<NameValuePair>();

        params.add(new BasicNameValuePair("tag", login_tag));

        params.add(new BasicNameValuePair("email", email));

        params.add(new BasicNameValuePair("password",
password));

        JSONObject json = jsonParser.getJSONFromUrl(loginURL,
params);

        // return json

        // Log.e("JSON", json.toString());

        return json;

    }



    /**

     * function make Login Request

     * @param name

     * @param email

     * @param password

     * */

    public JSONObject registerUser(String name, String email,
String password){

        // Building Parameters

        List<NameValuePair> params = new
ArrayList<NameValuePair>();

        params.add(new BasicNameValuePair("tag",
register_tag));

        params.add(new BasicNameValuePair("name", name));
        params.add(new BasicNameValuePair("email", email));
        params.add(new BasicNameValuePair("password",
password));


        // getting JSON Object
        JSONObject json =
jsonParser.getJSONFromUrl(registerURL, params);
        // return json
        return json;
    }


    /**
     * Function get Login status
     * */
    public boolean isUserLoggedIn(Context context){
        DatabaseHandler db = new DatabaseHandler(context);
        int count = db.getRowCount();
        if(count > 0){
            // user logged in
            return true;
        }
        return false;
    }


    /**
     * Function to logout user
     * Reset Database
     * */
    public boolean logoutUser(Context context){

        DatabaseHandler db = new DatabaseHandler(context);

        db.resetTables();

        return true;

    }



}
```

## Designing the Screens

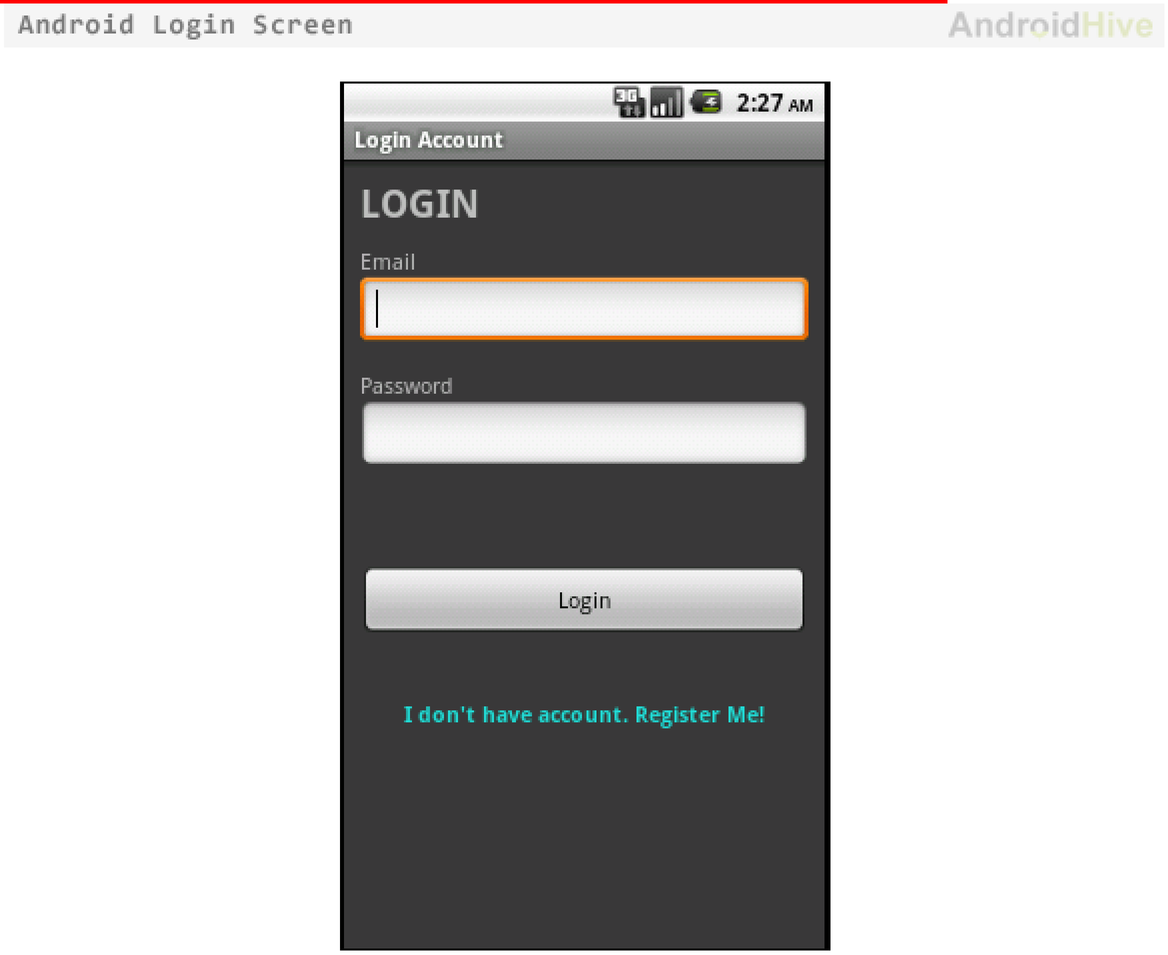
**6**. Until now we have developed the library classes needed in this application. Next thing is build screens. We need three screens Login Screen, Registration Screen and Dashboard Screen. Create 3 xml files under **res ⇒ layout folde**r and name them as **login.xml**,**register.xml** and **dashboard.xml**

**login.xml – login screen design layout**

login.xml

```
<?xml version="1.0" encoding="utf-8"?>

<ScrollView
xmlns:android="http://schemas.android.com/apk/res/android"

    android:layout_width="fill_parent"

    android:layout_height="fill_parent"

    android:background="#3b3b3b" >



    <LinearLayout

        android:layout_width="fill_parent"

        android:layout_height="fill_parent"

        android:orientation="vertical"

        android:padding="10dip" >

        <!--  View Title Label -->

        <TextView

            android:layout_width="fill_parent"
            android:layout_height="wrap_content"

            android:layout_marginBottom="10dip"

            android:text="LOGIN"

            android:textSize="25dip"

            android:textStyle="bold" />

        <!--  Email Label -->

        <TextView

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:text="Email" />

        <!--  Email TextField -->

        <EditText

            android:id="@+id/loginEmail"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content" />


        <!--  Password Label -->

        <TextView

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:layout_marginTop="15dip"

            android:text="Password" />

        <!--  Password TextField -->

        <EditText

            android:id="@+id/loginPassword"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"
```

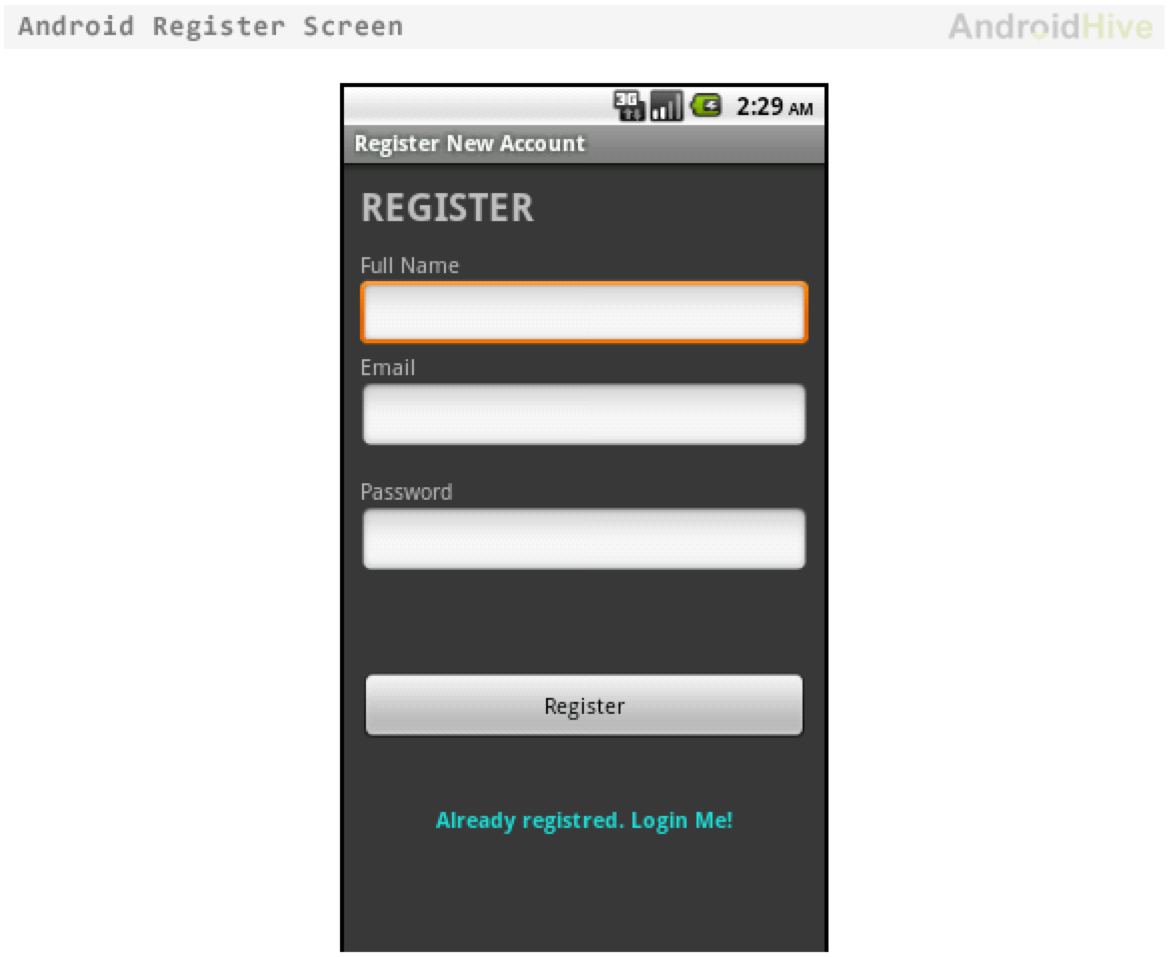
```
            android:password="true" />


        <!--  Error message -->
        <TextView android:id="@+id/login_error"
                    android:layout_width="fill_parent"
                    android:layout_height="wrap_content"
                    android:textColor="#e30000"
                    android:padding="10dip"
                    android:textStyle="bold"/>


        <!--  Login Button -->
        <Button
            android:id="@+id/btnLogin"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="20dip"
            android:text="Login" />


        <!--  Link to Registration Screen -->
        <Button
            android:id="@+id/btnLinkToRegisterScreen"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="40dip"
            android:background="@null"
            android:text="I don&apos;t have account. Register
Me!"
            android:textColor="#21dbd4"
            android:textStyle="bold" />

    </LinearLayout>



</ScrollView>
```



**register.xml – registration screen design layout**

register.xml

```
<?xml version="1.0" encoding="utf-8"?>

<ScrollView
xmlns:android="http://schemas.android.com/apk/res/android"

    android:layout_width="fill_parent"

    android:layout_height="fill_parent"
    android:background="#3b3b3b" >


    <LinearLayout

        android:layout_width="fill_parent"

        android:layout_height="fill_parent"

        android:orientation="vertical"

        android:padding="10dip" >

        <!--  View Title Label -->

        <TextView

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:layout_marginBottom="10dip"

            android:text="REGISTER"

            android:textSize="25dip"

            android:textStyle="bold" />

        <!--  Name Label -->

        <TextView

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:text="Full Name" />

        <!--  Name TextField -->

        <EditText

            android:id="@+id/registerName"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content" />


        <!--  Email Label -->
        <TextView

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:text="Email" />

        <!--  Email TextField -->

        <EditText

            android:id="@+id/registerEmail"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content" />



        <!--  Password Label -->

        <TextView

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:layout_marginTop="15dip"

            android:text="Password" />

        <!--  Password TextField -->

        <EditText

            android:id="@+id/registerPassword"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:password="true" />



        <!--  Error message -->

        <TextView android:id="@+id/register_error"

                    android:layout_width="fill_parent"

                    android:layout_height="wrap_content"
                    android:textColor="#e30000"

                    android:padding="10dip"

                    android:textStyle="bold"/>


        <!--  Login Button -->

        <Button

            android:id="@+id/btnRegister"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:layout_marginTop="20dip"

            android:text="Register" />


        <!--  Link to Login Screen -->

        <Button

            android:id="@+id/btnLinkToLoginScreen"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:layout_marginTop="40dip"

            android:background="@null"

            android:text="Already registred. Login Me!"

            android:textColor="#21dbd4"

            android:textStyle="bold" />

    </LinearLayout>


</ScrollView>
```



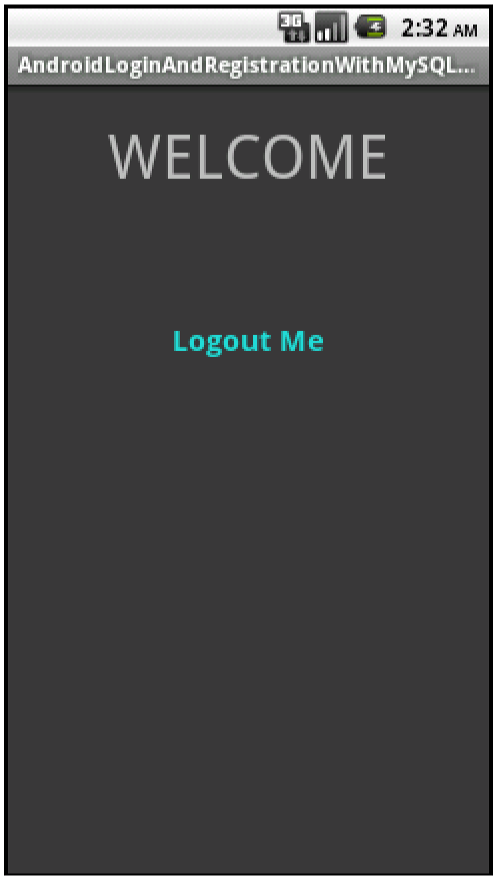
**dashboard.xml – dashboard screen design layout**

dashboard.xml

```
<?xml version="1.0" encoding="utf-8"?>

<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:orientation="vertical"

    android:background="#3b3b3b">



    <TextView android:layout_width="fill_parent"
```

```
              android:layout_height="wrap_content"

              android:text="WELCOME"

              android:textSize="40dip"

              android:gravity="center"

              android:layout_marginTop="20dip"/>


    <Button android:layout_width="fill_parent"

        android:layout_height="wrap_content"

        android:text="Logout Me"

        android:textSize="20dip"

        android:textColor="#21dbd4"

        android:textStyle="bold"

        android:id="@+id/btnLogout"

        android:layout_marginTop="80dip"

        android:background="@null"/>


</LinearLayout>
```

Android Dashboard Screen AndroidHive



## Switching between Activites

7. Now the designing part of the app is done next thing is to create activities for each layout and write functionality to achieve login and registration process. Create new activities **LoginActivity.java** and **RegisterActivity.java** and fill them with respective code below.

**LoginActivity.java – Activity to handle login event**

LoginActivity.java

```
package com.example.androidhive;

import java.util.HashMap;

import org.json.JSONException;
import org.json.JSONObject;


import android.app.Activity;
import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;


import com.example.androidhive.library.DatabaseHandler;
import com.example.androidhive.library.UserFunctions;


public class LoginActivity extends Activity {
    Button btnLogin;
    Button btnLinkToRegister;
    EditText inputEmail;
    EditText inputPassword;
    TextView loginErrorMsg;


    // JSON Response node names
    private static String KEY_SUCCESS = "success";
    private static String KEY_ERROR = "error";
    private static String KEY_ERROR_MSG = "error_msg";
    private static String KEY_UID = "uid";
    private static String KEY_NAME = "name";
    private static String KEY_EMAIL = "email";
    private static String KEY_CREATED_AT = "created_at";

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.login);

        // Importing all assets like buttons, text fields
        inputEmail = (EditText) findViewById(R.id.loginEmail);
        inputPassword = (EditText) findViewById(R.id.loginPassword);
        btnLogin = (Button) findViewById(R.id.btnLogin);
        btnLinkToRegister = (Button) findViewById(R.id.btnLinkToRegisterScreen);
        loginErrorMsg = (TextView) findViewById(R.id.login_error);

        // Login button Click Event
        btnLogin.setOnClickListener(new View.OnClickListener() {

            public void onClick(View view) {
                String email = inputEmail.getText().toString();
                String password = inputPassword.getText().toString();
                UserFunctions userFunction = new UserFunctions();
                JSONObject json = userFunction.loginUser(email, password);

                // check for login response
                try {
                    if (json.getString(KEY_SUCCESS) != null) {
                        loginErrorMsg.setText("");

                        String res = json.getString(KEY_SUCCESS);

                        if(Integer.parseInt(res) == 1){

                            // user successfully logged in

                            // Store user details in SQLite Database

                            DatabaseHandler db = new DatabaseHandler(getApplicationContext(

                            JSONObject json_user = json.getJSONObject("user");


                            // Clear all previous data in database

                            userFunction.logoutUser(getApplicationContext());

                            db.addUser(json_user.getString(KEY_NAME), json_user.getString(
json_user.getString(KEY_CREATED_AT));


                            // Launch Dashboard Screen

                            Intent dashboard = new Intent(getApplicationContext(), Dashboar


                            // Close all views before launching Dashboard

                            dashboard.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

                            startActivity(dashboard);


                            // Close Login Screen

                            finish();

                        }else{

                            // Error in login

                            loginErrorMsg.setText("Incorrect username/password");

                        }

                    }
```

```
                } catch (JSONException e) {
                    e.printStackTrace();
                }
            }
        });

        // Link to Register Screen
        btnLinkToRegister.setOnClickListener(new View.OnClickListener() {

            public void onClick(View view) {
                Intent i = new Intent(getApplicationContext(),
                        RegisterActivity.class);
                startActivity(i);
                finish();
            }
        });
    }
}
```

**RegisterActivity.java – Activity to handle registration event**

LoginActivity.java

```
package com.example.androidhive;

import org.json.JSONException;
import org.json.JSONObject;

import com.example.androidhive.library.DatabaseHandler;
import com.example.androidhive.library.UserFunctions;


import android.app.Activity;
import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;


public class RegisterActivity extends Activity {
    Button btnRegister;
    Button btnLinkToLogin;
    EditText inputFullName;
    EditText inputEmail;
    EditText inputPassword;
    TextView registerErrorMsg;


    // JSON Response node names
    private static String KEY_SUCCESS = "success";
    private static String KEY_ERROR = "error";
    private static String KEY_ERROR_MSG = "error_msg";
    private static String KEY_UID = "uid";
    private static String KEY_NAME = "name";
    private static String KEY_EMAIL = "email";
    private static String KEY_CREATED_AT = "created_at";
```

```
@Override
public void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.register);

    // Importing all assets like buttons, text fields
    inputFullName = (EditText) findViewById(R.id.registerName);
    inputEmail = (EditText) findViewById(R.id.registerEmail);
    inputPassword = (EditText) findViewById(R.id.registerPassword);
    btnRegister = (Button) findViewById(R.id.btnRegister);
    btnLinkToLogin = (Button) findViewById(R.id.btnLinkToLoginScreen);
    registerErrorMsg = (TextView) findViewById(R.id.register_error);

    // Register Button Click event
    btnRegister.setOnClickListener(new View.OnClickListener() {
        public void onClick(View view) {
            String name = inputFullName.getText().toString();
            String email = inputEmail.getText().toString();
            String password = inputPassword.getText().toString();
            UserFunctions userFunction = new UserFunctions();
            JSONObject json = userFunction.registerUser(name, email, password);

            // check for login response
            try {
                if (json.getString(KEY_SUCCESS) != null) {
                    registerErrorMsg.setText("");
```

```
                        String res = json.getString(KEY_SUCCESS);

                        if(Integer.parseInt(res) == 1){

                            // user successfully registred

                            // Store user details in SQLite Database

                            DatabaseHandler db = new DatabaseHandler(getApplicationContext

                            JSONObject json_user = json.getJSONObject("user");


                            // Clear all previous data in database

                            userFunction.logoutUser(getApplicationContext());

                            db.addUser(json_user.getString(KEY_NAME), json_user.getString(
json.getString(KEY_UID), json_user.getString(KEY_CREATED_AT));

                            // Launch Dashboard Screen

                            Intent dashboard = new Intent(getApplicationContext(), Dashboar

                            // Close all views before launching Dashboard

                            dashboard.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

                            startActivity(dashboard);

                            // Close Registration Screen

                            finish();

                        }else{

                            // Error in registration

                            registerErrorMsg.setText("Error occured in registration");

                        }

                    }

                } catch (JSONException e) {

                    e.printStackTrace();

                }

            }

        });
        // Link to Login Screen
        btnLinkToLogin.setOnClickListener(new View.OnClickListener() {

            public void onClick(View view) {
                Intent i = new Intent(getApplicationContext(),
                        LoginActivity.class);
                startActivity(i);
                // Close Registration View
                finish();
            }
        });
    }
}
```

**DashboardActivity.java – Activity to handle dashboard event**

LoginActivity.java

```
package com.example.androidhive;

import android.app.Activity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;

import com.example.androidhive.library.UserFunctions;
```

```
public class DashboardActivity extends Activity {

    UserFunctions userFunctions;

    Button btnLogout;

    @Override

    public void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);


        /**

         * Dashboard Screen for the application

         * */

        // Check login status in database

        userFunctions = new UserFunctions();

        if(userFunctions.isUserLoggedIn(getApplicationContext())){

       // user already logged in show databoard

            setContentView(R.layout.dashboard);

            btnLogout = (Button) findViewById(R.id.btnLogout);


            btnLogout.setOnClickListener(new View.OnClickListener() {


                public void onClick(View arg0) {

                    // TODO Auto-generated method stub

                    userFunctions.logoutUser(getApplicationContext());

                    Intent login = new Intent(getApplicationContext(),
LoginActivity.class);

                    login.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

                    startActivity(login);

                    // Closing dashboard screen

                    finish();
                }

            });



        }else{

            // user is not logged in show login screen

            Intent login = new Intent(getApplicationContext(),
LoginActivity.class);

            login.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

            startActivity(login);

            // Closing dashboard screen

            finish();

        }

    }

}
```

## Finally Updating AndroidManifest.xml

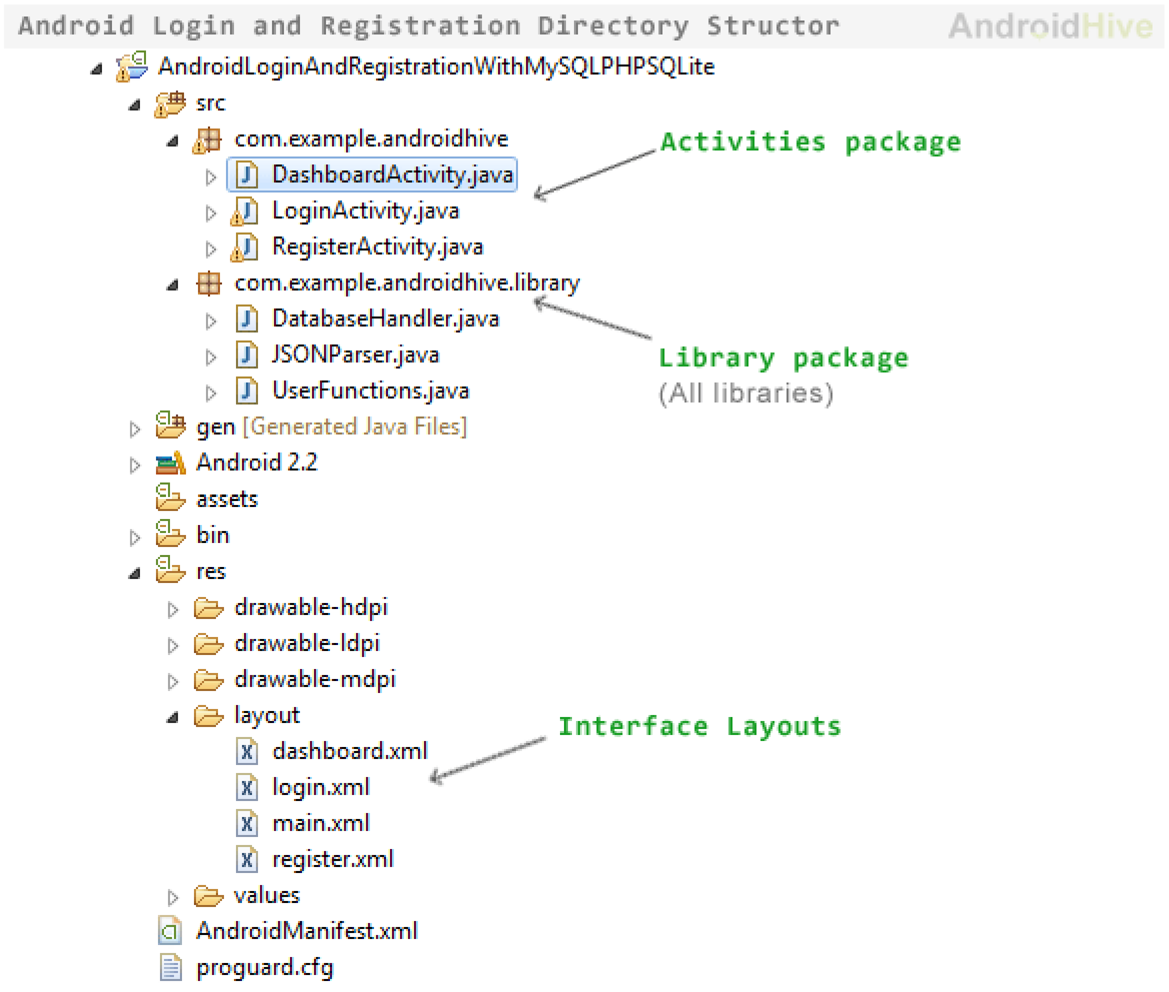
Don't forget to update you AndroidManifest.xml file. Change following modifications
⇒ **Add Internet Persmissions**
⇒ **Add Entries of each Activity**

AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>

<manifest
xmlns:android="http://schemas.android.com/apk/res/android"

    package="com.example.androidhive"

    android:versionCode="1"

    android:versionName="1.0" >



    <uses-sdk android:minSdkVersion="8" />
    <application
        android:icon="@drawable/ic_launcher"
        android:label="@string/app_name" >
        <activity
            android:label="@string/app_name"
            android:name=".DashboardActivity" >
            <intent-filter >
                <action
android:name="android.intent.action.MAIN" />


                <category
android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>


        <!--  Login Activity -->
        <activity
            android:label="Login Account"
            android:name=".LoginActivity"></activity>


        <!--  Register Activity -->
        <activity
            android:label="Register New Account"
            android:name=".RegisterActivity"></activity>
    </application>


    <!-- Allow to connect with internet -->
    <uses-permission
```

```
android:name="android.permission.INTERNET" />



</manifest>
```

**8**. Make sure that you have the files placed as in the following image



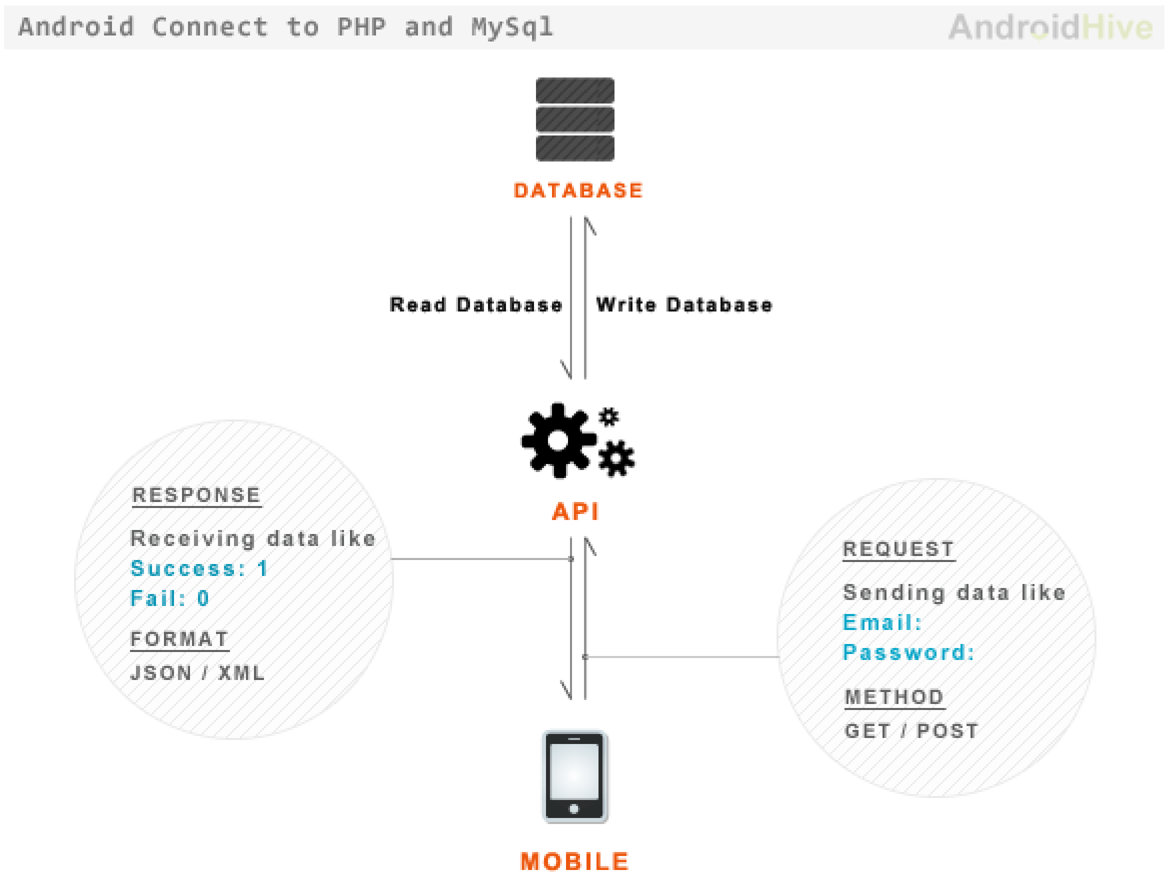
```
AndroidLoginAndRegistrationWithMySQLPHPSQLite
  src
    com.example.androidhive
      DashboardActivity.java
      LoginActivity.java
      RegisterActivity.java
    com.example.androidhive.library
      DatabaseHandler.java
      JSONParser.java
      UserFunctions.java
  gen [Generated Java Files]
  Android 2.2
  assets
  bin
  res
    drawable-hdpi
    drawable-ldpi
    drawable-mdpi
    layout
      dashboard.xml
      login.xml
      main.xml
      register.xml
    values
  AndroidManifest.xml
  proguard.cfg
```

## Prerequisites

This tutorial is combination of some of my previous tutorials. I hope you covered these tutorials before.
Android making HTTP Requests
Android JSON Parsing Tutorial
Android SQLite Database Tutorial
Android Login and Registration Screen Design

## API (Application Programming Interface)

⇒ Accepting requests by GET/POST methods
⇒ Interact with PHP classes to get data from database or store in database
⇒ Finally will give output in JSON format



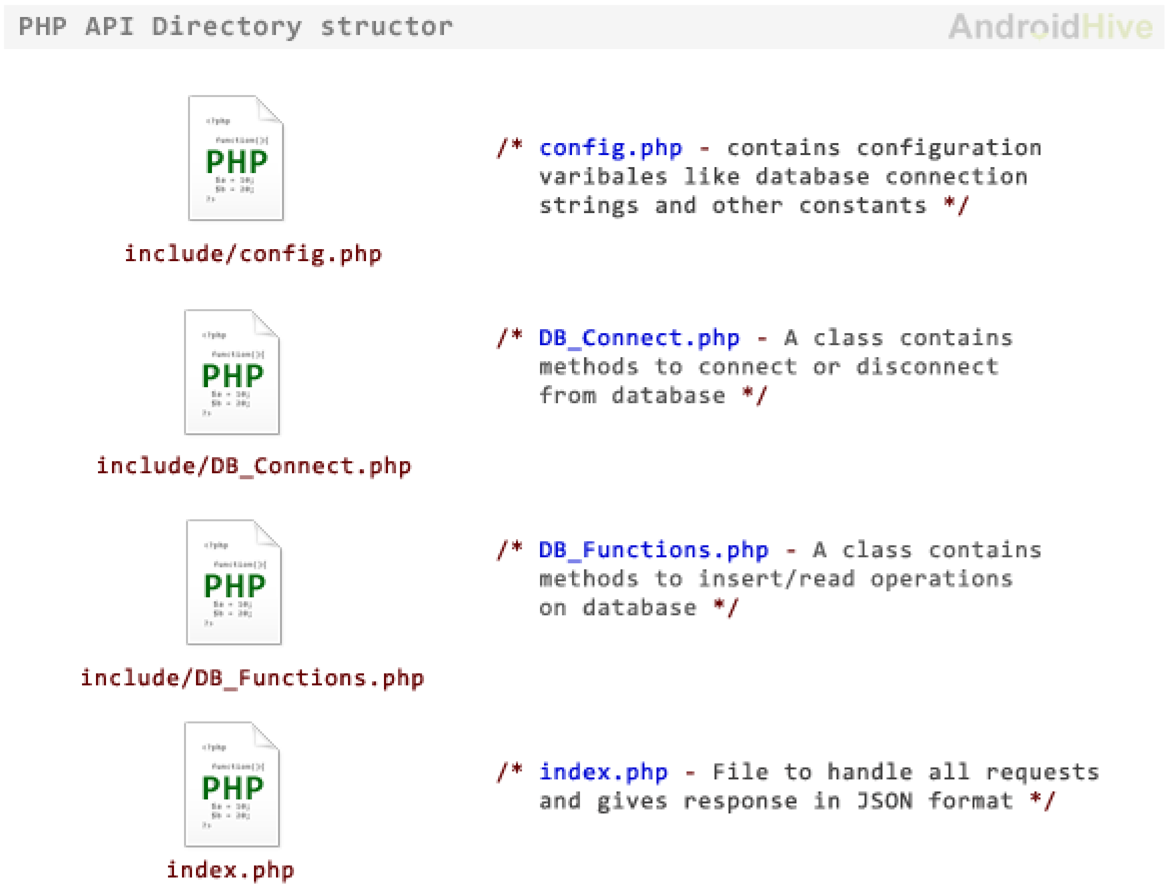
## 1. Creating MySQL Database and Tables

As I am writing API in PHP I selected MySql database to maintain users and other related information. Open your **mysql console** or **phpmyadmin** and run following query to create database and users table.

```
create database android_api /** Creating Database **/

use android_api /** Selecting Database **/

create table users(

   uid int(11) primary key auto_increment,

   unique_id varchar(23) not null unique,
   name varchar(50) not null,
   email varchar(100) not null unique,
   encrypted_password varchar(80) not null,
   salt varchar(10) not null,
   created_at datetime,
   updated_at datetime null
); /** Creating Users Table **/
```

## 2. Building PHP API Classes

To make it minimum i tried to use less number of php files. Following are the files are required to build API in php. You can find description of each file in the below image.



```
/* config.php - contains configuration
   varibales like database connection
   strings and other constants */

/* DB_Connect.php - A class contains
   methods to connect or disconnect
   from database */

/* DB_Functions.php - A class contains
   methods to insert/read operations
   on database */

/* index.php - File to handle all requests
   and gives response in JSON format */
```

**config.php** – This file contains constant variables to connect to database.

```
<?php
/**
 * Database config variables
 */
define("DB_HOST", "localhost");
define("DB_USER", "root");
define("DB_PASSWORD", "");
define("DB_DATABASE", "android_api");
?>
```

**DB_Connect.php** – This file is used to connect or disconnect to database.

```
<?php

class DB_Connect {

    // constructor
    function __construct() {

    }

    // destructor
    function __destruct() {
        // $this->close();
    }

    // Connecting to database
    public function connect() {

        require_once 'config.php';

        // connecting to mysql

        $con = mysql_connect(DB_HOST, DB_USER, DB_PASSWORD);

        // selecting database

        mysql_select_db(DB_DATABASE);


        // return database handler

        return $con;

    }


    // Closing database connection

    public function close() {

        mysql_close();

    }



}



?>
```

**DB_Functions.php –** This file contains functions to store user in database, get user from database. You can also add methods like update user, delete user.

**user unique id –** I am generating unique user id in php using **uniqid(", true)** function. Sample user id will be like **4f074eca601fb8.88015924**

**Encrypted Password –** This password is stored using **base64_encode** method. Each password will need two columns to store in database. One is to store **encrypted password**and second column is to store **salt** used to encrypt the password.

```
<?php
```

```
class DB_Functions {


    private $db;


    //put your code here

    // constructor

    function __construct() {

        require_once 'DB_Connect.php';

        // connecting to database

        $this->db = new DB_Connect();

        $this->db->connect();

    }


    // destructor

    function __destruct() {


    }


    /**

     * Storing new user

     * returns user details

     */

    public function storeUser($name, $email, $password) {

        $uuid = uniqid('', true);

        $hash = $this->hashSSHA($password);

        $encrypted_password = $hash["encrypted"]; // encrypted password

        $salt = $hash["salt"]; // salt
        $result = mysql_query("INSERT INTO users(unique_id, name, email, encrypted_passwor
'$email', '$encrypted_password', '$salt', NOW())");

        // check for successful store

        if ($result) {

            // get user details

            $uid = mysql_insert_id(); // last inserted id

            $result = mysql_query("SELECT * FROM users WHERE uid = $uid");

            // return user details

            return mysql_fetch_array($result);

        } else {

            return false;

        }

    }


    /**

     * Get user by email and password

     */

    public function getUserByEmailAndPassword($email, $password) {

        $result = mysql_query("SELECT * FROM users WHERE email = '$email'") or die(mysql_er

        // check for result

        $no_of_rows = mysql_num_rows($result);

        if ($no_of_rows > 0) {

            $result = mysql_fetch_array($result);

            $salt = $result['salt'];

            $encrypted_password = $result['encrypted_password'];

            $hash = $this->checkhashSSHA($salt, $password);

            // check for password equality

            if ($encrypted_password == $hash) {
                // user authentication details are correct
                return $result;
            }
        } else {
            // user not found
            return false;
        }
    }

    /**
     * Check user is existed or not
     */
    public function isUserExisted($email) {
        $result = mysql_query("SELECT email from users WHERE email = '$email'");
        $no_of_rows = mysql_num_rows($result);
        if ($no_of_rows > 0) {
            // user existed
            return true;
        } else {
            // user not existed
            return false;
        }
    }

    /**
     * Encrypting password
     * @param password
     * returns salt and encrypted password
     */
    public function hashSSHA($password) {

        $salt = sha1(rand());
        $salt = substr($salt, 0, 10);
        $encrypted = base64_encode(sha1($password . $salt, true) . $salt);
        $hash = array("salt" => $salt, "encrypted" => $encrypted);
        return $hash;
    }

    /**
     * Decrypting password
     * @param salt, password
     * returns hash string
     */
    public function checkhashSSHA($salt, $password) {

        $hash = base64_encode(sha1($password . $salt, true) . $salt);

        return $hash;
    }

}

?>
```

**index.php** – This file plays role of accepting requests and giving response. This file accepts all GET and POST requests. On each request it will talk to database and will give appropriate response in JSON format.

```
<?php
/**
 * File to handle all API requests
 * Accepts GET and POST
 *
 * Each request will be identified by TAG
 * Response will be JSON data

  /**
 * check for POST request
 */
if (isset($_POST['tag']) && $_POST['tag'] != '') {
    // get tag
    $tag = $_POST['tag'];

    // include db handler
    require_once 'include/DB_Functions.php';
    $db = new DB_Functions();

    // response Array
    $response = array("tag" => $tag, "success" => 0, "error" =>
0);

    // check for tag type
    if ($tag == 'login') {
        // Request type is check Login
        $email = $_POST['email'];

        $password = $_POST['password'];


        // check for user

        $user = $db->getUserByEmailAndPassword($email,
$password);

        if ($user != false) {

            // user found

            // echo json with success = 1

            $response["success"] = 1;

            $response["uid"] = $user["unique_id"];

            $response["user"]["name"] = $user["name"];

            $response["user"]["email"] = $user["email"];

            $response["user"]["created_at"] =
$user["created_at"];

            $response["user"]["updated_at"] =
$user["updated_at"];

            echo json_encode($response);

        } else {

            // user not found

            // echo json with error = 1

            $response["error"] = 1;

            $response["error_msg"] = "Incorrect email or
password!";

            echo json_encode($response);

        }

    } else if ($tag == 'register') {

        // Request type is Register new user

        $name = $_POST['name'];
        $email = $_POST['email'];

        $password = $_POST['password'];


        // check if user is already existed

        if ($db->isUserExisted($email)) {

            // user is already existed - error response

            $response["error"] = 2;

            $response["error_msg"] = "User already existed";

            echo json_encode($response);

        } else {

            // store user

            $user = $db->storeUser($name, $email, $password);

            if ($user) {

                // user stored successfully

                $response["success"] = 1;

                $response["uid"] = $user["unique_id"];

                $response["user"]["name"] = $user["name"];

                $response["user"]["email"] = $user["email"];

                $response["user"]["created_at"] =
$user["created_at"];

                $response["user"]["updated_at"] =
$user["updated_at"];

                echo json_encode($response);

            } else {

                // user failed to store

                $response["error"] = 1;

                $response["error_msg"] = "Error occured in
Registartion";

                echo json_encode($response);
            }

        }

    } else {

        echo "Invalid Request";

    }

} else {

    echo "Access Denied";

}

?>
```

## Types of API JSON Responses

The following are the different types of JSON responses generated by API.
**Registration Success Response – Success Code = 1 (User Successfully Stored)**

```
{

    "tag": "register",

    "success": 1,

    "error": 0,

    "uid": "4f074ca1e3df49.06340261",

    "user": {

        "name": "Ravi Tamada",

        "email": "ravi8x@gmail.com",

        "created_at": "2012-01-07 01:03:53",

        "updated_at": null

    }

}
```

**Registration Error Response – Error Code = 1 (Error in storing)**

```
{
    "tag": "register",

    "success": 0,

    "error": 1,

    "error_msg": "Error occured in Registartion"

}
```

**Registration Error Response – Error Code = 2 (User Already Existed)**

```
{

    "tag": "register",

    "success": 0,

    "error": 2,

    "error_msg": "User already existed"

}
```

**Login Success Response – Success Code = 1 (User Logged in)**

```
{

    "tag": "login",

    "success": 1,

    "error": 0,

    "uid": "4f074eca601fb8.88015924",

    "user": {

        "name": "Ravi Tamada",

        "email": "ravi8x@gmail.com",

        "created_at": "2012-01-07 01:03:53",

        "updated_at": null

    }

}
```

**Login Error Response – Error Code = 1 (Login Error – Incorrect username/password)**

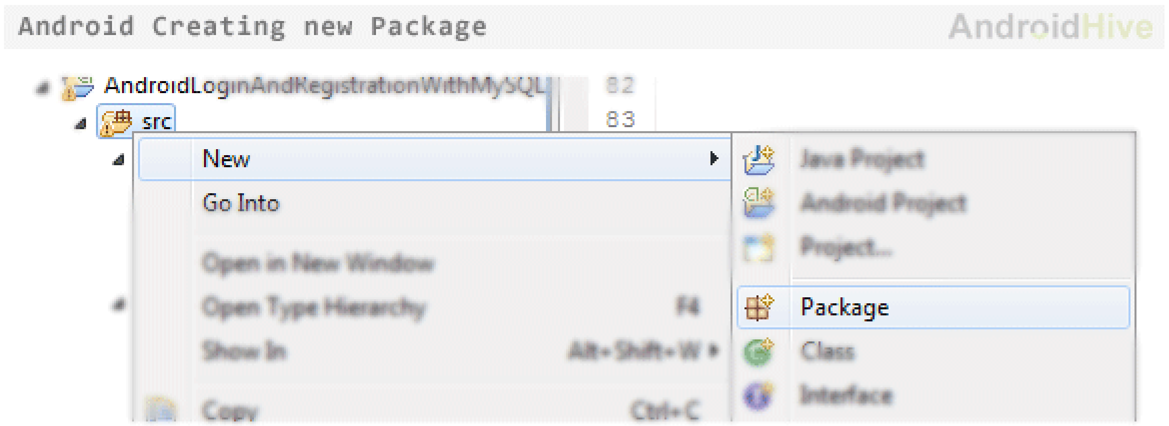
```
{

    "tag": "login",

    "success": 0,

    "error": 1,

    "error_msg": "Incorrect email or password!"

}
```

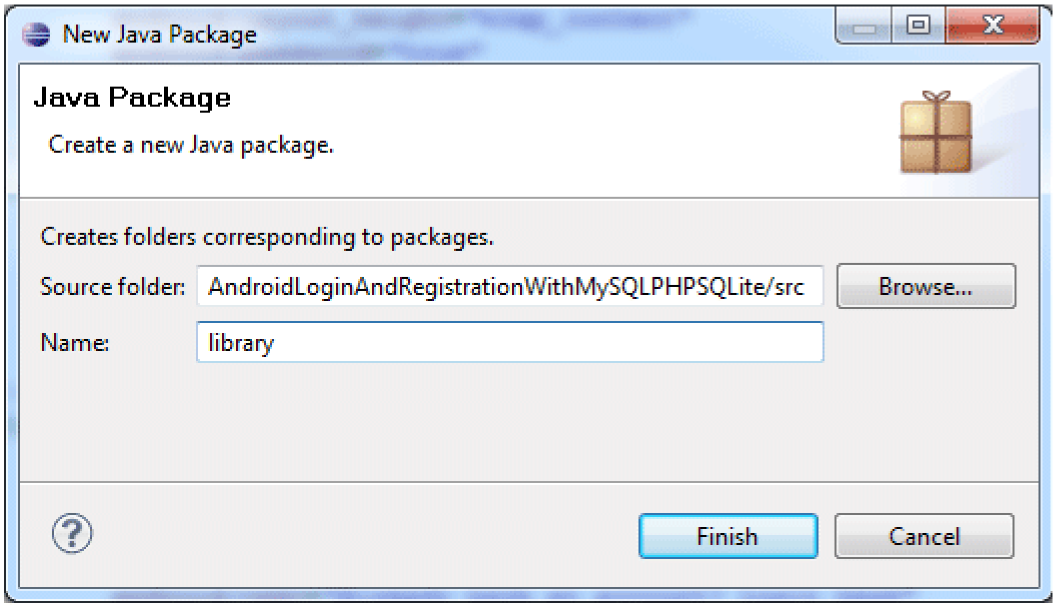
Here it completes the API part and start the Android Project.

## 3. Starting Android Project

Until now we wrote server side programming to build simple api. Next thing is build android app to interact with the API. In this project i am coding simple app which will have three screens **Login Screen**, **Registration Screen** and a welcome **Dashboard Screen**. So let's get started by creating new project in you Eclipse IDE.

**1**. Create a new project by going to **File ⇒ New Android Project**. Fill all the details and name your activity as *DashboardActivity*.
**2**. Next step is to create a new package to store all our library files. **Right Click on ⇒ src ⇒ New ⇒ Package** and name it as **library**.





Creates folders corresponding to packages.
Source folder: AndroidLoginAndRegistrationWithMySQLPHPSQLite/src
Name: library

## JSON Parser Class

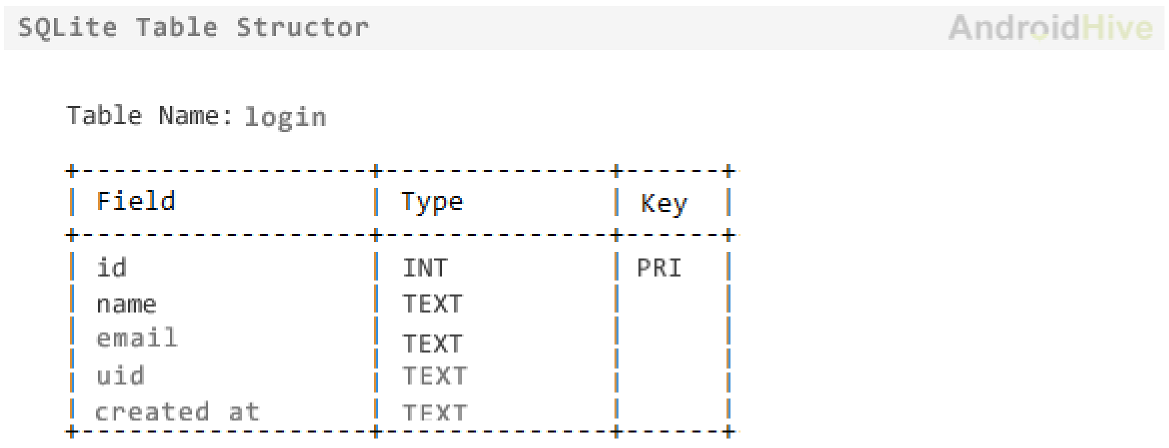
**3**. Next we need parser class to parse api response JSON. So create a new class in your library package name it as **JSONParser.java** and fill it with following code.

JSONParser.java

```
package com.example.androidhive.library;


import java.io.BufferedReader;

import java.io.IOException;

import java.io.InputStream;
import java.io.InputStreamReader;

import java.io.UnsupportedEncodingException;

import java.util.List;


import org.apache.http.HttpEntity;

import org.apache.http.HttpResponse;

import org.apache.http.NameValuePair;

import org.apache.http.client.ClientProtocolException;

import org.apache.http.client.entity.UrlEncodedFormEntity;

import org.apache.http.client.methods.HttpPost;

import org.apache.http.impl.client.DefaultHttpClient;

import org.json.JSONException;

import org.json.JSONObject;


import android.util.Log;


public class JSONParser {


    static InputStream is = null;

    static JSONObject jObj = null;

    static String json = "";


    // constructor

    public JSONParser() {


    }
    public JSONObject getJSONFromUrl(String url,
List<NameValuePair> params) {


        // Making HTTP request

        try {

            // defaultHttpClient

            DefaultHttpClient httpClient = new
DefaultHttpClient();

            HttpPost httpPost = new HttpPost(url);

            httpPost.setEntity(new
UrlEncodedFormEntity(params));


            HttpResponse httpResponse =
httpClient.execute(httpPost);

            HttpEntity httpEntity = httpResponse.getEntity();

            is = httpEntity.getContent();


        } catch (UnsupportedEncodingException e) {

            e.printStackTrace();

        } catch (ClientProtocolException e) {

            e.printStackTrace();

        } catch (IOException e) {

            e.printStackTrace();

        }


        try {

            BufferedReader reader = new BufferedReader(new
InputStreamReader(

                    is, "iso-8859-1"), 8);
            StringBuilder sb = new StringBuilder();

            String line = null;

            while ((line = reader.readLine()) != null) {

                sb.append(line + "n");

            }

            is.close();

            json = sb.toString();

            Log.e("JSON", json);

        } catch (Exception e) {

            Log.e("Buffer Error", "Error converting result " +
e.toString());

        }



        // try parse the string to a JSON object

        try {

            jObj = new JSONObject(json);

        } catch (JSONException e) {

            Log.e("JSON Parser", "Error parsing data " +
e.toString());

        }



        // return JSON String

        return jObj;



    }

}
```

## SQLite Database Handler Class

**4**. In the application to store user information i am using SQLite Database. So create new class in you library package folder and name it as **DatabaseHandler.java** and fill the class with following code. This class file has functions to handle database operations like storing user and getting user.



SQLite Table Structor

AndroidHive

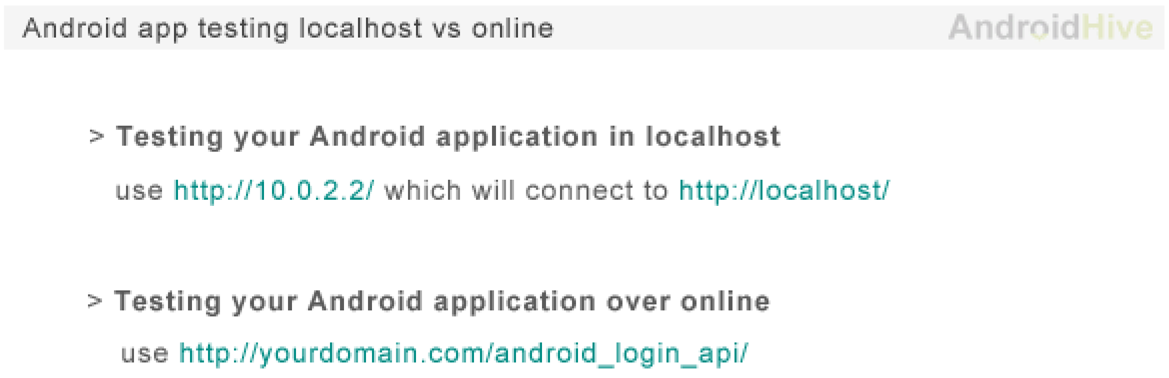
```
Table Name: login

+-------------------+---------------+------+
| Field             | Type          | Key  |
+-------------------+---------------+------+
| id                | INT           | PRI  |
| name              | TEXT          |      |
| email             | TEXT          |      |
| uid               | TEXT          |      |
| created at        | TEXT          |      |
+-------------------+---------------+------+
```

DatabaseHandler.java

```
package com.example.androidhive.library;


import java.util.HashMap;


import android.content.ContentValues;

import android.content.Context;

import android.database.Cursor;

import android.database.sqlite.SQLiteDatabase;

import android.database.sqlite.SQLiteOpenHelper;


public class DatabaseHandler extends SQLiteOpenHelper {


    // All Static variables

    // Database Version
    private static final int DATABASE_VERSION = 1;


    // Database Name

    private static final String DATABASE_NAME = "android_api";


    // Login table name

    private static final String TABLE_LOGIN = "login";


    // Login Table Columns names

    private static final String KEY_ID = "id";

    private static final String KEY_NAME = "name";

    private static final String KEY_EMAIL = "email";

    private static final String KEY_UID = "uid";

    private static final String KEY_CREATED_AT = "created_at";


    public DatabaseHandler(Context context) {

        super(context, DATABASE_NAME, null,
DATABASE_VERSION);

    }



    // Creating Tables

    @Override

    public void onCreate(SQLiteDatabase db) {

        String CREATE_LOGIN_TABLE = "CREATE TABLE " +
TABLE_LOGIN + "("

                + KEY_ID + " INTEGER PRIMARY KEY,"

                + KEY_NAME + " TEXT,"

                + KEY_EMAIL + " TEXT UNIQUE,"
                + KEY_UID + " TEXT,"
                + KEY_CREATED_AT + " TEXT" + ")";
        db.execSQL(CREATE_LOGIN_TABLE);
    }

    // Upgrading database
    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion,
int newVersion) {
        // Drop older table if existed
        db.execSQL("DROP TABLE IF EXISTS " + TABLE_LOGIN);

        // Create tables again
        onCreate(db);
    }

    /**
     * Storing user details in database
     * */
    public void addUser(String name, String email, String uid,
String created_at) {
        SQLiteDatabase db = this.getWritableDatabase();

        ContentValues values = new ContentValues();
        values.put(KEY_NAME, name); // Name
        values.put(KEY_EMAIL, email); // Email
        values.put(KEY_UID, uid); // Email
        values.put(KEY_CREATED_AT, created_at); // Created At
        // Inserting Row
        db.insert(TABLE_LOGIN, null, values);
        db.close(); // Closing database connection
    }

    /**
     * Getting user data from database
     * */
    public HashMap<String, String> getUserDetails(){
        HashMap<String,String> user = new
HashMap<String,String>();
        String selectQuery = "SELECT  * FROM " + TABLE_LOGIN;

        SQLiteDatabase db = this.getReadableDatabase();
        Cursor cursor = db.rawQuery(selectQuery, null);
        // Move to first row
        cursor.moveToFirst();
        if(cursor.getCount() > 0){
            user.put("name", cursor.getString(1));
            user.put("email", cursor.getString(2));
            user.put("uid", cursor.getString(3));
            user.put("created_at", cursor.getString(4));
        }
        cursor.close();
        db.close();
        // return user
        return user;
    }


    /**
     * Getting user login status
     * return true if rows are there in table
     * */
    public int getRowCount() {
        String countQuery = "SELECT  * FROM " + TABLE_LOGIN;
        SQLiteDatabase db = this.getReadableDatabase();
        Cursor cursor = db.rawQuery(countQuery, null);
        int rowCount = cursor.getCount();
        db.close();
        cursor.close();

        // return row count
        return rowCount;
    }


    /**
     * Re crate database
     * Delete all tables and create them again
     * */
    public void resetTables(){
        SQLiteDatabase db = this.getWritableDatabase();
        // Delete All Rows
        db.delete(TABLE_LOGIN, null, null);
        db.close();
    }



}
```

## User Functions Class

**5**. Create a new class file under library package and name it as **UserFunctions.java**. This class will have functions to handle all user events like
**loginUser()**
**registerUser()**
**getLoginStatus()**
**logoutUser()**.


Android app testing localhost vs online

> Testing your Android application in localhost

use http://10.0.2.2/ which will connect to http://localhost/

> Testing your Android application over online

use http://yourdomain.com/android_login_api/

AndroidHive

In this class all the functions will interact with JSONParser, DatabaseHandler classes. I am testing API in localhost using xampp software. Normally localhost will run on port http://127.0.0.1 or http://localhost/. In AVD to connect to localhost you need to use url**http://10.0.2.2/** instead of **http://localhost/**. If you want deploy your api on website the use the url http://yoursite.com/api/

UserFunctions.java

```
package com.example.androidhive.library;


import java.util.ArrayList;

import java.util.List;


import org.apache.http.NameValuePair;

import org.apache.http.message.BasicNameValuePair;

import org.json.JSONObject;
import android.content.Context;

public class UserFunctions {

    private JSONParser jsonParser;

    // Testing in localhost using wamp or xampp
    // use http://10.0.2.2/ to connect to your localhost ie
http://localhost/
    private static String loginURL =
"http://10.0.2.2/ah_login_api/";
    private static String registerURL =
"http://10.0.2.2/ah_login_api/";

    private static String login_tag = "login";
    private static String register_tag = "register";

    // constructor
    public UserFunctions(){
        jsonParser = new JSONParser();
    }

    /**
     * function make Login Request
     * @param email
     * @param password
     * */
    public JSONObject loginUser(String email, String
password){
        // Building Parameters
        List<NameValuePair> params = new
ArrayList<NameValuePair>();
        params.add(new BasicNameValuePair("tag", login_tag));
        params.add(new BasicNameValuePair("email", email));
        params.add(new BasicNameValuePair("password",
password));
        JSONObject json = jsonParser.getJSONFromUrl(loginURL,
params);
        // return json
        // Log.e("JSON", json.toString());
        return json;
    }


    /**
     * function make Login Request
     * @param name
     * @param email
     * @param password
     * */
    public JSONObject registerUser(String name, String email,
String password){
        // Building Parameters
        List<NameValuePair> params = new
ArrayList<NameValuePair>();
        params.add(new BasicNameValuePair("tag",
register_tag));
        params.add(new BasicNameValuePair("name", name));
        params.add(new BasicNameValuePair("email", email));
        params.add(new BasicNameValuePair("password",
password));


        // getting JSON Object
        JSONObject json =
jsonParser.getJSONFromUrl(registerURL, params);
        // return json
        return json;
    }


    /**
     * Function get Login status
     * */
    public boolean isUserLoggedIn(Context context){
        DatabaseHandler db = new DatabaseHandler(context);
        int count = db.getRowCount();
        if(count > 0){
            // user logged in
            return true;
        }
        return false;
    }


    /**
     * Function to logout user
     * Reset Database
     * */
    public boolean logoutUser(Context context){

        DatabaseHandler db = new DatabaseHandler(context);

        db.resetTables();

        return true;

    }



}
```

## Designing the Screens

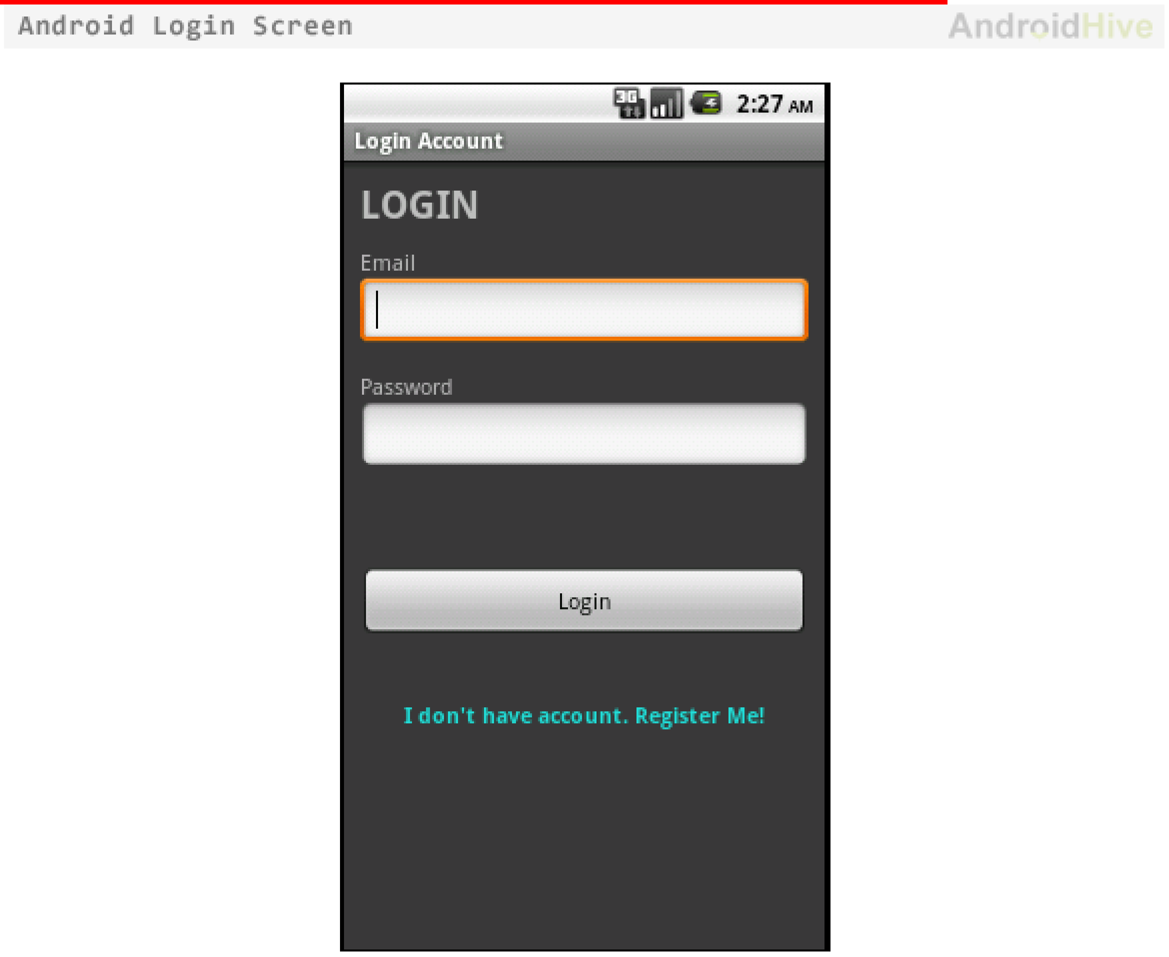
**6**. Until now we have developed the library classes needed in this application. Next thing is build screens. We need three screens Login Screen, Registration Screen and Dashboard Screen. Create 3 xml files under **res ⇒ layout folde**r and name them as **login.xml**,**register.xml** and **dashboard.xml**

**login.xml – login screen design layout**

login.xml

```
<?xml version="1.0" encoding="utf-8"?>

<ScrollView
xmlns:android="http://schemas.android.com/apk/res/android"

    android:layout_width="fill_parent"

    android:layout_height="fill_parent"

    android:background="#3b3b3b" >



    <LinearLayout

        android:layout_width="fill_parent"

        android:layout_height="fill_parent"

        android:orientation="vertical"

        android:padding="10dip" >

        <!--  View Title Label -->

        <TextView

            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginBottom="10dip"
            android:text="LOGIN"
            android:textSize="25dip"
            android:textStyle="bold" />
        <!--  Email Label -->
        <TextView
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:text="Email" />
        <!--  Email TextField -->
        <EditText
            android:id="@+id/loginEmail"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content" />

        <!--  Password Label -->
        <TextView
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="15dip"
            android:text="Password" />
        <!--  Password TextField -->
        <EditText
            android:id="@+id/loginPassword"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
```

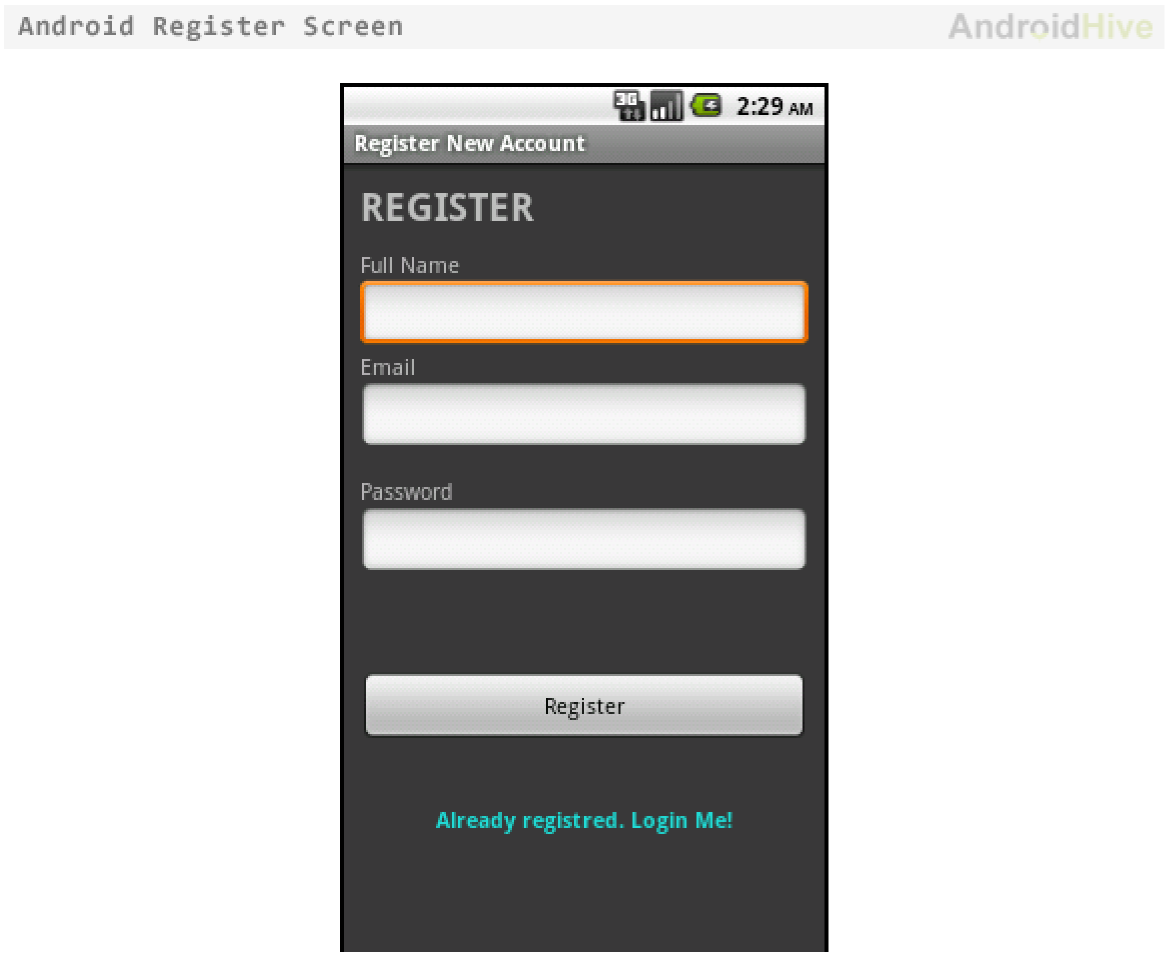
```
            android:password="true" />


        <!--  Error message -->
        <TextView android:id="@+id/login_error"
                    android:layout_width="fill_parent"
                    android:layout_height="wrap_content"
                    android:textColor="#e30000"
                    android:padding="10dip"
                    android:textStyle="bold"/>


        <!--  Login Button -->
        <Button
            android:id="@+id/btnLogin"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="20dip"
            android:text="Login" />


        <!--  Link to Registration Screen -->
        <Button
            android:id="@+id/btnLinkToRegisterScreen"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="40dip"
            android:background="@null"
            android:text="I don&apos;t have account. Register
Me!"
            android:textColor="#21dbd4"
            android:textStyle="bold" />

    </LinearLayout>



</ScrollView>
```



**register.xml – registration screen design layout**

register.xml

```
<?xml version="1.0" encoding="utf-8"?>

<ScrollView
xmlns:android="http://schemas.android.com/apk/res/android"

    android:layout_width="fill_parent"

    android:layout_height="fill_parent"
    android:background="#3b3b3b" >


    <LinearLayout
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        android:orientation="vertical"
        android:padding="10dip" >
        <!--  View Title Label -->
        <TextView
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginBottom="10dip"
            android:text="REGISTER"
            android:textSize="25dip"
            android:textStyle="bold" />
        <!--  Name Label -->
        <TextView
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:text="Full Name" />
        <!--  Name TextField -->
        <EditText
            android:id="@+id/registerName"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content" />


        <!--  Email Label -->
        <TextView
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:text="Email" />
        <!--  Email TextField -->
        <EditText
            android:id="@+id/registerEmail"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content" />

        <!--  Password Label -->
        <TextView
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="15dip"
            android:text="Password" />
        <!--  Password TextField -->
        <EditText
            android:id="@+id/registerPassword"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:password="true" />

        <!--  Error message -->
        <TextView android:id="@+id/register_error"
                    android:layout_width="fill_parent"
                    android:layout_height="wrap_content"
                    android:textColor="#e30000"

                    android:padding="10dip"

                    android:textStyle="bold"/>


        <!--  Login Button -->

        <Button

            android:id="@+id/btnRegister"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:layout_marginTop="20dip"

            android:text="Register" />


        <!--  Link to Login Screen -->

        <Button

            android:id="@+id/btnLinkToLoginScreen"

            android:layout_width="fill_parent"

            android:layout_height="wrap_content"

            android:layout_marginTop="40dip"

            android:background="@null"

            android:text="Already registred. Login Me!"

            android:textColor="#21dbd4"

            android:textStyle="bold" />

    </LinearLayout>


</ScrollView>
```

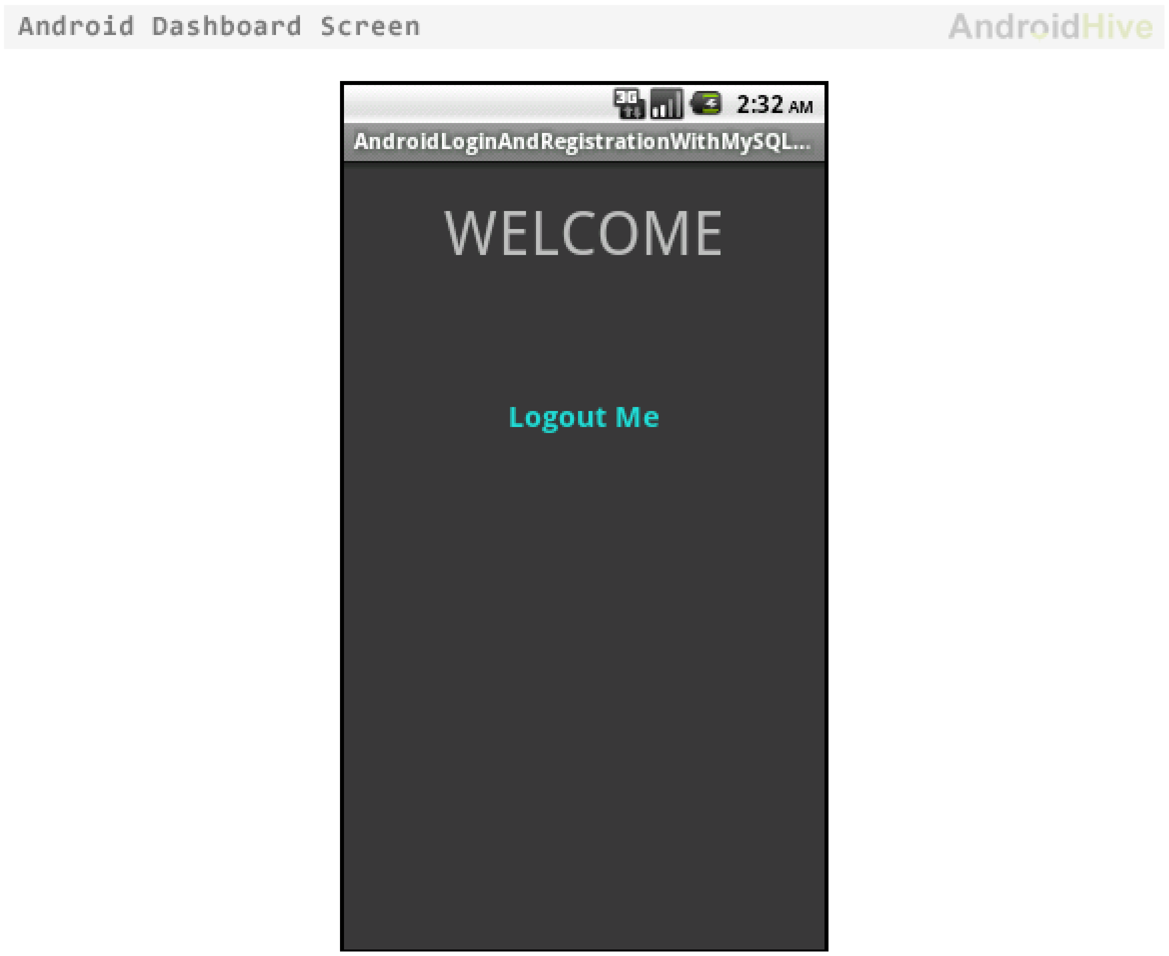


**dashboard.xml – dashboard screen design layout**

dashboard.xml

```
<?xml version="1.0" encoding="utf-8"?>

<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:orientation="vertical"

    android:background="#3b3b3b">



    <TextView android:layout_width="fill_parent"
```

```
              android:layout_height="wrap_content"

              android:text="WELCOME"

              android:textSize="40dip"

              android:gravity="center"

              android:layout_marginTop="20dip"/>


    <Button android:layout_width="fill_parent"

        android:layout_height="wrap_content"

        android:text="Logout Me"

        android:textSize="20dip"

        android:textColor="#21dbd4"

        android:textStyle="bold"

        android:id="@+id/btnLogout"

        android:layout_marginTop="80dip"

        android:background="@null"/>


</LinearLayout>
```



## Switching between Activites

7. Now the designing part of the app is done next thing is to create activities for each layout and write functionality to achieve login and registration process.
Create new activities **LoginActivity.java** and **RegisterActivity.java** and fill them with respective code below.

**LoginActivity.java – Activity to handle login event**

LoginActivity.java

```
package com.example.androidhive;

import java.util.HashMap;

import org.json.JSONException;
import org.json.JSONObject;


import android.app.Activity;

import android.content.Intent;

import android.os.Bundle;

import android.util.Log;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.TextView;


import com.example.androidhive.library.DatabaseHandler;

import com.example.androidhive.library.UserFunctions;


public class LoginActivity extends Activity {

    Button btnLogin;

    Button btnLinkToRegister;

    EditText inputEmail;

    EditText inputPassword;

    TextView loginErrorMsg;


    // JSON Response node names

    private static String KEY_SUCCESS = "success";

    private static String KEY_ERROR = "error";

    private static String KEY_ERROR_MSG = "error_msg";

    private static String KEY_UID = "uid";

    private static String KEY_NAME = "name";
    private static String KEY_EMAIL = "email";

    private static String KEY_CREATED_AT = "created_at";


    @Override

    public void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.login);


        // Importing all assets like buttons, text fields

        inputEmail = (EditText) findViewById(R.id.loginEmail);

        inputPassword = (EditText) findViewById(R.id.loginPassword);

        btnLogin = (Button) findViewById(R.id.btnLogin);

        btnLinkToRegister = (Button) findViewById(R.id.btnLinkToRegisterScreen);

        loginErrorMsg = (TextView) findViewById(R.id.login_error);


        // Login button Click Event

        btnLogin.setOnClickListener(new View.OnClickListener() {


            public void onClick(View view) {

                String email = inputEmail.getText().toString();

                String password = inputPassword.getText().toString();

                UserFunctions userFunction = new UserFunctions();

                JSONObject json = userFunction.loginUser(email, password);


                // check for login response

                try {

                    if (json.getString(KEY_SUCCESS) != null) {
                        loginErrorMsg.setText("");

                        String res = json.getString(KEY_SUCCESS);

                        if(Integer.parseInt(res) == 1){

                            // user successfully logged in

                            // Store user details in SQLite Database

                            DatabaseHandler db = new DatabaseHandler(getApplicationContext(

                            JSONObject json_user = json.getJSONObject("user");


                            // Clear all previous data in database

                            userFunction.logoutUser(getApplicationContext());

                            db.addUser(json_user.getString(KEY_NAME), json_user.getString(
json_user.getString(KEY_CREATED_AT));


                            // Launch Dashboard Screen

                            Intent dashboard = new Intent(getApplicationContext(), Dashboar


                            // Close all views before launching Dashboard

                            dashboard.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

                            startActivity(dashboard);


                            // Close Login Screen

                            finish();

                        }else{

                            // Error in login

                            loginErrorMsg.setText("Incorrect username/password");

                        }

                    }
```

```
                } catch (JSONException e) {
                    e.printStackTrace();
                }
            }
        });

        // Link to Register Screen
        btnLinkToRegister.setOnClickListener(new View.OnClickListener() {

            public void onClick(View view) {
                Intent i = new Intent(getApplicationContext(),
                        RegisterActivity.class);
                startActivity(i);
                finish();
            }
        });
    }
}
```

**RegisterActivity.java – Activity to handle registration event**

LoginActivity.java

```
package com.example.androidhive;

import org.json.JSONException;
import org.json.JSONObject;

import com.example.androidhive.library.DatabaseHandler;
import com.example.androidhive.library.UserFunctions;


import android.app.Activity;

import android.content.Intent;

import android.os.Bundle;

import android.util.Log;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.TextView;


public class RegisterActivity extends Activity {

    Button btnRegister;

    Button btnLinkToLogin;

    EditText inputFullName;

    EditText inputEmail;

    EditText inputPassword;

    TextView registerErrorMsg;


    // JSON Response node names

    private static String KEY_SUCCESS = "success";

    private static String KEY_ERROR = "error";

    private static String KEY_ERROR_MSG = "error_msg";

    private static String KEY_UID = "uid";

    private static String KEY_NAME = "name";

    private static String KEY_EMAIL = "email";

    private static String KEY_CREATED_AT = "created_at";
```

```
@Override
public void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.register);

    // Importing all assets like buttons, text fields
    inputFullName = (EditText) findViewById(R.id.registerName);
    inputEmail = (EditText) findViewById(R.id.registerEmail);
    inputPassword = (EditText) findViewById(R.id.registerPassword);
    btnRegister = (Button) findViewById(R.id.btnRegister);
    btnLinkToLogin = (Button) findViewById(R.id.btnLinkToLoginScreen);
    registerErrorMsg = (TextView) findViewById(R.id.register_error);

    // Register Button Click event
    btnRegister.setOnClickListener(new View.OnClickListener() {
        public void onClick(View view) {
            String name = inputFullName.getText().toString();
            String email = inputEmail.getText().toString();
            String password = inputPassword.getText().toString();
            UserFunctions userFunction = new UserFunctions();
            JSONObject json = userFunction.registerUser(name, email, password);

            // check for login response
            try {
                if (json.getString(KEY_SUCCESS) != null) {
                    registerErrorMsg.setText("");
```

```
                        String res = json.getString(KEY_SUCCESS);

                        if(Integer.parseInt(res) == 1){

                            // user successfully registred

                            // Store user details in SQLite Database

                            DatabaseHandler db = new DatabaseHandler(getApplicationContext

                            JSONObject json_user = json.getJSONObject("user");


                            // Clear all previous data in database

                            userFunction.logoutUser(getApplicationContext());

                            db.addUser(json_user.getString(KEY_NAME), json_user.getString(
json.getString(KEY_UID), json_user.getString(KEY_CREATED_AT));

                            // Launch Dashboard Screen

                            Intent dashboard = new Intent(getApplicationContext(), Dashboar

                            // Close all views before launching Dashboard

                            dashboard.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

                            startActivity(dashboard);

                            // Close Registration Screen

                            finish();

                        }else{

                            // Error in registration

                            registerErrorMsg.setText("Error occured in registration");

                        }

                    }

                } catch (JSONException e) {

                    e.printStackTrace();

                }

            }

        });
        // Link to Login Screen
        btnLinkToLogin.setOnClickListener(new View.OnClickListener() {

            public void onClick(View view) {
                Intent i = new Intent(getApplicationContext(),
                        LoginActivity.class);
                startActivity(i);
                // Close Registration View
                finish();
            }
        });
    }
}
```

**DashboardActivity.java – Activity to handle dashboard event**

LoginActivity.java

```
package com.example.androidhive;

import android.app.Activity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;

import com.example.androidhive.library.UserFunctions;
```

```
public class DashboardActivity extends Activity {

    UserFunctions userFunctions;

    Button btnLogout;

    @Override

    public void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);


        /**

         * Dashboard Screen for the application

         * */

        // Check login status in database

        userFunctions = new UserFunctions();

        if(userFunctions.isUserLoggedIn(getApplicationContext())){

       // user already logged in show databoard

            setContentView(R.layout.dashboard);

            btnLogout = (Button) findViewById(R.id.btnLogout);


            btnLogout.setOnClickListener(new View.OnClickListener() {


                public void onClick(View arg0) {

                    // TODO Auto-generated method stub

                    userFunctions.logoutUser(getApplicationContext());

                    Intent login = new Intent(getApplicationContext(),
LoginActivity.class);

                    login.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

                    startActivity(login);

                    // Closing dashboard screen

                    finish();
                    }

                });



        }else{

            // user is not logged in show login screen

            Intent login = new Intent(getApplicationContext(),
LoginActivity.class);

            login.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

            startActivity(login);

            // Closing dashboard screen

            finish();

        }

    }

}
```

## Finally Updating AndroidManifest.xml

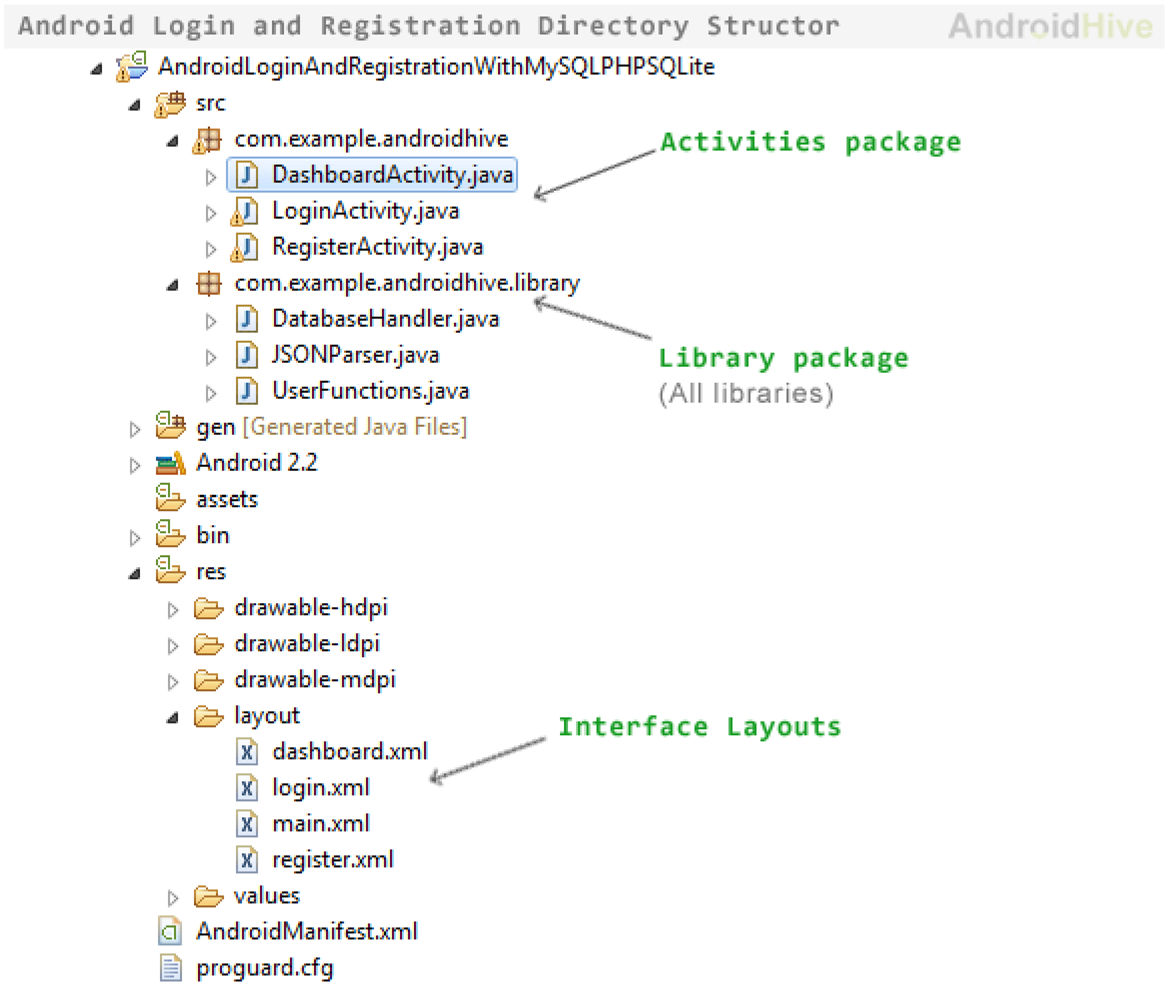
Don't forget to update you AndroidManifest.xml file. Change following modifications
⇒ **Add Internet Persmissions**
⇒ **Add Entries of each Activity**

AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>

<manifest
xmlns:android="http://schemas.android.com/apk/res/android"

    package="com.example.androidhive"

    android:versionCode="1"

    android:versionName="1.0" >



    <uses-sdk android:minSdkVersion="8" />
    <application
        android:icon="@drawable/ic_launcher"
        android:label="@string/app_name" >
        <activity
            android:label="@string/app_name"
            android:name=".DashboardActivity" >
            <intent-filter >
                <action
android:name="android.intent.action.MAIN" />


                <category
android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>


        <!--  Login Activity -->
        <activity
            android:label="Login Account"
            android:name=".LoginActivity"></activity>


        <!--  Register Activity -->
        <activity
            android:label="Register New Account"
            android:name=".RegisterActivity"></activity>
    </application>


    <!-- Allow to connect with internet -->
    <uses-permission
```

```
android:name="android.permission.INTERNET" />


</manifest>
```

**8**. Make sure that you have the files placed as in the following image



```
AndroidLoginAndRegistrationWithMySQLPHPSQLite
  src
    com.example.androidhive
      DashboardActivity.java
      LoginActivity.java
      RegisterActivity.java
    com.example.androidhive.library
      DatabaseHandler.java
      JSONParser.java
      UserFunctions.java
  gen [Generated Java Files]
  Android 2.2
  assets
  bin
  res
    drawable-hdpi
    drawable-ldpi
    drawable-mdpi
    layout
      dashboard.xml
      login.xml
      main.xml
      register.xml
    values
  AndroidManifest.xml
  proguard.cfg
```