Weather Forecast Android App

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GDG 2 CREDIT COURSE

ABSTRACT

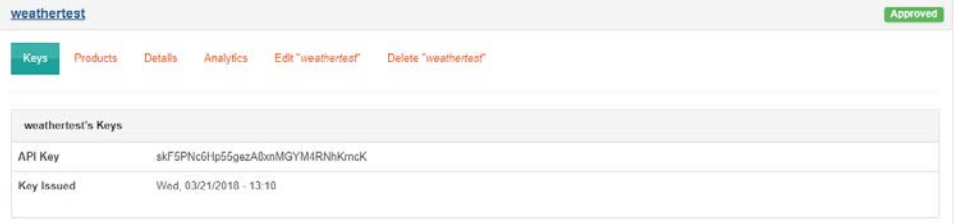
This is a simple android application which has two activities. It uses Accuweather API to fetch the weather Information. And displays up to 5 upcoming days of forecast including Max, Min Temperature.

INTRODUCTION

- The app is developed for Target Android API 25.
- The main Activity displays the current weather conditions for the city Vellore. It shows Current temperature and the current weather conditions. And contains a button which links to another activity.
- The second Activity displays the forecast for next 5 days in the list form as Max Temperature and Min temperature.

METHODOLOGY

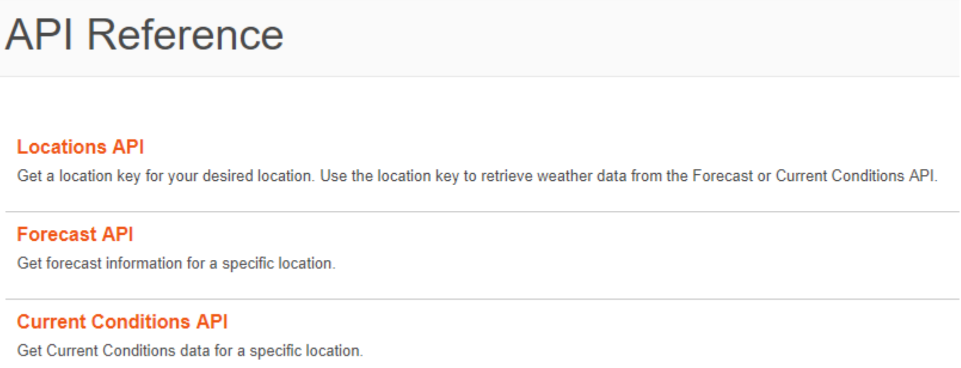
First thing I did was create an API key from https://developer.accuweather.com/



weathertest's Keys

API Key	skF5PNc6Hp55gezA8xnMGYM4RNhKmcK
Key Issued	Wed, 03/21/2018 - 13:10

Next find the location key for the Vellore city from API reference page.



API Reference

Locations API

Get a location key for your desired location. Use the location key to retrieve weather data from the Forecast or Current Conditions API.

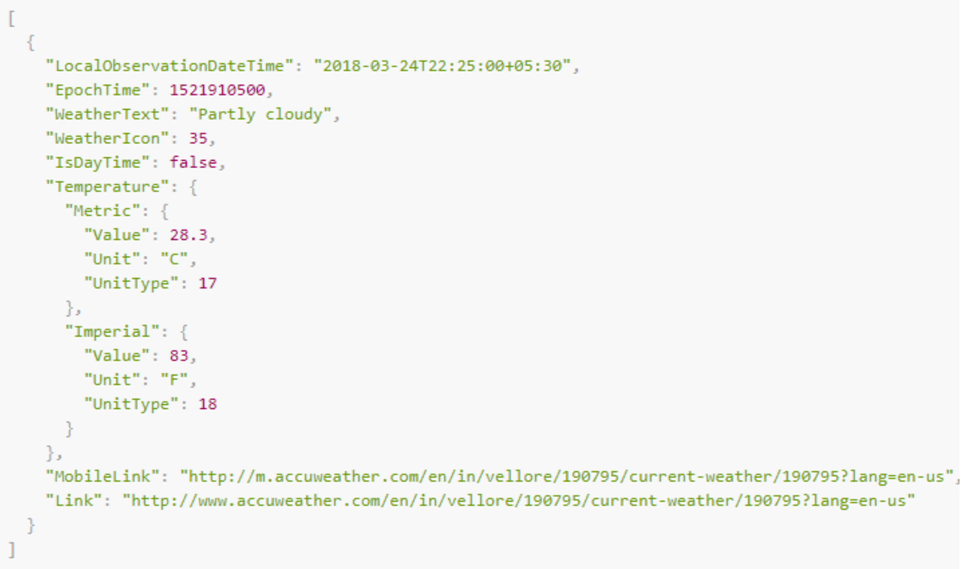
Forecast API

Get forecast information for a specific location.

Current Conditions API

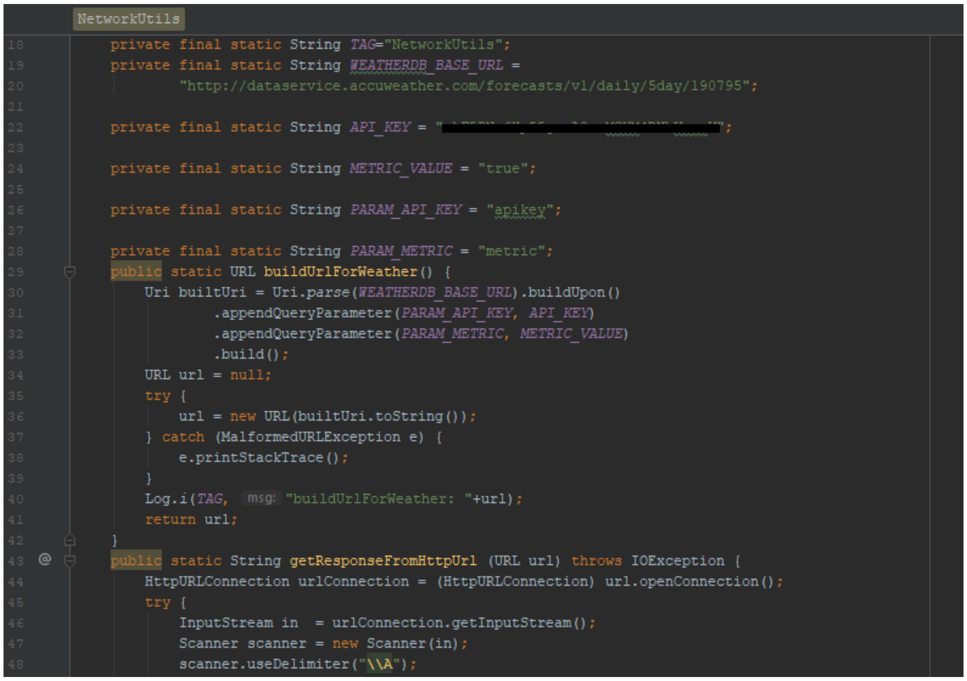
Get Current Conditions data for a specific location.

Get the JSON for current weather and 5 days forecast by entering your API key and location key.



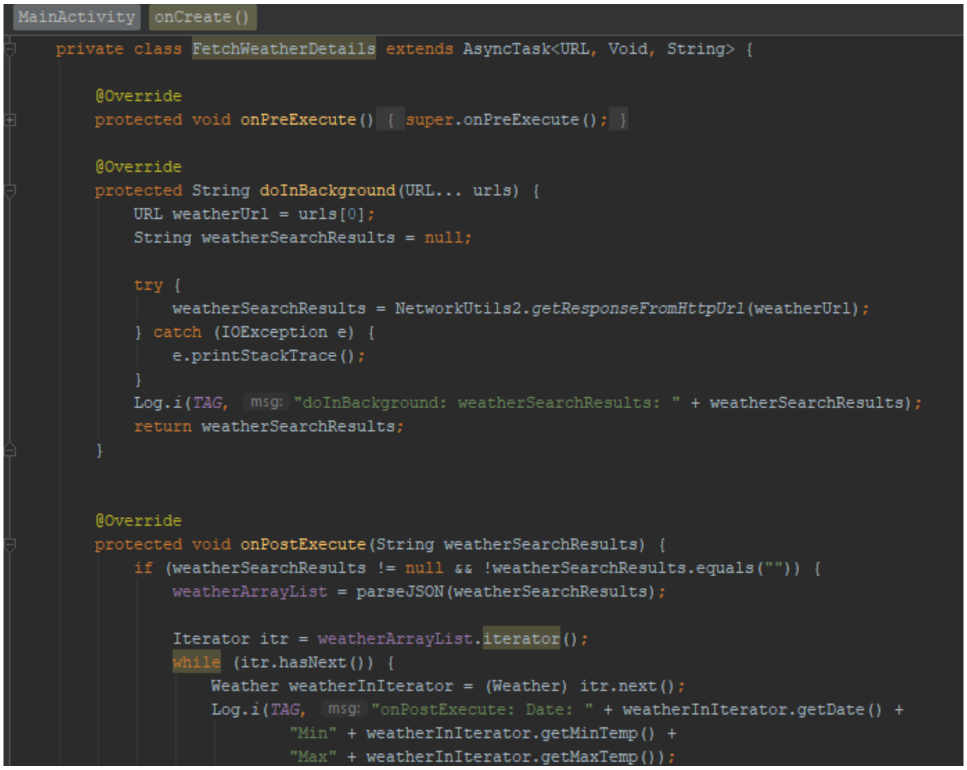
```
[
  {
    "LocalObservationDateTime": "2018-03-24T22:25:00+05:30",
    "EpochTime": 1521910500,
    "WeatherText": "Partly cloudy",
    "WeatherIcon": 35,
    "IsDayTime": false,
    "Temperature": {
      "Metric": {
        "Value": 28.3,
        "Unit": "C",
        "UnitType": 17
      },
      "Imperial": {
        "Value": 83,
        "Unit": "F",
        "UnitType": 18
      }
    },
    "MobileLink": "http://m.accuweather.com/en/in/vellore/190795/current-weather/190795?lang=en-us",
    "Link": "http://www.accuweather.com/en/in/vellore/190795/current-weather/190795?lang=en-us"
  }
]
```

Now we start developing in Android studio. We need NetworkUtils java files to connect to Accuweather



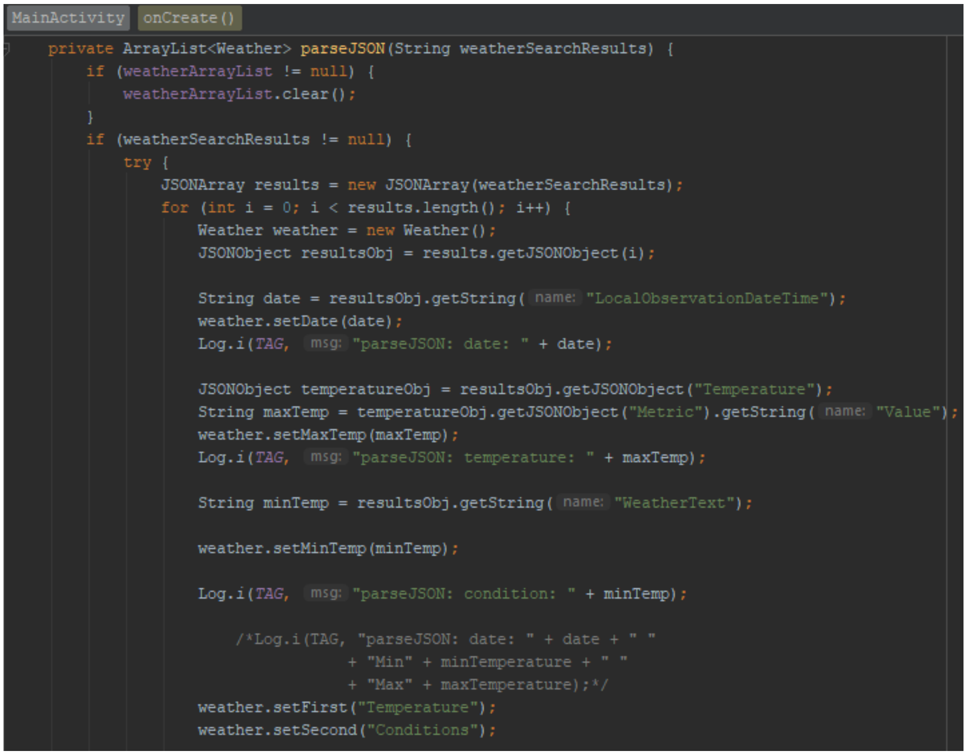
```
    private final static String TAG="NetworkUtils";
    private final static String WEATHERDB_BASE_URL =
            "http://dataservice.accuweather.com/forecasts/v1/daily/5day/190795";

    private final static String API_KEY = "[redacted]";

    private final static String METRIC_VALUE = "true";

    private final static String PARAM_API_KEY = "apikey";

    private final static String PARAM_METRIC = "metric";
    public static URL buildUrlForWeather() {
        Uri builtUri = Uri.parse(WEATHERDB_BASE_URL).buildUpon()
                .appendQueryParameter(PARAM_API_KEY, API_KEY)
                .appendQueryParameter(PARAM_METRIC, METRIC_VALUE)
                .build();
        URL url = null;
        try {
            url = new URL(builtUri.toString());
        } catch (MalformedURLException e) {
            e.printStackTrace();
        }
        Log.i(TAG, msg: "buildUrlForWeather: "+url);
        return url;
    }
    public static String getResponseFromHttpUrl (URL url) throws IOException {
        HttpURLConnection urlConnection = (HttpURLConnection) url.openConnection();
        try {
            InputStream in  = urlConnection.getInputStream();
            Scanner scanner = new Scanner(in);
            scanner.useDelimiter("\\A");
```

We need to fetch the weather details in JSON from the Accuweather website



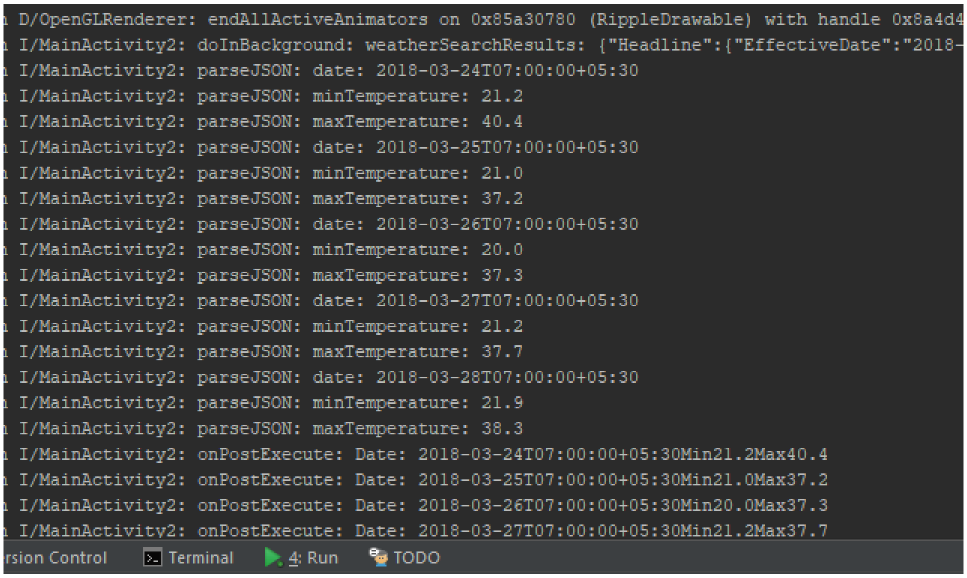
```
private class FetchWeatherDetails extends AsyncTask<URL, Void, String> {

    @Override
    protected void onPreExecute() { super.onPreExecute(); }

    @Override
    protected String doInBackground(URL... urls) {
        URL weatherUrl = urls[0];
        String weatherSearchResults = null;

        try {
            weatherSearchResults = NetworkUtils2.getResponseFromHttpUrl(weatherUrl);
        } catch (IOException e) {
            e.printStackTrace();
        }
        Log.i(TAG, msg: "doInBackground: weatherSearchResults: " + weatherSearchResults);
        return weatherSearchResults;
    }


    @Override
    protected void onPostExecute(String weatherSearchResults) {
        if (weatherSearchResults != null && !weatherSearchResults.equals("")) {
            weatherArrayList = parseJSON(weatherSearchResults);

            Iterator itr = weatherArrayList.iterator();
            while (itr.hasNext()) {
                Weather weatherInIterator = (Weather) itr.next();
                Log.i(TAG, msg: "onPostExecute: Date: " + weatherInIterator.getDate() +
                        "Min" + weatherInIterator.getMinTemp() +
                        "Max" + weatherInIterator.getMaxTemp());
```

And parse the JSON fetched



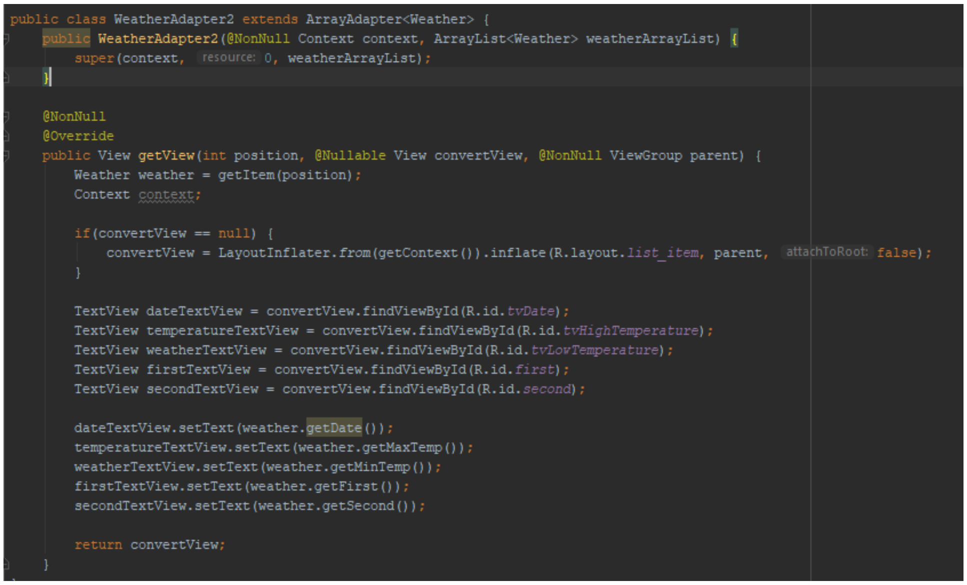
```
private ArrayList<Weather> parseJSON(String weatherSearchResults) {
    if (weatherArrayList != null) {
        weatherArrayList.clear();
    }
    if (weatherSearchResults != null) {
        try {
            JSONArray results = new JSONArray(weatherSearchResults);
            for (int i = 0; i < results.length(); i++) {
                Weather weather = new Weather();
                JSONObject resultsObj = results.getJSONObject(i);

                String date = resultsObj.getString( name: "LocalObservationDateTime");
                weather.setDate(date);
                Log.i(TAG, msg: "parseJSON: date: " + date);

                JSONObject temperatureObj = resultsObj.getJSONObject("Temperature");
                String maxTemp = temperatureObj.getJSONObject("Metric").getString( name: "Value");
                weather.setMaxTemp(maxTemp);
                Log.i(TAG, msg: "parseJSON: temperature: " + maxTemp);

                String minTemp = resultsObj.getString( name: "WeatherText");

                weather.setMinTemp(minTemp);

                Log.i(TAG, msg: "parseJSON: condition: " + minTemp);

                    /*Log.i(TAG, "parseJSON: date: " + date + " "
                                + "Min" + minTemperature + " "
                                + "Max" + maxTemperature);*/
                weather.setFirst("Temperature");
                weather.setSecond("Conditions");
```

Parsed JSON can be seen from the Logcat window when we run the app.
Validate the JSON just to be safe from JSON Validator



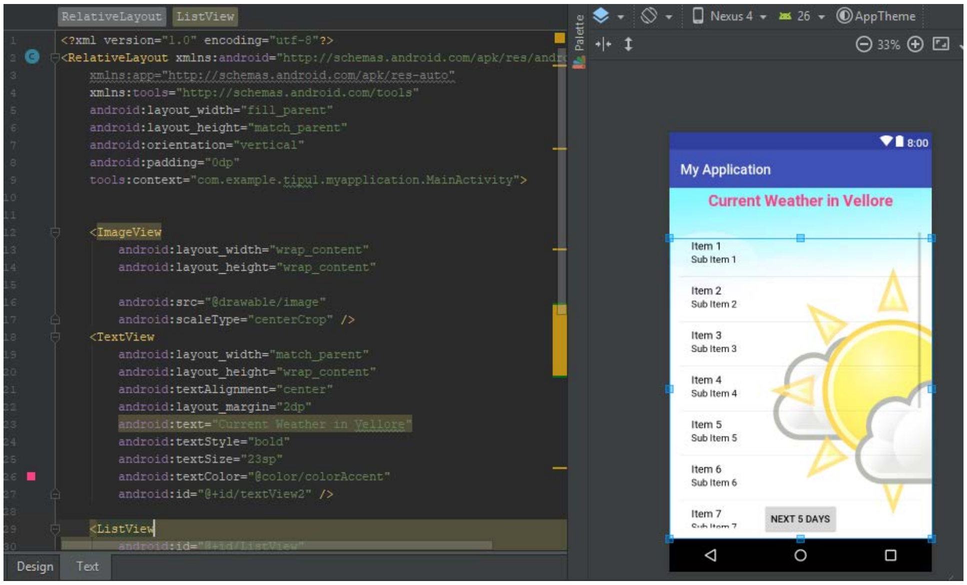
```
D/OpenGLRenderer: endAllActiveAnimators on 0x85a30780 (RippleDrawable) with handle 0x8a4d4
I/MainActivity2: doInBackground: weatherSearchResults: {"Headline":{"EffectiveDate":"2018-
I/MainActivity2: parseJSON: date: 2018-03-24T07:00:00+05:30
I/MainActivity2: parseJSON: minTemperature: 21.2
I/MainActivity2: parseJSON: maxTemperature: 40.4
I/MainActivity2: parseJSON: date: 2018-03-25T07:00:00+05:30
I/MainActivity2: parseJSON: minTemperature: 21.0
I/MainActivity2: parseJSON: maxTemperature: 37.2
I/MainActivity2: parseJSON: date: 2018-03-26T07:00:00+05:30
I/MainActivity2: parseJSON: minTemperature: 20.0
I/MainActivity2: parseJSON: maxTemperature: 37.3
I/MainActivity2: parseJSON: date: 2018-03-27T07:00:00+05:30
I/MainActivity2: parseJSON: minTemperature: 21.2
I/MainActivity2: parseJSON: maxTemperature: 37.7
I/MainActivity2: parseJSON: date: 2018-03-28T07:00:00+05:30
I/MainActivity2: parseJSON: minTemperature: 21.9
I/MainActivity2: parseJSON: maxTemperature: 38.3
I/MainActivity2: onPostExecute: Date: 2018-03-24T07:00:00+05:30Min21.2Max40.4
I/MainActivity2: onPostExecute: Date: 2018-03-25T07:00:00+05:30Min21.0Max37.2
I/MainActivity2: onPostExecute: Date: 2018-03-26T07:00:00+05:30Min20.0Max37.3
I/MainActivity2: onPostExecute: Date: 2018-03-27T07:00:00+05:30Min21.2Max37.7
```

Weather Adapter java file is used to parse the JSON and convert view in to the required list format



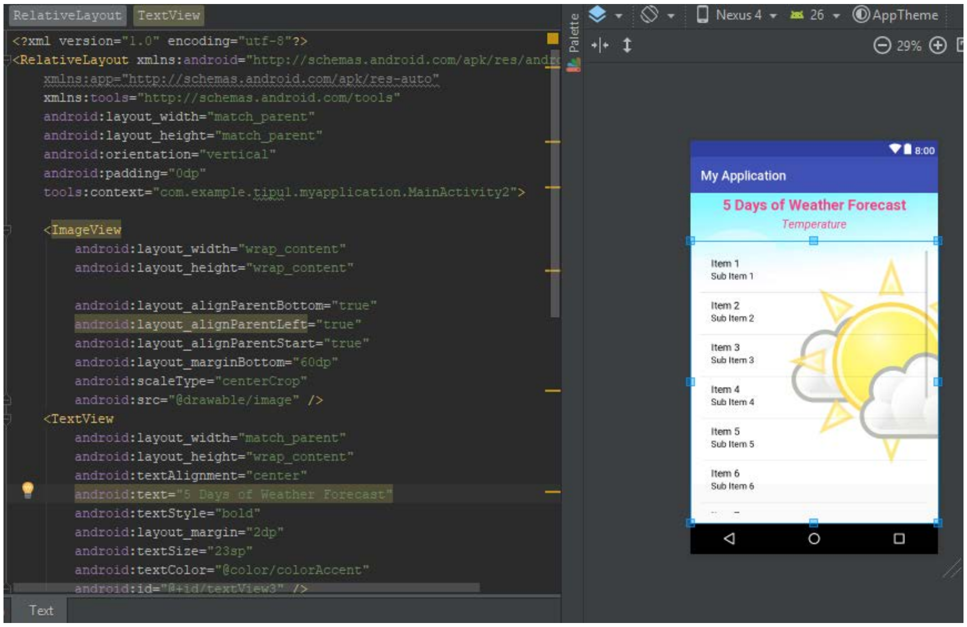
```
public class WeatherAdapter2 extends ArrayAdapter<Weather> {
    public WeatherAdapter2(@NonNull Context context, ArrayList<Weather> weatherArrayList) {
        super(context,  resource: 0, weatherArrayList);
    }

    @NonNull
    @Override
    public View getView(int position, @Nullable View convertView, @NonNull ViewGroup parent) {
        Weather weather = getItem(position);
        Context context;

        if(convertView == null) {
            convertView = LayoutInflater.from(getContext()).inflate(R.layout.list_item, parent,  attachToRoot: false);
        }

        TextView dateTextView = convertView.findViewById(R.id.tvDate);
        TextView temperatureTextView = convertView.findViewById(R.id.tvHighTemperature);
        TextView weatherTextView = convertView.findViewById(R.id.tvLowTemperature);
        TextView firstTextView = convertView.findViewById(R.id.first);
        TextView secondTextView = convertView.findViewById(R.id.second);

        dateTextView.setText(weather.getDate());
        temperatureTextView.setText(weather.getMaxTemp());
        weatherTextView.setText(weather.getMinTemp());
        firstTextView.setText(weather.getFirst());
        secondTextView.setText(weather.getSecond());

        return convertView;
    }
```

Main Activity XML



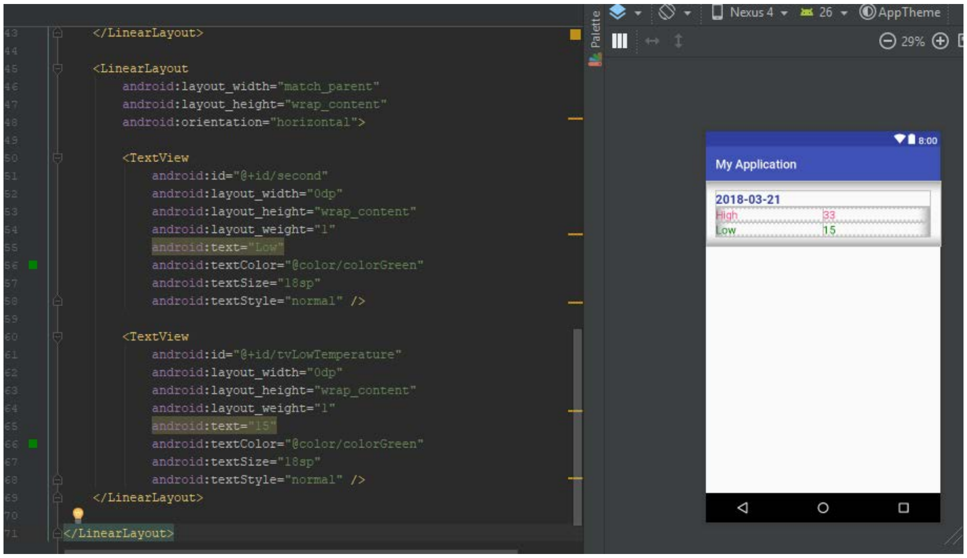
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/andr
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="fill_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="0dp"
    tools:context="com.example.tipul.myapplication.MainActivity">


    <ImageView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"

        android:src="@drawable/image"
        android:scaleType="centerCrop" />
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textAlignment="center"
        android:layout_margin="2dp"
        android:text="Current Weather in Vellore"
        android:textStyle="bold"
        android:textSize="23sp"
        android:textColor="@color/colorAccent"
        android:id="@+id/textView2" />

    <ListView
        android:id="@+id/ListView"
```

ACTIVITY 2 XML



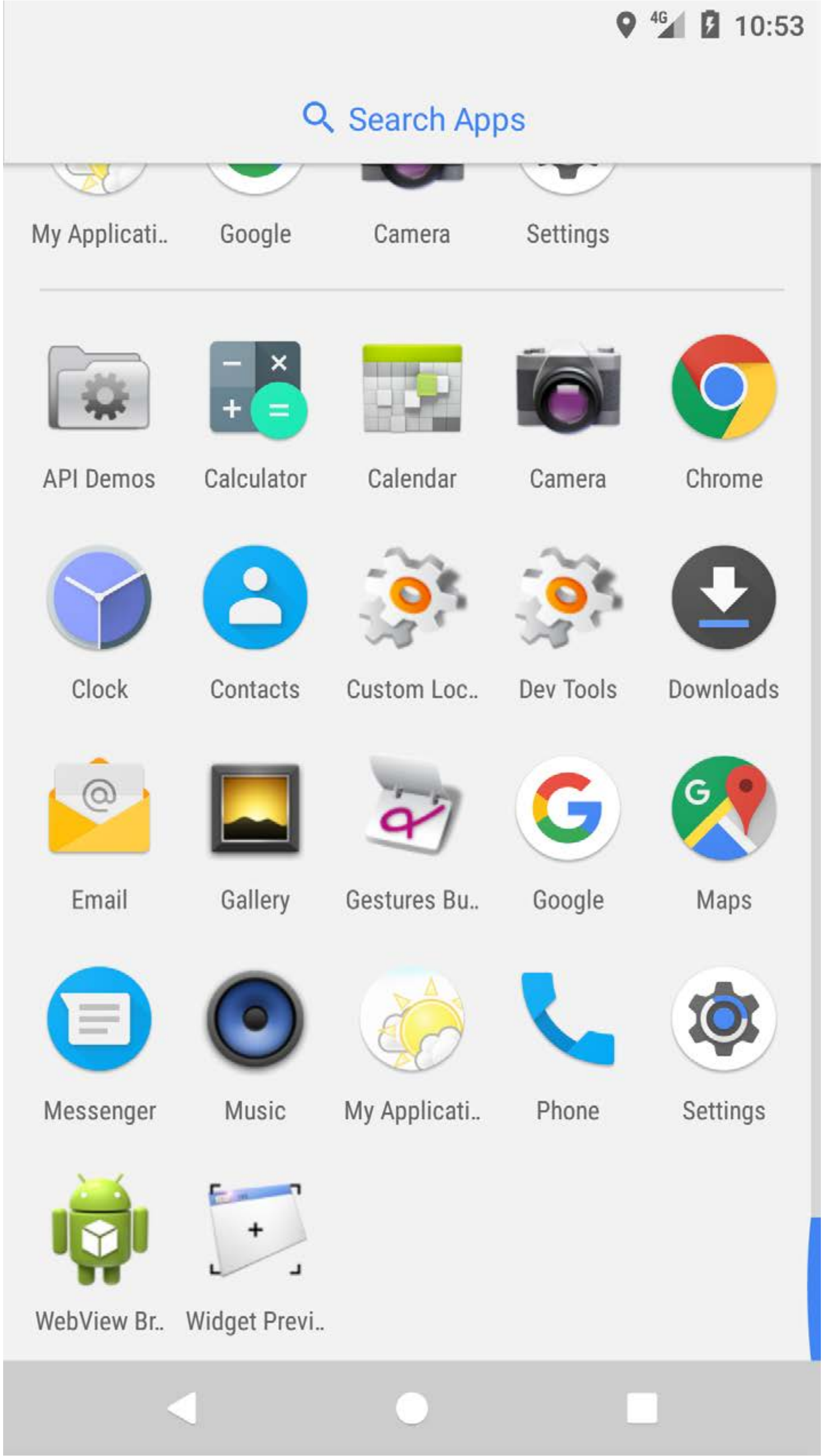
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/andr
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="0dp"
    tools:context="com.example.tipul.myapplication.MainActivity2">

    <ImageView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"

        android:layout_alignParentBottom="true"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:layout_marginBottom="60dp"
        android:scaleType="centerCrop"
        android:src="@drawable/image" />
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textAlignment="center"
        android:text="5 Days of Weather Forecast"
        android:textStyle="bold"
        android:layout_margin="2dp"
        android:textSize="23sp"
        android:textColor="@color/colorAccent"
        android:id="@+id/textView3" />
```

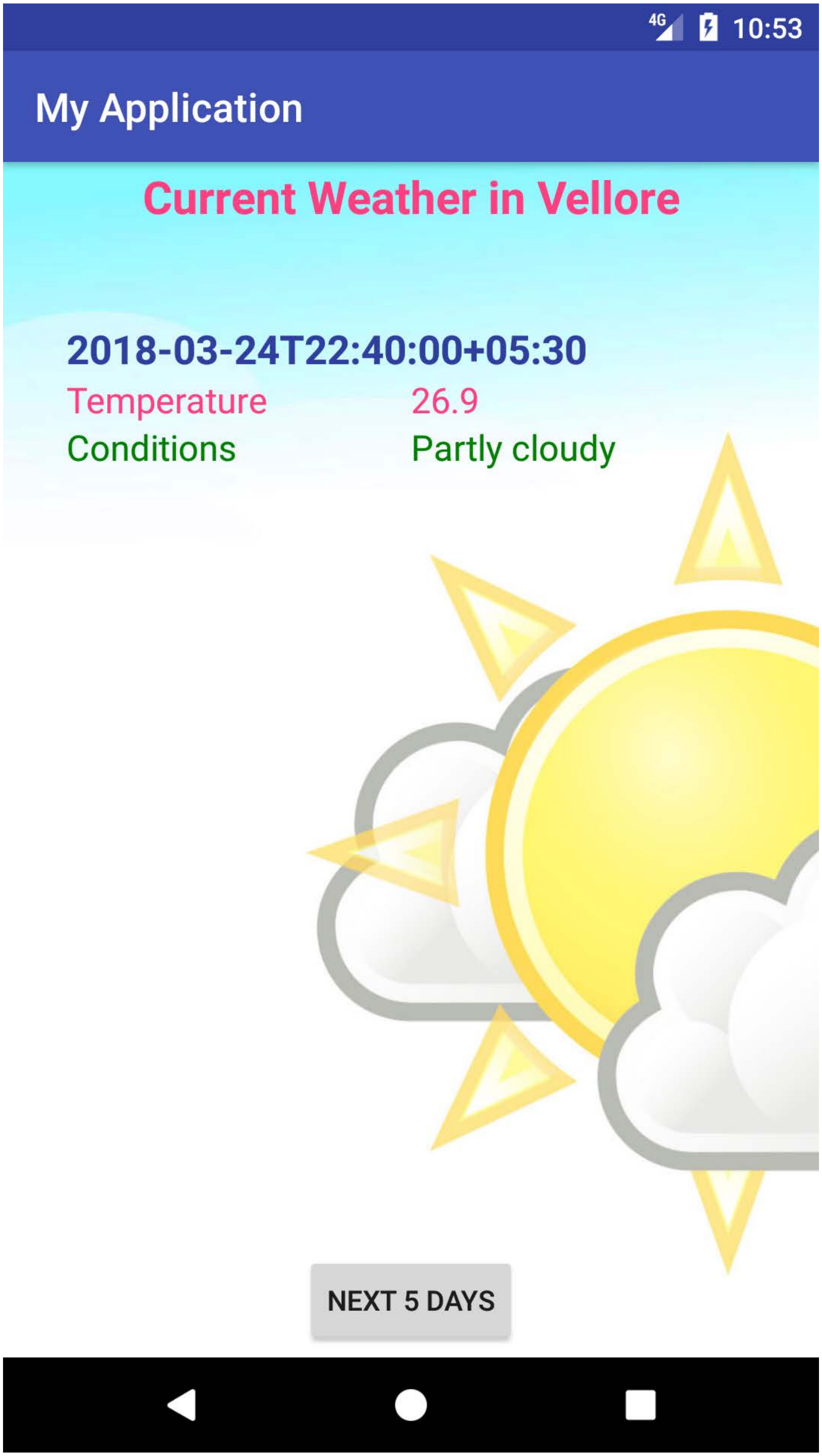
List_item resource XML



```
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

        <TextView
            android:id="@+id/second"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="Low"
            android:textColor="@color/colorGreen"
            android:textSize="18sp"
            android:textStyle="normal" />

        <TextView
            android:id="@+id/tvLowTemperature"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="15"
            android:textColor="@color/colorGreen"
            android:textSize="18sp"
            android:textStyle="normal" />
    </LinearLayout>

</LinearLayout>
```

RESULT OF EXECUTION


10:53
Search Apps
My Applicati..
Google
Camera
Settings
API Demos
Calculator
Calendar
Camera
Chrome
Clock
Contacts
Custom Loc..
Dev Tools
Downloads
Email
Gallery
Gestures Bu..
Google
Maps
Messenger
Music
My Applicati..
Phone
Settings
WebView Br..
Widget Previ..

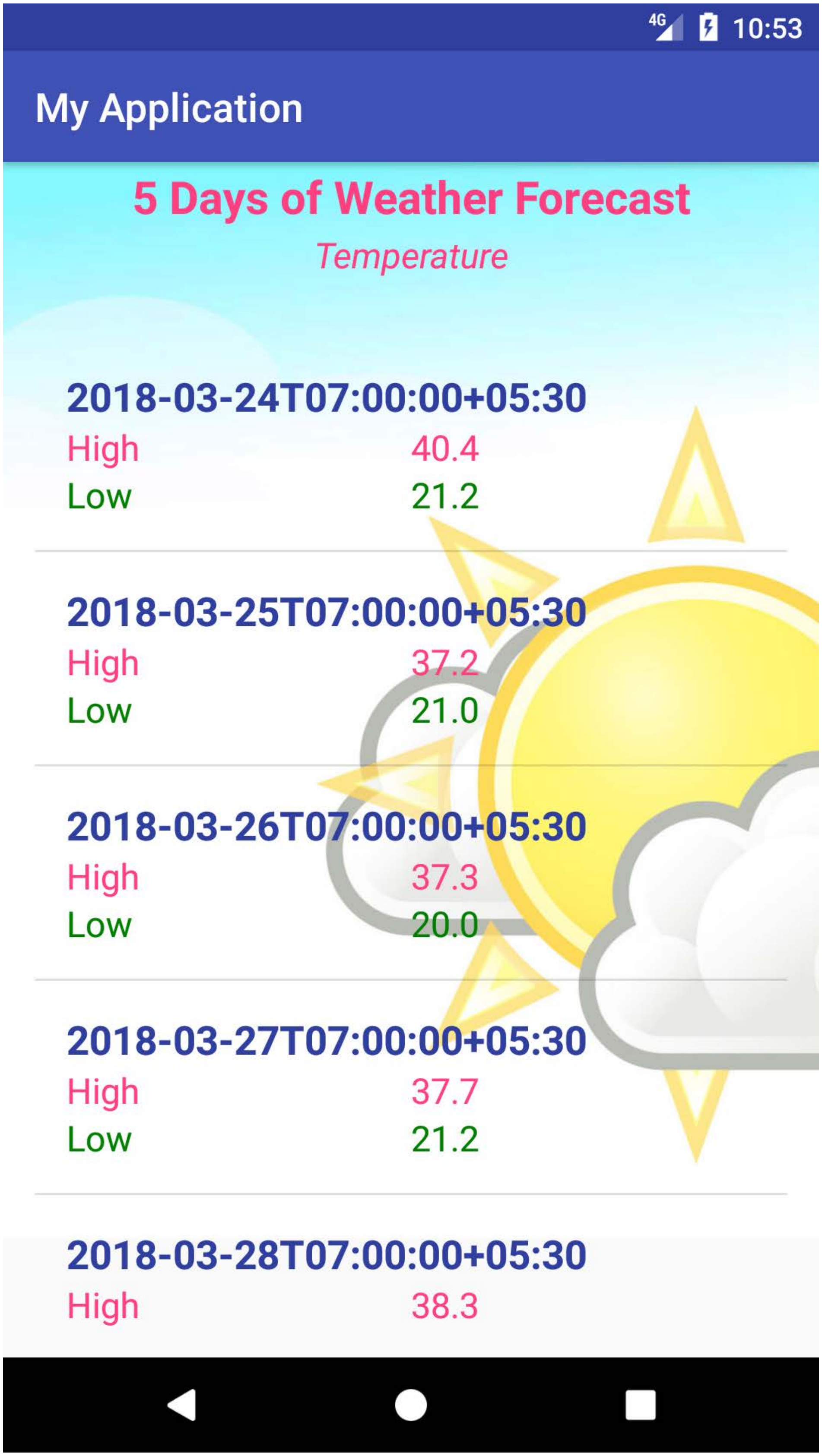


Current Weather in Vellore

2018-03-24T22:40:00+05:30

Temperature 26.9

Conditions Partly cloudy



5 Days of Weather Forecast

Temperature

2018-03-24T07:00:00+05:30
High 40.4
Low 21.2

2018-03-25T07:00:00+05:30
High 37.2
Low 21.0

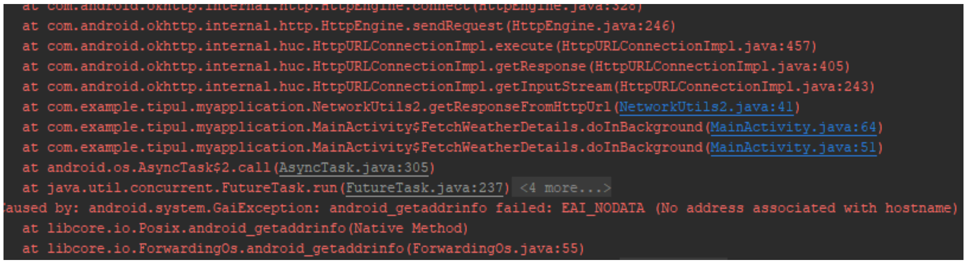
2018-03-26T07:00:00+05:30
High 37.3
Low 20.0

2018-03-27T07:00:00+05:30
High 37.7
Low 21.2

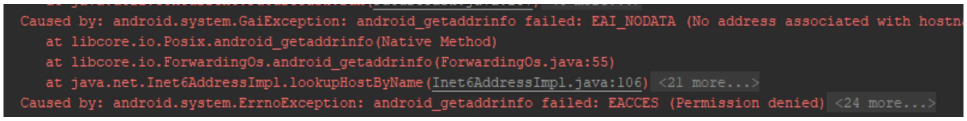
2018-03-28T07:00:00+05:30
High 38.3

SOME PROBLEMS FACED DURING EXECUTION:

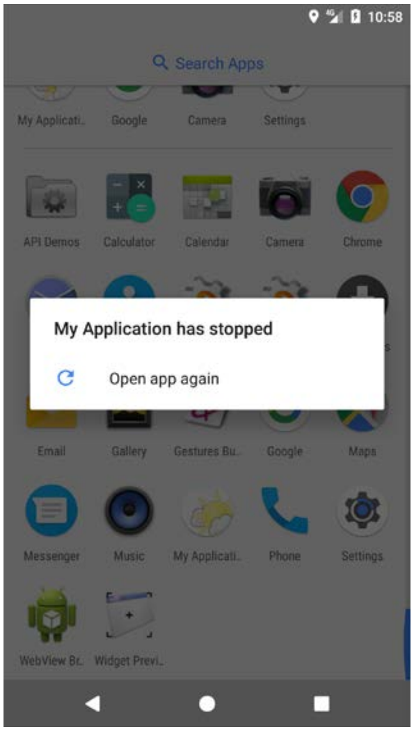
I was getting an Access denied error for mainActivity.java and NetworkUtils.java when it was trying to access Accuweather website



```
  at com.android.okhttp.internal.http.HttpEngine.connect(HttpEngine.java:328)
  at com.android.okhttp.internal.http.HttpEngine.sendRequest(HttpEngine.java:246)
  at com.android.okhttp.internal.huc.HttpURLConnectionImpl.execute(HttpURLConnectionImpl.java:457)
  at com.android.okhttp.internal.huc.HttpURLConnectionImpl.getResponse(HttpURLConnectionImpl.java:405)
  at com.android.okhttp.internal.huc.HttpURLConnectionImpl.getInputStream(HttpURLConnectionImpl.java:243)
  at com.example.tipul.myapplication.NetworkUtils2.getResponseFromHttpUrl(NetworkUtils2.java:41)
  at com.example.tipul.myapplication.MainActivity$FetchWeatherDetails.doInBackground(MainActivity.java:64)
  at com.example.tipul.myapplication.MainActivity$FetchWeatherDetails.doInBackground(MainActivity.java:51)
  at android.os.AsyncTask$2.call(AsyncTask.java:305)
  at java.util.concurrent.FutureTask.run(FutureTask.java:237) <4 more...>
aused by: android.system.GaiException: android_getaddrinfo failed: EAI_NODATA (No address associated with hostname)
  at libcore.io.Posix.android_getaddrinfo(Native Method)
  at libcore.io.ForwardingOs.android_getaddrinfo(ForwardingOs.java:55)
```



```
 Caused by: android.system.GaiException: android_getaddrinfo failed: EAI_NODATA (No address associated with hostn
    at libcore.io.Posix.android_getaddrinfo(Native Method)
    at libcore.io.ForwardingOs.android_getaddrinfo(ForwardingOs.java:55)
    at java.net.Inet6AddressImpl.lookupHostByName(Inet6AddressImpl.java:106) <21 more...>
 Caused by: android.system.ErrnoException: android_getaddrinfo failed: EACCES (Permission denied) <24 more...>
```



My Application has stopped

Open app again

REFERENCES AND RESOURCES

1. https://developer.accuweather.com/
2. https://jsonlint.com/
3. https://www.androidhive.info/2012/01/android-json-parsing-tutorial/
4. https://stackoverflow.com/questions/4186021/how-to-start-new-activity-on-button-click
5. https://www.tutorialspoint.com/android/android_list_view.htm