SE4040 – Enterprise Application Development

Year 4 - Semester 2 – 2022

Fuel Queue Management

Web Services based Mobile Application Report

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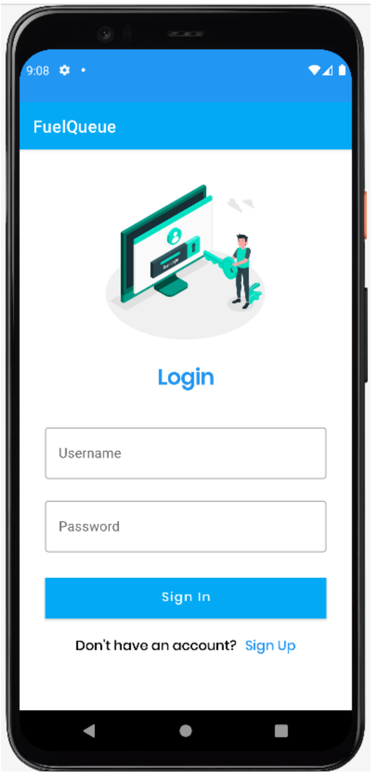
Individual Contribution

IT19114040	**IT19110530**
User Handling (Login)	User Handling (Registration)
View fuel queue length & fuel status	View Fuel Stations List and waiting time at fuel queues
Join fuel queues	Add new fuel stations
Update fuel arrival time, fuel finish time and the fuel type of the fuel station	Update arrival and depart time from fuel queue.
View vehicle queue details	View vehicle queue details
Description, High-level Diagram, Database Design, Screenshots of user interfaces & Copy pasting code	Description, High-level Diagram, Database Design, Screenshots of user interfaces & Copy pasting code

1. Description of the Project

The fuel Management system is a web API based mobile application. There are two main user roles, namely Admin and the Fuel User. We took into account the fact that consumers might choose the closest gasoline station in this situation if they wanted to buy petrol. Users may monitor the length of the line and how long the wait time has been for that by doing so. With the help of this application, users may look up the queue in advance and pick another line based on their preferences or enter the current one. Administrators will be able to view a list of fuel stations added to the system. They can add their fuel stations into the system via the app by entering details such as location, fuel availability, fuel type available, fuel arrival time, etc. Administrators can also update the details of the fuel station such as fuel availability, fuel type available and fuel finishing time.

2. User Interfaces



FuelQueue

Login

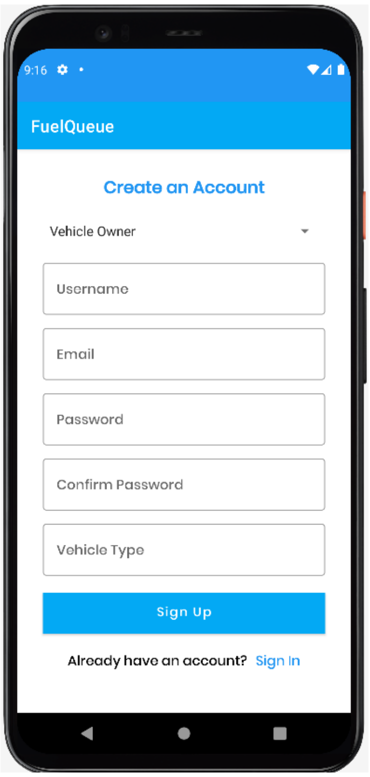
Username

Password

Sign In

Don't have an account? Sign Up

Figure 1: Sign In Interface



FuelQueue

Create an Account

Vehicle Owner

Username

Email

Password

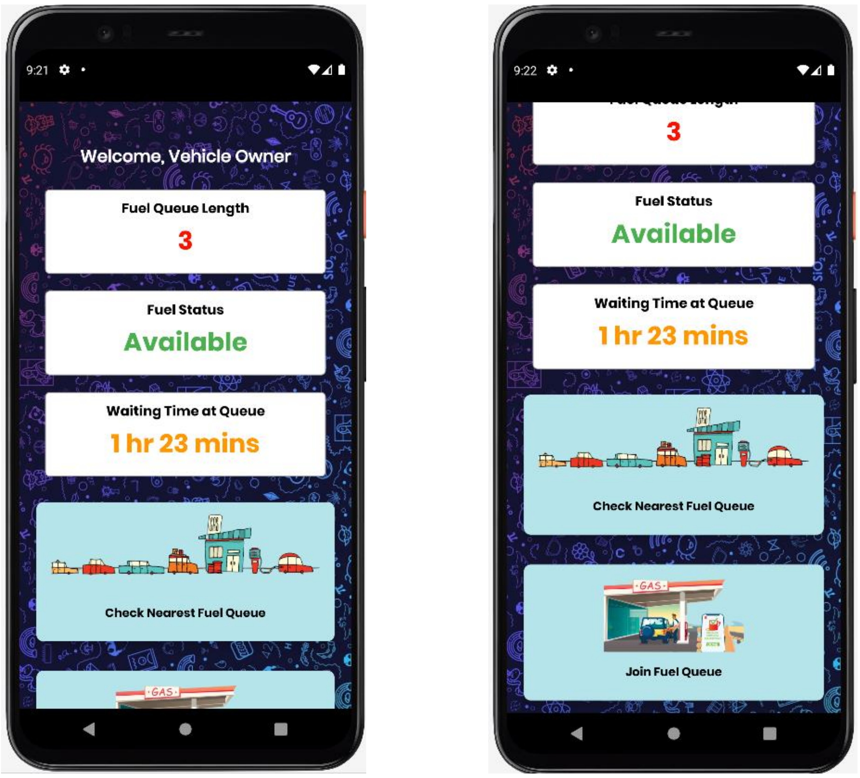
Confirm Password

Vehicle Type

Sign Up

Already have an account? Sign In

Figure 2: Sign Up Interface



Welcome, Vehicle Owner

Fuel Queue Length

3

Fuel Status

Available

Waiting Time at Queue

1 hr 23 mins

Check Nearest Fuel Queue

3

Fuel Status

Available

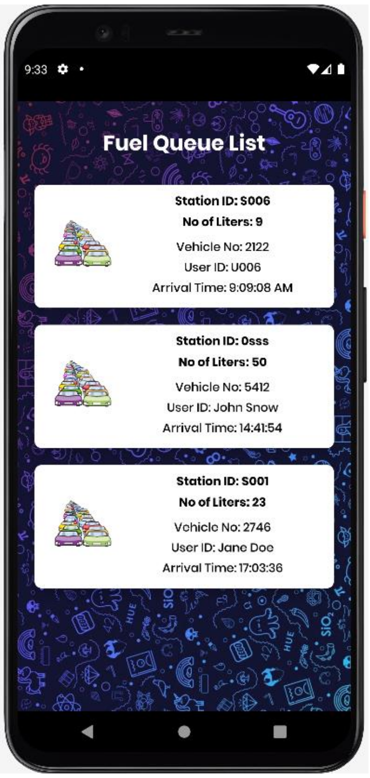
Waiting Time at Queue

1 hr 23 mins

Check Nearest Fuel Queue

Join Fuel Queue

Figure 3: Vehicle Owner Home Page



Station ID: S006
No of Liters: 9
Vehicle No: 2122
User ID: U006
Arrival Time: 8:09:08 AM

Station ID: 0sss
No of Liters: 50
Vehicle No: 5412
User ID: John Snow
Arrival Time: 14:41:54

Station ID: S001
No of Liters: 23
Vehicle No: 2746
User ID: Jane Doe
Arrival Time: 17:03:36

Figure 4: View Vehicle Queue Details Interface

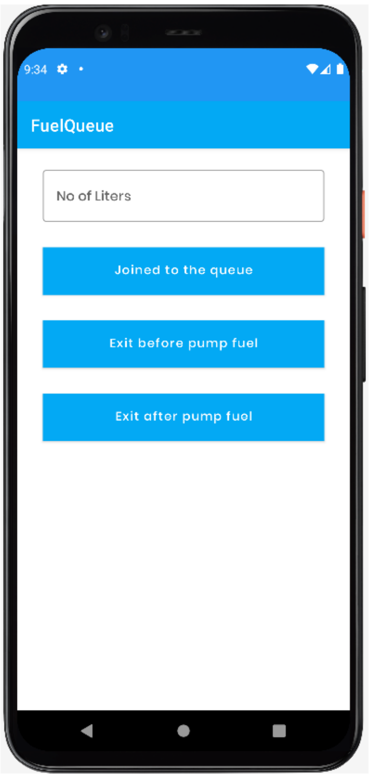
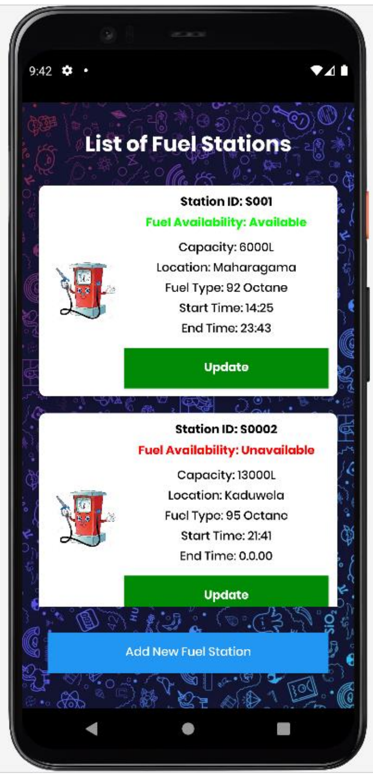


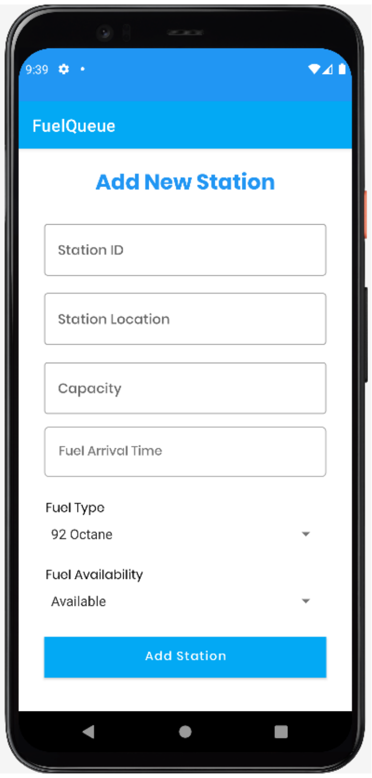
Figure 5: Join/Leave Vehicle Queue Interface



Station ID: S001
Fuel Availability: Available
Capacity: 6000L
Location: Maharagama
Fuel Type: 92 Octane
Start Time: 14:25
End Time: 23:43

Station ID: S0002
Fuel Availability: Unavailable
Capacity: 13000L
Location: Kaduwela
Fuel Type: 95 Octane
Start Time: 21:41
End Time: 0.0.00

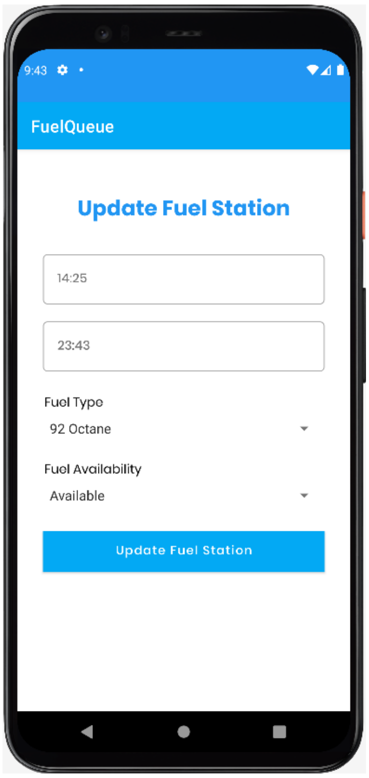
Figure 6: View Gas Stations List Interface



Fuel Type
92 Octane

Fuel Availability
Available

Figure 7: Add New Gas Stations Interface



9:43

FueLQueue

Update Fuel Station

14:25

23:43

Fuel Type: 92 Octane

Fuel Availability: Available

Figure 8: Update Gas Stations Interface

Figure 9: Splash Screen

3. High Level Diagram

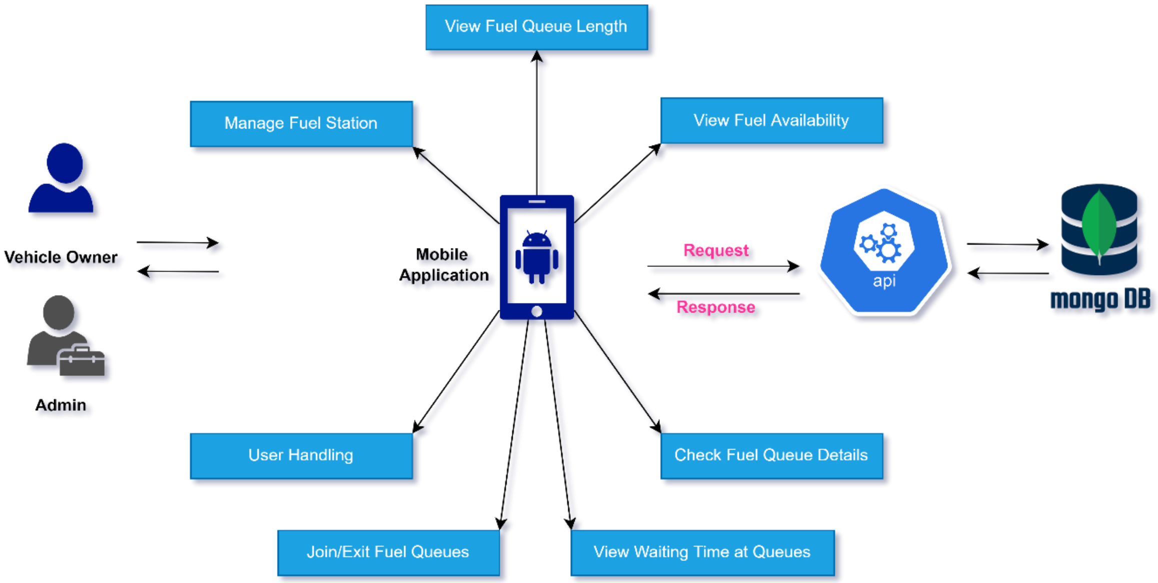


Figure 10: High Level Diagram

4. Frontend Development

4.1 Java Files

a. AdminAddStationActivity.java

```
package vian.mobile.fuelqueue;

import androidx.appcompat.app.AppCompatActivity;

import android.app.TimePickerDialog;
import android.content.Intent;
import android.graphics.Color;
import android.os.Build;
import android.os.Bundle;
import android.text.TextUtils;
import android.util.Log;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Spinner;
import android.widget.TextView;
import android.widget.TimePicker;
import android.widget.Toast;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.JsonObjectRequest;
import com.android.volley.toolbox.Volley;

import org.json.JSONArray;
import org.json.JSONObject;

import java.util.Calendar;
import java.util.HashMap;
import java.util.Map;

public class AdminAddStationActivity extends
AppCompatActivity implements
AdapterView.OnItemSelectedListener {

    String[] fuelAvailability = {"Available",
"Unavailable"};
    String[] fuelType = {"92 Octane", "95 Octane",
"Diesel"};

    EditText textField1, textField2, textField3;
    TextView textField4, textField5;
    Button btnAddStation;
    private int hours, minutes;
    String stationID, stationLocation, stationCapacity,
fuelArrivalTime, fuelFinishTime, fuelAvailabilityInStation,
fuelTypeInStation;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

setContentView(R.layout.activity_admin_add_station);

        textField1 = findViewById(R.id.textField1);
        textField2 = findViewById(R.id.textField2);
        textField3 = findViewById(R.id.textField3);
        textField4 = findViewById(R.id.textField4);
        textField5 = findViewById(R.id.textField5);
        btnAddStation = findViewById(R.id.btnAddStation);

        Spinner fuelAvailabilitySpinner = (Spinner)
findViewById(R.id.fuelAvailabilitySpinner);
        Spinner fuelTypeSpinner = (Spinner)
findViewById(R.id.fuelTypeSpinner);

fuelAvailabilitySpinner.setOnItemSelectedListener(this);
        fuelTypeSpinner.setOnItemSelectedListener(this);

        ArrayAdapter arrayAdapter = new
ArrayAdapter(this,android.R.layout.simple_spinner_item,
fuelAvailability);

arrayAdapter.setDropDownViewResource(android.R.layout.simpl
e_spinner_dropdown_item);
        fuelAvailabilitySpinner.setAdapter(arrayAdapter);

        ArrayAdapter arrayAdapter2 = new
ArrayAdapter(this,android.R.layout.simple_spinner_item,
fuelType);

arrayAdapter2.setDropDownViewResource(android.R.layout.simp
le_spinner_dropdown_item);
        fuelTypeSpinner.setAdapter(arrayAdapter2);

        // implementation of the time picker
        textField4.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                final Calendar c = Calendar.getInstance();
                hours = c.get(Calendar.HOUR_OF_DAY);
                minutes = c.get(Calendar.MINUTE);

                TimePickerDialog timePickerDialog = new
TimePickerDialog(AdminAddStationActivity.this, new
TimePickerDialog.OnTimeSetListener() {
```

```
                              @Override
                              public void
onTimeSet(TimePicker view, int hourOfDay, int minute) {

textField4.setTextColor(Color.BLACK);

textField4.setText(hourOfDay +":"+ minute);
                              }
                         }, hours, minutes, false);
                timePickerDialog.show();

            }
        });


        // actions to be done after button click
        btnAddStation.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {

                SignInActivity.handleSSLHandshake();

                // get user inputs
                stationID =
textField1.getText().toString();
                stationLocation =
textField2.getText().toString();
                stationCapacity =
textField3.getText().toString();
                fuelArrivalTime =
textField4.getText().toString();

                // validate data
                if (TextUtils.isEmpty(stationID)) {
                    Toast.makeText(getApplicationContext(),
"Please enter station id!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else if
(TextUtils.isEmpty(stationLocation)) {
                    Toast.makeText(getApplicationContext(),
"Please enter station location!",
Toast.LENGTH_SHORT).show();
                    return;
                }
                else if
(TextUtils.isEmpty(stationCapacity)) {

Toast.makeText(getApplicationContext(),"Please enter
station capacity!", Toast.LENGTH_SHORT).show();
                    return;
                }                   else if
(TextUtils.isEmpty(fuelArrivalTime)) {
```

```
Toast.makeText(getApplicationContext(),"Please select fuel
arrival time!", Toast.LENGTH_SHORT).show();
                    return;
                }/*
                else if (TextUtils.isEmpty(fuelFinishTime))
{

Toast.makeText(getApplicationContext(),"Please select fuel
finish time!", Toast.LENGTH_SHORT).show();
                    return;
                }*/
                else {

                    Map<Object, String> mapData = new
HashMap<Object, String>();
                    String url =
"https://10.0.2.2:7165/addToFuelStation";
                    RequestQueue requestQueue =
Volley.newRequestQueue(AdminAddStationActivity.this);

                    mapData.put("stationID", stationID);
                    mapData.put("location",
stationLocation);
                    mapData.put("capacity",
stationCapacity);
                    mapData.put("availability",
fuelAvailabilityInStation);
                    mapData.put("type", fuelTypeInStation);
                    mapData.put("startingTime",
fuelArrivalTime);

                    try {
                        JsonObjectRequest request=new
JsonObjectRequest(Request.Method.POST, url, new
JSONObject(mapData), new Response.Listener<JSONObject>() {
                            @Override
                            public void
onResponse(JSONObject response) {
                                Log.i("onResponse",
""+response.toString());

Toast.makeText(getApplicationContext(), "Fuel Station Added
Successfully",Toast.LENGTH_LONG).show();
                                startActivity(new
Intent(getApplicationContext(),
FuelStationListActivity.class));
                            }
                        }, new Response.ErrorListener() {
                            @Override
                            public void
onErrorResponse(VolleyError error) {
                                error.printStackTrace();
                                Log.i("onErrorResponse",
"Error");
                            }
                        });

                        requestQueue.add(request);

                    } catch (Exception e) {
                        Log.d("error", String.valueOf(e)) ;

                        e.printStackTrace();
                    }
                }

            }
        });

    }

    // Get the value selected from spinner
    @Override
    public void onItemSelected(AdapterView<?> arg0, View
arg1, int position, long id) {
        fuelAvailabilityInStation =
fuelAvailability[position];
        fuelTypeInStation = fuelType[position];
    }
    @Override
    public void onNothingSelected(AdapterView<?> arg0) {
    }

    // navigate to FuelStationListActivity activity
    @Override
    public void onBackPressed() {
        super.onBackPressed();
        finish();
        startActivity(new Intent(getApplicationContext(),
FuelStationListActivity.class));
    }

}
```

b. FuelQueue.java

```
package vian.mobile.fuelqueue;

public class FuelQueue {

    private String stationID;
    private String vehicleNumber;
    private String userId;
    private String noOfLiters;
    private String arrivalTime;
    private String departureTime;
    private String status;

    // constructor
    public FuelQueue(String stationID, String
vehicleNumber, String userId, String noOfLiters, String
arrivalTime, String departureTime, String status) {
        this.stationID = stationID;
        this.vehicleNumber = vehicleNumber;
        this.userId = userId;
        this.noOfLiters = noOfLiters;
        this.arrivalTime = arrivalTime;
        this.departureTime = departureTime;
        this.status = status;
    }

    // getters and setters
    public String getStationID() {
        return stationID;
    }

    public void setStationID(String stationID) {
        this.stationID = stationID;
    }

    public String getVehicleNumber() {
        return vehicleNumber;
    }

    public void setVehicleNumber(String vehicleNumber) {
        this.vehicleNumber = vehicleNumber;
    }

    public String getUserId() {
        return userId;
    }

    public void setUserId(String userId) {
        this.userId = userId;
    }

    public String getNoOfLiters() {
        return noOfLiters;
    }

    public void setNoOfLiters(String noOfLiters) {
        this.noOfLiters = noOfLiters;
    }

    public String getArrivalTime() {
        return arrivalTime;
    }

    public void setArrivalTime(String arrivalTime) {
        this.arrivalTime = arrivalTime;
    }

    public String getDepartureTime() {
        return departureTime;
    }

    public void setDepartureTime(String departureTime) {
        this.departureTime = departureTime;
    }

    public String getStatus() {
        return status;
    }

    public void setStatus(String status) {
        this.status = status;
    }

}
```

c. FuelQueueAdapter.java

```
package vian.mobile.fuelqueue;

import android.content.Context;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.TextView;

import androidx.recyclerview.widget.RecyclerView;

import java.util.ArrayList;

public class FuelQueueAdapter extends
RecyclerView.Adapter<FuelQueueAdapter.ViewHolder>{

    private ArrayList<FuelQueue> fuelQueueArrayList;
    private Context context;

    public FuelQueueAdapter(Context context,
ArrayList<FuelQueue> fuelQueueArrayList){
        this.context = context;
        this.fuelQueueArrayList = fuelQueueArrayList;
    }

    @Override
    public ViewHolder onCreateViewHolder(ViewGroup parent,
int viewType) {

        View view =
LayoutInflater.from(context).inflate(R.layout.fuel_queue_it
em_layout,parent,false);

        return  new ViewHolder(view);
    }

    @Override
    public void onBindViewHolder(ViewHolder holder, int
position) {
        setUpData(holder,position);
    }

    @Override
    public int getItemCount() {
        return fuelQueueArrayList.size();
    }

    // set values to variables
    private void setUpData(ViewHolder holder, int position)
{

        FuelQueue fuelQueue =
fuelQueueArrayList.get(position);
        holder.txt1.setText("Station ID: " +
fuelQueue.getStationID());
        holder.txt2.setText("Vehicle No: " +
fuelQueue.getVehicleNumber());
        holder.txt3.setText("User ID: " +
fuelQueue.getUserId());
        holder.txt4.setText("No of Liters: " +
fuelQueue.getNoOfLiters());
        holder.txt6.setText("Arrival Time: " +
fuelQueue.getArrivalTime());

    }

    public class ViewHolder extends RecyclerView.ViewHolder
{

        TextView txt1, txt2, txt3, txt4, txt5, txt6, txt7;

        public ViewHolder(View itemView) {
            super(itemView);

            txt1 = itemView.findViewById(R.id.txt1);
            txt2 = itemView.findViewById(R.id.txt2);
            txt3 = itemView.findViewById(R.id.txt3);
            txt4 = itemView.findViewById(R.id.txt4);
            txt6 = itemView.findViewById(R.id.txt6);

            txt1.setOnClickListener(new
View.OnClickListener() {
                @Override
                public void onClick(View view) {
                    int position = getAdapterPosition();

                    FuelQueue fuelQueue =
fuelQueueArrayList.get(position);

                }

            });
            }

        }


    }
```

d. FuelQueueListActivity.java

```
package vian.mobile.fuelqueue;

import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

import androidx.appcompat.app.AppCompatActivity;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.JsonArrayRequest;
import com.android.volley.toolbox.Volley;

import org.json.JSONArray;
import org.json.JSONObject;

import java.util.ArrayList;

public class FuelQueueListActivity extends
AppCompatActivity {

    private RecyclerView recyclerView;
    private ArrayList<FuelQueue> fuelQueueArrayList;
    private FuelQueueAdapter fuelQueueAdapter;
    private TextView textViewNoQueue, heading;
    private Button btnAddStation;
    JSONArray jsonArray;
    JSONObject jsonObject;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

setContentView(R.layout.activity_fuel_station_list);

        SignInActivity.handleSSLHandshake();
        initViews();
        fetchFuelQueue();

        heading.setText("Fuel Queue List");
        btnAddStation.setVisibility(View.INVISIBLE);

    }


    // initializing views
    private void initViews() {
        fuelQueueArrayList = new ArrayList<FuelQueue>();

        recyclerView = (RecyclerView)
findViewById(R.id.recyclerView);
        recyclerView.setLayoutManager(new
LinearLayoutManager(this,LinearLayoutManager.VERTICAL,
false));
        recyclerView.setHasFixedSize(true);

        textViewNoQueue = findViewById(R.id.textView);
        heading = findViewById(R.id.heading);
        btnAddStation = findViewById(R.id.btnAddStation);

    }


    // fetch records of the fuel queue
    private void fetchFuelQueue() {

        String URL = "https://10.0.2.2:7165/getFuelQueue";

        RequestQueue requestQueue =
Volley.newRequestQueue(FuelQueueListActivity.this);

        JsonArrayRequest objectRequest = new
JsonArrayRequest(
                Request.Method.GET, URL, null,
                new Response.Listener<JSONArray>() {
                    @Override
                    public void onResponse(JSONArray
response) {

                        if (jsonArray == null) {

textViewNoQueue.setVisibility(View.VISIBLE);

recyclerView.setVisibility(View.GONE);
                        }


recyclerView.getLayoutParams().height = 1700;


                        jsonArray = response;
                        Log.e("**************************",
jsonArray.toString());

                        int a = jsonArray.length();
                            for (int i=0;i<a;i++){
                                try {
                                    jsonObject =
(JSONObject) jsonArray.get(i);

Log.d("$$$$$$$$$$$$$$$$$$$$$$",
String.valueOf(jsonArray.length()));
                                    FuelQueue fuelStation =
new FuelQueue(jsonObject.getString("stationId"),

jsonObject.getString("vehicleNumber"),

jsonObject.getString("userId"),

jsonObject.getString("noOfLiters"),

jsonObject.getString("arrivalTime"),

jsonObject.getString("departureTime"),

jsonObject.getString("status"));


fuelQueueArrayList.add(fuelStation);


                                } catch (Exception e) {
                                    e.printStackTrace();
                                }
                            }


textViewNoQueue.setVisibility(View.GONE);

recyclerView.setVisibility(View.VISIBLE);
                        setAdaptertoRecyclerView();

                    }
                },
                new Response.ErrorListener() {
                    @Override
                    public void onErrorResponse(VolleyError
error) {
                        Log.e("**************************",
error.toString());

                    }
                }
        );

        requestQueue.add(objectRequest);
```

```
    }

    // setting Adapter to recycler view
    private void setAdaptertoRecyclerView() {
        fuelQueueAdapter = new 
FuelQueueAdapter(this,fuelQueueArrayList);
        recyclerView.setAdapter(fuelQueueAdapter);
    }

    // navigate to MainActivity activity
    @Override
    public void onBackPressed() {
        super.onBackPressed();
        finish();
        startActivity(new Intent(getApplicationContext(), 
MainActivity.class));
    }
}
```

e. FuelStation.java

```
package vian.mobile.fuelqueue;

public class FuelStation {

    private String Id;
    private String Location;
    private String Capacity;
    private String Availability;
    private String Type;
    private String StartingTime;
    private String endingTime;

    // constructor
    public FuelStation(String id, String location, String 
capacity, String availability, String type, String 
startingTime, String endingTime) {
        Id = id;
        Location = location;
        Capacity = capacity;
        Availability = availability;
        Type = type;
        StartingTime = startingTime;
        this.endingTime = endingTime;
    }

    // getter and setter
    public String getId() {
        return Id;
    }
    public void setId(String id) {
        Id = id;
    }

    public String getLocation() {
        return Location;
    }

    public void setLocation(String location) {
        Location = location;
    }

    public String getCapacity() {
        return Capacity;
    }

    public void setCapacity(String capacity) {
        Capacity = capacity;
    }

    public String getAvailability() {
        return Availability;
    }

    public void setAvailability(String availability) {
        Availability = availability;
    }

    public String getStartingTime() {
        return StartingTime;
    }

    public void setStartingTime(String startingTime) {
        StartingTime = startingTime;
    }

    public String getEndingTime() {
        return endingTime;
    }

    public void setEndingTime(String endingTime) {
        this.endingTime = endingTime;
    }

    public String getType() {
        return Type;
    }

    public void setType(String type) {
        Type = type;
    }
}
```

f. FuelStationAdapter.java

```
package vian.mobile.fuelqueue;

import android.content.Context;
import android.content.Intent;
import android.graphics.Color;
import android.media.MediaPlayer;
import android.os.Handler;
import android.util.Log;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.Button;
import android.widget.ImageView;
import android.widget.SeekBar;
import android.widget.TextView;

import androidx.recyclerview.widget.RecyclerView;
import androidx.transition.TransitionManager;

import java.io.IOException;
import java.util.ArrayList;

public class FuelStationAdapter extends
RecyclerView.Adapter<FuelStationAdapter.ViewHolder>{

    private ArrayList<FuelStation> fuelStationArrayList;
    private Context context;
    public static  String id, start, end;

    public FuelStationAdapter(Context context,
ArrayList<FuelStation> fuelStationArrayList){
        this.context = context;
        this.fuelStationArrayList = fuelStationArrayList;
    }

    @Override
    public ViewHolder onCreateViewHolder(ViewGroup parent,
int viewType) {

        View view =
LayoutInflater.from(context).inflate(R.layout.fuel_station_
item_layout,parent,false);

        return  new ViewHolder(view);
    }

    @Override
    public void onBindViewHolder(ViewHolder holder, int
position) {
        setUpData(holder,position);
    }

    @Override
    public int getItemCount() {
        return fuelStationArrayList.size();
    }

    private void setUpData(ViewHolder holder, int position)
{

        FuelStation fuelStation =
fuelStationArrayList.get(position);
        holder.txt1.setText("Station ID: " +
fuelStation.getId());
        holder.txt4.setText("Fuel Availability: " +
fuelStation.getAvailability());
        holder.txt3.setText("Location: " +
fuelStation.getLocation());
        holder.txt2.setText("Capacity: " +
fuelStation.getCapacity());
        holder.txt7.setText("Fuel Type: " +
fuelStation.getType());
        holder.txt5.setText("Start Time: " +
fuelStation.getStartingTime());
        holder.txt6.setText("End Time: " +
fuelStation.getEndingTime());


if(fuelStation.getAvailability().equals("Available")) {
            holder.txt4.setTextColor(Color.GREEN);
        }
        else {
            holder.txt4.setTextColor(Color.RED);
        }
    }

    // set values to variables
    public class ViewHolder extends RecyclerView.ViewHolder
{

        TextView txt1, txt2, txt3, txt4, txt5, txt6, txt7;
        Button update;

        public ViewHolder(View itemView) {
            super(itemView);

            txt1 = itemView.findViewById(R.id.txt1);
            txt2 = itemView.findViewById(R.id.txt2);
            txt3 = itemView.findViewById(R.id.txt3);
            txt4 = itemView.findViewById(R.id.txt4);
            txt5 = itemView.findViewById(R.id.txt5);
            txt6 = itemView.findViewById(R.id.txt6);
            txt7 = itemView.findViewById(R.id.txt7);
            update = itemView.findViewById(R.id.update);

            update.setOnClickListener(new
View.OnClickListener() {
                @Override
                public void onClick(View view) {
                    int position = getAdapterPosition();
                    FuelStation fuelStation =
fuelStationArrayList.get(position);
                    id = fuelStation.getId();
                    start = fuelStation.getStartingTime();
                    end = fuelStation.getEndingTime();
                    context.startActivity(new
Intent(context, UpdateFuelStationActivity.class));
                }

            });
        }

    }


}
```

g. FuelStationListActivity.java

```
package vian.mobile.fuelqueue;

import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

import androidx.appcompat.app.AppCompatActivity;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.JsonArrayRequest;
import com.android.volley.toolbox.JsonObjectRequest;
import com.android.volley.toolbox.Volley;

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

import java.io.File;
import java.util.ArrayList;

public class FuelStationListActivity extends
AppCompatActivity {

    private RecyclerView recyclerView;
    private ArrayList<FuelStation> fuelStationArrayList;
    private FuelStationAdapter fuelStationAdapter;
    private TextView textViewNoStations;
    private Button btnAddStation;
    JSONArray jsonArray;
    JSONObject jsonObject;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

setContentView(R.layout.activity_fuel_station_list);

        SignInActivity.handleSSLHandshake();

        initViews();
        fetchFuelStations();

        btnAddStation.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                finish();
                startActivity(new
Intent(getApplicationContext(),
AdminAddStationActivity.class));
            }
        });

    }

    // initializing views
    private void initViews() {
        fuelStationArrayList = new
ArrayList<FuelStation>();

        recyclerView = (RecyclerView)
findViewById(R.id.recyclerView);
        recyclerView.setLayoutManager(new
LinearLayoutManager(this,LinearLayoutManager.VERTICAL,
false));
        recyclerView.setHasFixedSize(true);

        textViewNoStations = findViewById(R.id.textView);
        btnAddStation = findViewById(R.id.btnAddStation);

    }

    // fetch records of the fuel stations
    private void fetchFuelStations() {

        String URL =
"https://10.0.2.2:7165/getAllFuelStations";

        RequestQueue requestQueue =
Volley.newRequestQueue(FuelStationListActivity.this);

        JsonArrayRequest objectRequest = new
JsonArrayRequest(
                Request.Method.GET, URL, null,
                new Response.Listener<JSONArray>() {
                    @Override
                    public void onResponse(JSONArray
response) {

                        if (jsonArray == null) {

textViewNoStations.setVisibility(View.VISIBLE);

recyclerView.setVisibility(View.GONE);
                        }

                        jsonArray = response;
                        Log.e("**************************",
jsonArray.toString());

                        int a = jsonArray.length();
                            for (int i=0;i<a;i++){
                                try {
                                    jsonObject =
(JSONObject) jsonArray.get(i);

Log.d("$$$$$$$$$$$$$$$$$$$$$$$",
String.valueOf(jsonArray.length()));
                                    FuelStation fuelStation
= new FuelStation(jsonObject.getString("stationID"),

jsonObject.getString("location"),

jsonObject.getString("capacity"),

jsonObject.getString("availability"),

jsonObject.getString("type"),

jsonObject.getString("startingTime"),

jsonObject.getString("endingTime"));


fuelStationArrayList.add(fuelStation);

                                } catch (Exception e) {
                                    e.printStackTrace();
                                }
                            }


textViewNoStations.setVisibility(View.GONE);
recyclerView.setVisibility(View.VISIBLE);
                        setAdaptertoRecyclerView();

                    }
                },
                new Response.ErrorListener() {
                    @Override
                    public void onErrorResponse(VolleyError
error) {
                        Log.e("**************************",
error.toString());

                    }
                }
        );

        requestQueue.add(objectRequest);


    }

    // setting Adapter to recycler view
    private void setAdaptertoRecyclerView() {
        fuelStationAdapter = new
FuelStationAdapter(this,fuelStationArrayList);
        recyclerView.setAdapter(fuelStationAdapter);
    }

}
```

h. MainActivity.java

```
package vian.mobile.fuelqueue;

import androidx.appcompat.app.AppCompatActivity;
import androidx.cardview.widget.CardView;

import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.TextView;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.JsonArrayRequest;
import com.android.volley.toolbox.Volley;

import org.json.JSONArray;
import org.json.JSONObject;

import java.util.ArrayList;
```

```
public class MainActivity extends AppCompatActivity {

    CardView cardView1, cardView2;
    TextView textField1, textField2, textField3;
    private ArrayList<FuelQueue> fuelQueueArrayList;
    JSONArray jsonArray;
    JSONObject jsonObject;


    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        cardView1 = findViewById(R.id.cardView1);
        cardView2 = findViewById(R.id.cardView2);

        cardView1.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                finish();
                startActivity(new
Intent(getApplicationContext(),
FuelQueueListActivity.class));
            }
        });

        cardView2.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                finish();
                startActivity(new
Intent(getApplicationContext(),
VehicleOwnerActivity.class));
            }
        });

        fuelQueueArrayList = new ArrayList<FuelQueue>();
        textField1 = findViewById(R.id.textField1);
        textField2 = findViewById(R.id.textField2);
        textField3 = findViewById(R.id.textField3);

        SignInActivity.handleSSLHandshake();

        String URL = "https://10.0.2.2:7165/getFuelQueue";

        RequestQueue requestQueue =
Volley.newRequestQueue(MainActivity.this);

        JsonArrayRequest objectRequest = new
JsonArrayRequest(
                Request.Method.GET, URL, null,
                new Response.Listener<JSONArray>() {
                    @Override
                    public void onResponse(JSONArray
response) {

                        if (jsonArray == null) {
                            textField1.setText("");
                            textField2.setText("");
                            textField3.setText("");
                        }

                        jsonArray = response;
                        Log.e("*************************",
jsonArray.toString());

                        int a = jsonArray.length();
                        for (int i=0;i<a;i++){
                            try {
                                jsonObject = (JSONObject)
jsonArray.get(i);

Log.d("$$$$$$$$$$$$$$$$$$$$$$",
String.valueOf(jsonArray.length()));


textField1.setText(String.valueOf(jsonArray.length()));

textField2.setText("Available");
                                textField3.setText("1 hr 23
mins");

                                FuelQueue fuelStation = new
FuelQueue(jsonObject.getString("stationId"),

jsonObject.getString("vehicleNumber"),

jsonObject.getString("userId"),

jsonObject.getString("noOfLiters"),

jsonObject.getString("arrivalTime"),

jsonObject.getString("departureTime"),

jsonObject.getString("status"));


fuelQueueArrayList.add(fuelStation);


                            } catch (Exception e) {
                                e.printStackTrace();
                            }
                        }
                    }
                },
                new Response.ErrorListener() {
                    @Override
                    public void onErrorResponse(VolleyError 
error) {
                        Log.e("**************************", 
error.toString());

                    }
                }
        );

        requestQueue.add(objectRequest);
    }
}
```

i. SignInActivity.java

```
package vian.mobile.fuelqueue;

import androidx.appcompat.app.AppCompatActivity;

import android.annotation.SuppressLint;
import android.content.Intent;
import android.os.Bundle;
import android.text.TextUtils;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.JsonObjectRequest;
import com.android.volley.toolbox.Volley;

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

import java.security.SecureRandom;
import java.security.cert.X509Certificate;
import java.util.HashMap;
import java.util.Map;

import javax.net.ssl.HostnameVerifier;
import javax.net.ssl.HttpsURLConnection;
import javax.net.ssl.SSLContext;
import javax.net.ssl.SSLSession;
import javax.net.ssl.TrustManager;
import javax.net.ssl.X509TrustManager;

public class SignInActivity extends AppCompatActivity {

    EditText textField1, textField2;
    Button btnSignIn;
    TextView btnSignUp;
    String usernameTxt, passwordTxt;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_sign_in);

        textField1 = findViewById(R.id.textField1);
        textField2 = findViewById(R.id.textField2);
        btnSignIn = findViewById(R.id.btnSignIn);
        btnSignUp = findViewById(R.id.btnSignUp);

        btnSignIn.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {

                usernameTxt =
textField1.getText().toString().trim();
                passwordTxt =
textField2.getText().toString().trim();

                if (TextUtils.isEmpty(usernameTxt)) {
                    Toast.makeText(getApplicationContext(),
"Please enter username!", Toast.LENGTH_SHORT).show();
                    return;
                } else if (TextUtils.isEmpty(passwordTxt))
{
                    Toast.makeText(getApplicationContext(),
"Please enter password!", Toast.LENGTH_SHORT).show();
                    return;
                } else {

                    handleSSLHandshake();

                    String URL =
"https://10.0.2.2:7165/api/User/login";

                    Map<Object, String> mapData = new
HashMap<Object, String>();

                    RequestQueue requestQueue =
Volley.newRequestQueue(SignInActivity.this);

                    mapData.put("username", usernameTxt);
                    mapData.put("password", passwordTxt);
                    try {
                        JsonObjectRequest request = new
JsonObjectRequest(Request.Method.POST, URL, new
JSONObject(mapData), new Response.Listener<JSONObject>() {
                            @Override
                            public void
onResponse(JSONObject response) {

Toast.makeText(getApplicationContext(), "Sign In
Successfully", Toast.LENGTH_LONG).show();
                                Log.i("onResponse", "" +
response.toString());

                                try {

if(response.getString("role").equals("Vehicle Owner")) {

Toast.makeText(getApplicationContext(),
"Successfully",Toast.LENGTH_LONG).show();
                                        startActivity(new
Intent(getApplicationContext(), MainActivity.class));
                                    }
                                    else {
                                        startActivity(new
Intent(getApplicationContext(),
FuelStationListActivity.class));
                                    }
                                } catch (JSONException e) {
                                    e.printStackTrace();
                                }
                            }
                        }, new Response.ErrorListener() {
                            @Override
                            public void
onErrorResponse(VolleyError error) {
                                error.printStackTrace();
                                Log.i("onErrorResponse",
"Error");
                            }
                        });

                        requestQueue.add(request);

                    } catch (Exception e) {
                        Log.d("Exception",
String.valueOf(e));
                        e.printStackTrace();
                    }

                }
            }
        });

        btnSignUp.setOnClickListener(new
View.OnClickListener() {
```

```
            @Override
            public void onClick(View v) {
                startActivity(new
Intent(getApplicationContext(), SignUpActivity.class));
            }
        });


    }

    /**
     * Enables https connections
     */
    @SuppressLint("TrulyRandom")
    public static void handleSSLHandshake() {
        try {
            TrustManager[] trustAllCerts = new
TrustManager[]{new X509TrustManager() {
                public X509Certificate[]
getAcceptedIssuers() {
                    return new X509Certificate[0];
                }

                @Override
                public void
checkClientTrusted(X509Certificate[] certs, String
authType) {
                }

                @Override
                public void
checkServerTrusted(X509Certificate[] certs, String
authType) {
                }
            }};

            SSLContext sc = SSLContext.getInstance("SSL");
            sc.init(null, trustAllCerts, new
SecureRandom());

HttpsURLConnection.setDefaultSSLSocketFactory(sc.getSocketF
actory());

HttpsURLConnection.setDefaultHostnameVerifier(new
HostnameVerifier() {
                @Override
                public boolean verify(String arg0,
SSLSession arg1) {
                    return true;
                }
            });
        } catch (Exception ignored) {
        }
    }
```

```
}
```

j. SignUpActivity.java

```
package vian.mobile.fuelqueue;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Bundle;
import android.text.TextUtils;
import android.util.Log;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Spinner;
import android.widget.TextView;
import android.widget.Toast;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.JsonObjectRequest;
import com.android.volley.toolbox.Volley;

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

import java.util.HashMap;
import java.util.Map;

public class SignUpActivity extends AppCompatActivity
implements AdapterView.OnItemSelectedListener {

    String[] userRole = {"Vehicle Owner", "Admin"};

    EditText textField1, textField2, textField3,
textField4, textField5;
    Button btnSignUp;
    TextView btnSignIn;
    public static String usernameTxt, emailTxt,
passwordTxt, confirmPasswordTxt, role, vehicleTypeTxt;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_sign_up);

        textField1 = findViewById(R.id.textField1);
        textField2 = findViewById(R.id.textField2);
        textField3 = findViewById(R.id.textField3);
        textField4 = findViewById(R.id.textField4);
        textField5 = findViewById(R.id.textField5);
        btnSignIn = findViewById(R.id.btnSignIn);
        btnSignUp = findViewById(R.id.btnSignUp);

        Spinner userRolesSpinner = (Spinner)
findViewById(R.id.userRolesSpinner);
        userRolesSpinner.setOnItemSelectedListener(this);

        ArrayAdapter arrayAdapter = new
ArrayAdapter(this,android.R.layout.simple_spinner_item,
userRole);

arrayAdapter.setDropDownViewResource(android.R.layout.simpl
e_spinner_dropdown_item);
        userRolesSpinner.setAdapter(arrayAdapter);

        btnSignIn.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                startActivity(new
Intent(getApplicationContext(), SignInActivity.class));
            }
        });


        btnSignUp.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {

                SignInActivity.handleSSLHandshake();
                usernameTxt =
textField1.getText().toString();
                emailTxt = textField2.getText().toString();
                passwordTxt =
textField3.getText().toString();
                confirmPasswordTxt =
textField4.getText().toString();
                vehicleTypeTxt =
textField5.getText().toString();

                // validating Data
                if (TextUtils.isEmpty(usernameTxt)) {
                    Toast.makeText(getApplicationContext(),
"Please enter username!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else if (TextUtils.isEmpty(emailTxt)) {
                    Toast.makeText(getApplicationContext(),
"Please enter email!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else if (TextUtils.isEmpty(passwordTxt)) {

Toast.makeText(getApplicationContext(),"Please enter
password!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else if
(TextUtils.isEmpty(confirmPasswordTxt)) {

Toast.makeText(getApplicationContext(),"Please confirm
password!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else
if(!passwordTxt.equals(confirmPasswordTxt)) {

Toast.makeText(getApplicationContext(),"Passwords do not
match!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else if (TextUtils.isEmpty(vehicleTypeTxt))
{

Toast.makeText(getApplicationContext(),"Please enter
vehicle type!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else {

                    Map<Object, String> mapData = new
HashMap<Object, String>();

                    String url =
"https://10.0.2.2:7165/api/User/registration";

                    RequestQueue requestQueue =
Volley.newRequestQueue(SignUpActivity.this);

                    mapData.put("username", usernameTxt);
                    mapData.put("email", emailTxt);
                    mapData.put("password", passwordTxt);
                    mapData.put("role", role);
                    mapData.put("vehicleType",
vehicleTypeTxt);

                    try {
                        JsonObjectRequest request = new
JsonObjectRequest(Request.Method.POST, url, new
JSONObject(mapData), new Response.Listener<JSONObject>() {
                            @Override
                            public void
onResponse(JSONObject response) {
                                Log.i("onResponse", "" +
response.toString());
Toast.makeText(getApplicationContext(), "Sign Up
Successful", Toast.LENGTH_LONG).show();
                                startActivity(new
Intent(getApplicationContext(), SignInActivity.class));
                            }
                        }, new Response.ErrorListener() {
                            @Override
                            public void
onErrorResponse(VolleyError error) {
                                error.printStackTrace();
                                Log.i("onErrorResponse",
"Error");
                            }
                        });

                        requestQueue.add(request);

                    } catch (Exception e) {
                        e.printStackTrace();
                    }

                }

            }
        });

    }

    @Override
    public void onItemSelected(AdapterView<?> arg0, View
arg1, int position, long id) {
        role = userRole[position];
    }
    @Override
    public void onNothingSelected(AdapterView<?> arg0) {
    }
}
```

k. SplashActivity

```
package vian.mobile.fuelqueue;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Build;
import android.os.Bundle;
import android.os.Handler;
import android.view.View;
import android.view.WindowManager;

public class SplashActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        if (Build.VERSION.SDK_INT < 16) {

getWindow().setFlags(WindowManager.LayoutParams.FLAG_FULLSC
REEN,

WindowManager.LayoutParams.FLAG_FULLSCREEN);
        }
        View activityView = getWindow().getDecorView();
        int fullscreen = View.SYSTEM_UI_FLAG_FULLSCREEN;
        activityView.setSystemUiVisibility(fullscreen);
        setContentView(R.layout.activity_splash);

        Handler handler = new Handler();
        handler.postDelayed(new Runnable() {
            @Override
            public void run() {
                startActivity(new
Intent(getApplicationContext(), SignInActivity.class));
                finish();
            }
        },1000);

    }
}
```

l. UpdateFuelStationActivity.java

```
package vian.mobile.fuelqueue;

import androidx.appcompat.app.AppCompatActivity;

import android.app.TimePickerDialog;
import android.content.Intent;
import android.graphics.Color;
import android.os.Bundle;
import android.text.TextUtils;
import android.util.Log;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Spinner;
import android.widget.TextView;
import android.widget.TimePicker;
import android.widget.Toast;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.JsonObjectRequest;
import com.android.volley.toolbox.Volley;

import org.json.JSONObject;

import java.util.Calendar;
import java.util.HashMap;
import java.util.Map;

public class UpdateFuelStationActivity extends
AppCompatActivity implements
AdapterView.OnItemSelectedListener{

    String[] fuelAvailability = {"Available",
"Unavailable"};
    String[] fuelType = {"92 Octane", "95 Octane",
"Diesel"};

    TextView textField4, textField5;
    Button btnUpdateStation;

    private int hours, minutes;
    String id, fuelArrivalTime, fuelFinishTime,
fuelAvailabilityInStation, fuelTypeInStation;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

setContentView(R.layout.activity_update_fuel_station);

        textField4 = findViewById(R.id.textField4);
        textField5 = findViewById(R.id.textField5);
        btnUpdateStation =
findViewById(R.id.btnUpdateStation);

        id = FuelStationAdapter.id;
        textField4.setText(FuelStationAdapter.start);
        textField5.setText(FuelStationAdapter.end);

        Spinner fuelAvailabilitySpinner = (Spinner)
findViewById(R.id.fuelAvailabilitySpinner);
        Spinner fuelTypeSpinner = (Spinner)
findViewById(R.id.fuelTypeSpinner);

fuelAvailabilitySpinner.setOnItemSelectedListener(this);
        fuelTypeSpinner.setOnItemSelectedListener(this);

        ArrayAdapter arrayAdapter = new
ArrayAdapter(this,android.R.layout.simple_spinner_item,
fuelAvailability);

arrayAdapter.setDropDownViewResource(android.R.layout.simpl
e_spinner_dropdown_item);
        fuelAvailabilitySpinner.setAdapter(arrayAdapter);
        ArrayAdapter arrayAdapter2 = new
ArrayAdapter(this,android.R.layout.simple_spinner_item,
fuelType);

arrayAdapter2.setDropDownViewResource(android.R.layout.simp
le_spinner_dropdown_item);
        fuelTypeSpinner.setAdapter(arrayAdapter2);

        textField4.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                final Calendar c = Calendar.getInstance();
                hours = c.get(Calendar.HOUR_OF_DAY);
                minutes = c.get(Calendar.MINUTE);

                TimePickerDialog timePickerDialog = new
TimePickerDialog(UpdateFuelStationActivity.this, new
TimePickerDialog.OnTimeSetListener() {
                    @Override
                    public void onTimeSet(TimePicker view,
int hourOfDay, int minute) {

textField4.setTextColor(Color.BLACK);
                        textField4.setText(hourOfDay +":"+
minute);
                    }
                }, hours, minutes, false);
                timePickerDialog.show();

            }
        });

        textField5.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                final Calendar c = Calendar.getInstance();
                hours = c.get(Calendar.HOUR_OF_DAY);
                minutes = c.get(Calendar.MINUTE);

                TimePickerDialog timePickerDialog = new
TimePickerDialog(UpdateFuelStationActivity.this, new
TimePickerDialog.OnTimeSetListener() {
                    @Override
                    public void onTimeSet(TimePicker view,
int hourOfDay, int minute) {

textField5.setTextColor(Color.BLACK);
                        textField5.setText(hourOfDay +":"+
minute);
                    }
                }, hours, minutes, false);
                timePickerDialog.show();
            }
        });

        btnUpdateStation.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {

                SignInActivity.handleSSLHandshake();

                fuelArrivalTime =
textField4.getText().toString();
                fuelFinishTime =
textField5.getText().toString();

                if (TextUtils.isEmpty(fuelArrivalTime)) {

Toast.makeText(getApplicationContext(),"Please select fuel
arrival time!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else if (TextUtils.isEmpty(fuelFinishTime))
{

Toast.makeText(getApplicationContext(),"Please select fuel
finish time!", Toast.LENGTH_SHORT).show();
                    return;
                }
                else {

                    Map<Object, String> mapData = new
HashMap<Object, String>();
                    String url =
"https://10.0.2.2:7165/updateFuelStation/" + id;
                    RequestQueue requestQueue =
Volley.newRequestQueue(UpdateFuelStationActivity.this);

                    mapData.put("availability",
fuelAvailabilityInStation);
                    mapData.put("type", fuelTypeInStation);
                    mapData.put("startingTime",
fuelArrivalTime);
                    mapData.put("endingTime",
fuelFinishTime);

                    try {
                        JsonObjectRequest request=new
JsonObjectRequest(Request.Method.PUT, url, new
JSONObject(mapData), new Response.Listener<JSONObject>() {
                            @Override
                            public void
onResponse(JSONObject response) {
                                Log.i("onResponse",
""+response.toString());
Toast.makeText(getApplicationContext(), "Fuel Station
Updated Successfully",Toast.LENGTH_LONG).show();
                                startActivity(new
Intent(getApplicationContext(),
FuelStationListActivity.class));
                            }
                        }, new Response.ErrorListener() {
                            @Override
                            public void
onErrorResponse(VolleyError error) {

Toast.makeText(getApplicationContext(), "Fuel Station
Updated Successfully",Toast.LENGTH_LONG).show();
                                startActivity(new
Intent(getApplicationContext(),
FuelStationListActivity.class));

                                error.printStackTrace();
                                Log.i("onErrorResponse",
"Error");
                            }
                        });

                        requestQueue.add(request);

                    } catch (Exception e) {
                        Log.d("error", String.valueOf(e)) ;

                        e.printStackTrace();
                    }
                }

            }
        });

    }

    @Override
    public void onItemSelected(AdapterView<?> arg0, View
arg1, int position, long id) {
        fuelAvailabilityInStation =
fuelAvailability[position];
        fuelTypeInStation = fuelType[position];
    }
    @Override
    public void onNothingSelected(AdapterView<?> arg0) {
    }

    @Override
    public void onBackPressed() {
        super.onBackPressed();
        finish();
        startActivity(new Intent(getApplicationContext(),
FuelStationListActivity.class));
    }
```

```
}
```

m. VehicleOwnerActivity.java

```
package vian.mobile.fuelqueue;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.graphics.Color;
import android.os.Bundle;
import android.text.TextUtils;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.ImageView;
import android.widget.TextView;
import android.widget.Toast;

import com.android.volley.Request;
import com.android.volley.RequestQueue;
import com.android.volley.Response;
import com.android.volley.VolleyError;
import com.android.volley.toolbox.JsonObjectRequest;
import com.android.volley.toolbox.Volley;
import
com.google.android.material.textfield.TextInputLayout;

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

import java.text.SimpleDateFormat;
import java.util.Date;
import java.util.HashMap;
import java.util.Locale;
import java.util.Map;

public class VehicleOwnerActivity extends AppCompatActivity
{

    Button btnOne, btnTwo, btnThree;

    EditText textField1;
    TextView textView;
    TextInputLayout txt;
    ImageView imageView;
    int flag = 0;
    JSONObject id;

    String stationID, userID, noOfLiters, vehicleNumber,
arrivalTime, departureTime, status;
```

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

        btnOne = findViewById(R.id.btnOne);
        btnTwo = findViewById(R.id.btnTwo);
        btnThree = findViewById(R.id.btnThree);
        textField1 = findViewById(R.id.textField1);
        textView = findViewById(R.id.status);
        imageView = findViewById(R.id.image);
        txt = findViewById(R.id.txt);

        stationID = "S001";
        //userID = SignUpActivity.usernameTxt;
        userID = "usernameTxt";
        //vehicleNumber = SignUpActivity.vehicleTypeTxt;
        vehicleNumber = "2746";

        try {
            id = new JSONObject("2111");
        } catch (JSONException e) {
            e.printStackTrace();
        }

        txt.setVisibility(View.VISIBLE);
        textField1.setVisibility(View.VISIBLE);


        btnOne.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                arrivalTime = new
SimpleDateFormat("HH:mm:ss",
Locale.getDefault()).format(new Date());
                addVehicleOwnerToQueue();
            }
        });

        btnTwo.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                departureTime = new
SimpleDateFormat("HH:mm:ss",
Locale.getDefault()).format(new Date());
                status = "Did Not Pumped Fuel";
                flag = 1;
                updateQueueStatus();
            }
        });

        btnThree.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View v) {
                departureTime = new
SimpleDateFormat("HH:mm:ss",
Locale.getDefault()).format(new Date());
                status = "Pumped Fuel";
                flag = 2;
                updateQueueStatus();
            }
        });

    }

    private void updateQueueStatus() {

        SignInActivity.handleSSLHandshake();

        Map<Object, String> mapData = new HashMap<Object,
String>();

        String url;
        if(flag == 1) {
            url =
"https://10.0.2.2:7165/updateQueueStateTwo/2425";
        }
        else {
            url = "https://10.0.2.2:7165/updateQueueState/"
+ vehicleNumber;
        }


        RequestQueue requestQueue =
Volley.newRequestQueue(VehicleOwnerActivity.this);

        mapData.put("status", status);

        try {
            JsonObjectRequest request=new
JsonObjectRequest(Request.Method.PUT, url, new
JSONObject(mapData), new Response.Listener<JSONObject>() {
                @Override
                public void onResponse(JSONObject response)
{
                    Log.i("onResponse", "" +
response.toString());
                    if (flag == 1) {
                        textView.setText("Did Not Get
Fuel");

imageView.setImageResource(R.drawable.sad);

imageView.setVisibility(View.VISIBLE);

textView.setVisibility(View.VISIBLE);
```

```
                        textView.setTextColor(Color.RED);

Toast.makeText(getApplicationContext(), "Left Queue
Successfully",Toast.LENGTH_LONG).show();
                    }
                    else {
                        textView.setText("Pumped Fuel");

imageView.setImageResource(R.drawable.happy);

imageView.setVisibility(View.VISIBLE);

textView.setVisibility(View.VISIBLE);
                        textView.setTextColor(Color.GREEN);

Toast.makeText(getApplicationContext(), "Left Queue
Successfully",Toast.LENGTH_LONG).show();

                    }

                }
            }, new Response.ErrorListener() {
                @Override
                public void onErrorResponse(VolleyError
error) {
                    error.printStackTrace();
                    Log.i("onErrorResponse", "Error");
                    if (flag == 1) {
                        textView.setText("Did Not Get
Fuel");

imageView.setImageResource(R.drawable.sad);

imageView.setVisibility(View.VISIBLE);

textView.setVisibility(View.VISIBLE);
                        textView.setTextColor(Color.RED);

Toast.makeText(getApplicationContext(), "Left Queue
Successfully",Toast.LENGTH_LONG).show();
                    }
                    else {
                        textView.setText("Pumped Fuel");

imageView.setImageResource(R.drawable.happy);

imageView.setVisibility(View.VISIBLE);

textView.setVisibility(View.VISIBLE);
                        textView.setTextColor(Color.GREEN);

Toast.makeText(getApplicationContext(), "Left Queue
Successfully",Toast.LENGTH_LONG).show();

                    }
                }
            });

            requestQueue.add(request);

        } catch (Exception e) {
            Log.d("Exception", String.valueOf(e)) ;
            e.printStackTrace();
        }

    }

    private void addVehicleOwnerToQueue() {

        noOfLiters = textField1.getText().toString();
        if (TextUtils.isEmpty(noOfLiters)) {
            Toast.makeText(getApplicationContext(), "Please
enter no of liters!", Toast.LENGTH_SHORT).show();
            return;
        }
        else {

            SignInActivity.handleSSLHandshake();

            Map<Object, String> mapData = new
HashMap<Object, String>();

            String url =
"https://10.0.2.2:7165/addFuelStationQueue";

            RequestQueue requestQueue =
Volley.newRequestQueue(VehicleOwnerActivity.this);

            mapData.put("stationId", stationID);
            mapData.put("vehicleNumber", vehicleNumber);
            mapData.put("userId", userID);
            mapData.put("noOfLiters", noOfLiters);

            try {
                JsonObjectRequest request=new
JsonObjectRequest(Request.Method.POST, url, new
JSONObject(mapData), new Response.Listener<JSONObject>() {
                    @Override
                    public void onResponse(JSONObject
response) {
                        Log.i("onResponse",
""+response.toString());
                        textField1.setText("");
                        txt.setVisibility(View.INVISIBLE);

textField1.setVisibility(View.INVISIBLE);
                        textView.setText("Awaiting Fuel at
Queue");

textView.setTextColor(Color.MAGENTA);
imageView.setVisibility(View.VISIBLE);

textView.setVisibility(View.VISIBLE);

Toast.makeText(getApplicationContext(), "Joined Queue
Successfully",Toast.LENGTH_LONG).show();

                    }
                }, new Response.ErrorListener() {
                    @Override
                    public void onErrorResponse(VolleyError
error) {
                        error.printStackTrace();
                        Log.i("onErrorResponse", "Error");
                    }
                });

                requestQueue.add(request);

            } catch (Exception e) {
                Log.d("Exception", String.valueOf(e)) ;
                e.printStackTrace();
            }

        }
    }

    @Override
    public void onBackPressed() {
        super.onBackPressed();
        finish();
        startActivity(new Intent(getApplicationContext(),
MainActivity.class));
    }

}
```

4.2 XML Files

a. activity_admin_add_station.xml

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

   xmlns:android="http://schemas.android.com/apk/res/android"
       xmlns:tools="http://schemas.android.com/tools"
       android:layout_width="match_parent"
       android:layout_height="match_parent"
       android:background="@color/white"
       android:orientation="vertical"
```

```
    tools:context=".AdminAddStationActivity">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:fontFamily="@font/poppins_bold"
        android:gravity="center"
        android:text="Add New Station"
        android:textColor="#2196F3"
        android:textSize="25dp"
        android:textStyle="bold" />

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="20dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:hint="Station ID">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField1"
            android:fontFamily="@font/poppins_medium"
            android:inputType="text"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="15dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:hint="Station Location">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField2"
            android:fontFamily="@font/poppins_medium"
            android:inputType="text"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />
```

```
</com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="15dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:hint="Capacity">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField3"
            android:fontFamily="@font/poppins_medium"
            android:inputType="text"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>


    <TextView
        android:id="@+id/textField4"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="15dp"
        android:background="@drawable/edit_text_border"
        android:padding="17dp"
        android:textSize="15dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:text="Fuel Arrival Time"/>


    <TextView
        android:id="@+id/textField5"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="20dp"
        android:background="@drawable/edit_text_border"
        android:padding="17dp"
        android:textSize="15dp"
        android:visibility="gone"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:text="Fuel Finish Time"/>
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginTop="25dp"
        android:layout_marginEnd="30dp"
        android:fontFamily="@font/poppins"
        android:text="Fuel Type"
        android:textColor="@color/black"
        android:textSize="15dp" />

    <Spinner
        android:id="@+id/fuelTypeSpinner"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="5dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp" />

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginTop="25dp"
        android:layout_marginEnd="30dp"
        android:fontFamily="@font/poppins"
        android:text="Fuel Availability"
        android:textColor="@color/black"
        android:textSize="15dp" />

    <Spinner
        android:id="@+id/fuelAvailabilitySpinner"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="5dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp" />

    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/btnAddStation"
        android:layout_marginTop="30dp"
        android:layout_marginStart="30dp"
        android:layout_marginEnd="30dp"
        android:text="Add Station"
        android:padding="5dp"
        android:background="#2196F3"
        android:backgroundTint="#2196F3"

android:elevation="@dimen/cardview_default_elevation"
        android:fontFamily="@font/poppins_medium"
        android:textAllCaps="false" />

</LinearLayout>
```

c. activity_fuel_station_list.xml

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

xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@drawable/bg1"
    android:orientation="vertical"
    tools:context=".FuelStationListActivity">

    <TextView
        android:id="@+id/heading"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:fontFamily="@font/poppins_bold"
        android:gravity="center"
        android:layout_marginTop="30dp"
        android:text="List of Fuel Stations"
        android:textColor="#fff"
        android:textSize="25dp"
        android:textStyle="bold" />

    <androidx.recyclerview.widget.RecyclerView
        android:id="@+id/recyclerView"
        android:layout_width="match_parent"
        android:layout_height="520dp"
        android:layout_below="@+id/heading"
        android:layout_marginTop="5dp" />

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="No Stations found."
        android:visibility="gone"
        android:layout_centerInParent="true"
        android:textColor="@android:color/darker_gray" />

    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/btnAddStation"
        android:layout_marginTop="30dp"
        android:layout_marginStart="30dp"
        android:layout_marginEnd="30dp"
        android:text="Add New Fuel Station"
        android:padding="5dp"
        android:background="#2196F3"
```

```
            android:backgroundTint="#2196F3"

    android:elevation="@dimen/cardview_default_elevation"
            android:fontFamily="@font/poppins_medium"
            android:textAllCaps="false" />

    </LinearLayout>
```

d. activity_main.xml

```
    <?xml version="1.0" encoding="utf-8"?>
    <androidx.core.widget.NestedScrollView

    xmlns:android="http://schemas.android.com/apk/res/android"
        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:background="@drawable/bg1"
        tools:context=".MainActivity">

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:orientation="vertical" >

            <TextView
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:text="Welcome, Vehicle Owner"
                android:textSize="20dp"
                android:textColor="#fff"
                android:layout_marginTop="50dp"
                android:textStyle="bold"
                android:fontFamily="@font/poppins_medium"
                android:gravity="center" />

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginStart="30dp"
                android:background="@drawable/edit_text_border"
                android:padding="10dp"
                android:layout_marginEnd="30dp"
                android:orientation="vertical"
                android:layout_marginTop="20dp" >

                <TextView
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:textSize="16dp"
                    android:textColor="@color/black"
                    android:gravity="center"
                    android:fontFamily="@font/poppins_bold"
                    android:text="Fuel Queue Length"/>

                <TextView
                    android:id="@+id/textField1"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:textSize="30dp"
                    android:textColor="#FF1100"
                    android:gravity="center"
                    android:fontFamily="@font/poppins_bold"
                    android:text="15"/>

            </LinearLayout>

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginStart="30dp"
                android:background="@drawable/edit_text_border"
                android:padding="10dp"
                android:layout_marginEnd="30dp"
                android:orientation="vertical"
                android:layout_marginTop="20dp" >

                <TextView
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:textSize="16dp"
                    android:textColor="@color/black"
                    android:gravity="center"
                    android:fontFamily="@font/poppins_bold"
                    android:text="Fuel Status"/>

                <TextView
                    android:id="@+id/textField2"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:textSize="30dp"
                    android:textColor="#4CAF50"
                    android:gravity="center"
                    android:fontFamily="@font/poppins_bold"
                    android:text="Available"/>

            </LinearLayout>

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginStart="30dp"
                android:background="@drawable/edit_text_border"
                android:padding="10dp"
                android:layout_marginEnd="30dp"
                android:orientation="vertical"
                android:layout_marginTop="20dp" >
                <TextView
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:textSize="16dp"
                    android:textColor="@color/black"
                    android:gravity="center"
                    android:fontFamily="@font/poppins_bold"
                    android:text="Waiting Time at Queue"/>

                <TextView
                    android:id="@+id/textField3"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:textSize="30dp"
                    android:textColor="#FF9800"
                    android:gravity="center"
                    android:fontFamily="@font/poppins_bold"
                    android:text="1 hr 4 mins"/>

            </LinearLayout>

            <androidx.cardview.widget.CardView
                android:id="@+id/cardView1"
                android:layout_height="wrap_content"
                android:layout_width="match_parent"
                android:layout_gravity="center"
                android:layout_marginBottom="15dp"
                android:layout_marginLeft="20dp"
                android:layout_marginRight="20dp"
                android:layout_marginTop="30dp"
                app:cardCornerRadius="8dp"
                app:cardElevation="10dp" >

                <LinearLayout
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:background="#B5E4EA"
                    android:orientation="vertical" >

                    <ImageView
                        android:layout_width="wrap_content"
                        android:layout_height="100dp"
                        android:layout_gravity="center"
                        android:src="@drawable/queue"/>

                    <TextView
                        android:layout_width="wrap_content"
                        android:layout_height="match_parent"
                        android:layout_gravity="center"
                        android:gravity="center"
                        android:paddingLeft="20dp"
                        android:paddingTop="20dp"
                        android:paddingRight="20dp"
                        android:paddingBottom="20dp"
                        android:text="Check Nearest Fuel Queue"
```

```
                    android:textColor="@color/black"
                    android:fontFamily="@font/poppins_bold"
                    android:textSize="14dp" />

            </LinearLayout>

        </androidx.cardview.widget.CardView>

        <androidx.cardview.widget.CardView
            android:id="@+id/cardView2"
            android:layout_height="wrap_content"
            android:layout_width="match_parent"
            android:layout_gravity="center"
            android:layout_marginBottom="15dp"
            android:layout_marginLeft="20dp"
            android:layout_marginRight="20dp"
            android:layout_marginTop="20dp"
            app:cardCornerRadius="8dp"
            app:cardElevation="10dp" >

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:background="#B5E4EA"
                android:orientation="vertical" >

                <ImageView
                    android:layout_width="wrap_content"
                    android:layout_height="100dp"
                    android:layout_gravity="center"
                    android:layout_marginTop="10dp"
                    android:src="@drawable/gas"/>

                <TextView
                    android:layout_width="wrap_content"
                    android:layout_height="match_parent"
                    android:layout_gravity="center"
                    android:gravity="center"
                    android:paddingLeft="20dp"
                    android:paddingTop="5dp"
                    android:paddingRight="20dp"
                    android:paddingBottom="20dp"
                    android:text="Join Fuel Queue"
                    android:textColor="@color/black"
                    android:fontFamily="@font/poppins_bold"
                    android:textSize="14dp" />

            </LinearLayout>

        </androidx.cardview.widget.CardView>

    </LinearLayout>

</androidx.core.widget.NestedScrollView>
```

e. activity_sign_in.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:background="@color/white"
    tools:context=".SignInActivity">

    <ImageView
        android:layout_width="200dp"
        android:layout_height="200dp"
        android:layout_marginTop="30dp"
        android:layout_gravity="center_horizontal"
        android:layout_marginBottom="10dp"
        android:src="@drawable/login" />

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:fontFamily="@font/poppins_medium"
        android:text="Login"
        android:gravity="center"
        android:layout_marginTop="10dp"
        android:textColor="#2196F3"
        android:textSize="25dp"
        android:textStyle="bold" />

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="30dp"
        android:layout_marginEnd="30dp"
        android:fontFamily="@font/poppins_medium"
        android:hint="Username">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField1"
            android:fontFamily="@font/poppins_medium"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout
```

```
style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginTop="20dp"
        android:layout_marginEnd="30dp"
        android:hint="Password">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField2"
            android:fontFamily="@font/poppins_medium"
            android:layout_width="match_parent"
            android:inputType="textPassword"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>

    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/btnSignIn"
        android:layout_marginTop="30dp"
        android:layout_marginStart="30dp"
        android:layout_marginEnd="30dp"
        android:text="Sign In"
        android:padding="5dp"
        android:textSize="15dp"
        android:background="#2196F3"
        android:backgroundTint="#2196F3"

android:elevation="@dimen/cardview_default_elevation"
        android:fontFamily="@font/poppins_medium"
        android:textAllCaps="false" />


    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:layout_gravity="center"
        android:gravity="center"
        android:textSize="16sp"
        android:orientation="horizontal" >

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:textColor="@color/black"
            android:textSize="16sp"
            android:fontFamily="@font/poppins_medium"
            android:text="Don't have an account?"/>
        <TextView
            android:id="@+id/btnSignUp"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:fontFamily="@font/poppins_medium"
            android:text="Sign Up"
            android:clickable="true"
            android:textSize="16sp"
            android:textColor="#2196F3"/>

    </LinearLayout>

</LinearLayout>
```

f. activity_sign_up.xml

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

xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".SignUpActivity"
    android:background="@color/white">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:fontFamily="@font/poppins_medium"
        android:text="Create an Account"
        android:gravity="center"
        android:layout_marginTop="30dp"
        android:textColor="#2196F3"
        android:textSize="20dp"
        android:textStyle="bold" />

    <Spinner
        android:id="@+id/userRolesSpinner"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="20dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp" />

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="20dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:hint="Username">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField1"
            android:fontFamily="@font/poppins_medium"
            android:inputType="text"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="10dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:hint="Email">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField2"
            android:fontFamily="@font/poppins_medium"
            android:layout_width="match_parent"
            android:inputType="textEmailAddress"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginStart="30dp"
        android:layout_marginTop="10dp"
        android:layout_marginEnd="30dp"
        android:hint="Password">

        <!--this is the actual edit text which takes the
input-->
```

```
<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField3"
            android:fontFamily="@font/poppins_medium"
            android:layout_width="match_parent"
            android:inputType="textPassword"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginStart="30dp"
        android:layout_marginTop="10dp"
        android:layout_marginEnd="30dp"
        android:hint="Confirm Password">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField4"
            android:fontFamily="@font/poppins_medium"
            android:layout_width="match_parent"
            android:inputType="textPassword"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="10dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:hint="Vehicle Type">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField5"
            android:fontFamily="@font/poppins_medium"
            android:inputType="text"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />


</com.google.android.material.textfield.TextInputLayout>
```

```
    <Button
        android:id="@+id/btnSignUp"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:layout_marginStart="30dp"
        android:layout_marginEnd="30dp"
        android:text="Sign Up"
        android:fontFamily="@font/poppins_medium"
        android:padding="5dp"
        android:textSize="15dp"
        android:background="#2196F3"
        android:backgroundTint="#2196F3"

android:elevation="@dimen/cardview_default_elevation"
        android:textAllCaps="false" />

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:layout_gravity="center"
        android:gravity="center"
        android:fontFamily="@font/poppins_medium"
        android:orientation="horizontal" >

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:textColor="@color/black"
            android:textSize="16sp"
            android:fontFamily="@font/poppins_medium"
            android:text="Already have an account?"/>

        <TextView
            android:id="@+id/btnSignIn"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:text="Sign In"
            android:textSize="16sp"
            android:fontFamily="@font/poppins_medium"
            android:textColor="#2196F3"/>

    </LinearLayout>

</LinearLayout>
```

g. activity_splash.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    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:background="@color/white"
    tools:context=".SplashActivity">

    <ImageView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:src="@drawable/splash"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

h. activity_update_fuel_station.xml

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

xmlns:android="http://schemas.android.com/apk/res/android"
    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:background="@color/white"
    android:orientation="vertical"
    tools:context=".UpdateFuelStationActivity">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="50dp"
        android:fontFamily="@font/poppins_bold"
        android:gravity="center"
        android:text="Update Fuel Station"
        android:textColor="#2196F3"
        android:textSize="25dp"
        android:textStyle="bold" />

    <TextView
        android:id="@+id/textField4"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="30dp"
        android:background="@drawable/edit_text_border"
        android:padding="17dp"
        android:textSize="15dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:text="Fuel Arrival Time"/>


    <TextView
        android:id="@+id/textField5"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="20dp"
        android:background="@drawable/edit_text_border"
        android:padding="17dp"
        android:textSize="15dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:text="Fuel Finish Time"/>

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginTop="25dp"
        android:layout_marginEnd="30dp"
        android:fontFamily="@font/poppins"
        android:text="Fuel Type"
        android:textColor="@color/black"
        android:textSize="15dp" />

    <Spinner
        android:id="@+id/fuelTypeSpinner"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="5dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp" />

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginTop="25dp"
        android:layout_marginEnd="30dp"
        android:fontFamily="@font/poppins"
        android:text="Fuel Availability"
        android:textColor="@color/black"
        android:textSize="15dp" />

    <Spinner
        android:id="@+id/fuelAvailabilitySpinner"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="5dp"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp" />
    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/btnUpdateStation"
        android:layout_marginTop="30dp"
        android:layout_marginStart="30dp"
        android:layout_marginEnd="30dp"
        android:text="Update Fuel Station"
        android:padding="5dp"
        android:background="#2196F3"
        android:backgroundTint="#2196F3"

android:elevation="@dimen/cardview_default_elevation"
        android:fontFamily="@font/poppins_medium"
        android:textAllCaps="false" />


</LinearLayout>
```

i. activity_vehicle_owner.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    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:background="@color/white"
    tools:context=".VehicleOwnerActivity">

    <com.google.android.material.textfield.TextInputLayout

style="@style/Widget.MaterialComponents.TextInputLayout.Out
linedBox"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="30dp"
        android:layout_marginTop="20dp"
        android:visibility="gone"
        android:id="@+id/txt"
        android:fontFamily="@font/poppins_medium"
        android:layout_marginEnd="30dp"
        android:hint="No of Liters">


<com.google.android.material.textfield.TextInputEditText
            android:id="@+id/textField1"
            android:fontFamily="@font/poppins_medium"
            android:inputType="number"
            android:visibility="gone"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />

</com.google.android.material.textfield.TextInputLayout>

    <Button
        android:id="@+id/btnOne"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        android:layout_marginStart="30dp"
        android:layout_marginEnd="30dp"
        android:text="Joined to the queue"
        android:paddingTop="10dp"
        android:paddingBottom="10dp"
        android:background="#2196F3"
        android:backgroundTint="#2196F3"

android:elevation="@dimen/cardview_default_elevation"
        android:fontFamily="@font/poppins_medium"
        android:textAllCaps="false" />

    <Button
        android:id="@+id/btnTwo"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        android:layout_marginStart="30dp"
        android:layout_marginEnd="30dp"
        android:text="Exit before pump fuel"
        android:paddingTop="10dp"
        android:paddingBottom="10dp"
        android:background="#2196F3"
        android:backgroundTint="#2196F3"

android:elevation="@dimen/cardview_default_elevation"
        android:fontFamily="@font/poppins_medium"
        android:textAllCaps="false" />

    <Button
        android:id="@+id/btnThree"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        android:layout_marginStart="30dp"
        android:layout_marginEnd="30dp"
        android:text="Exit after pump fuel"
        android:paddingTop="10dp"
        android:paddingBottom="10dp"
        android:background="#2196F3"
        android:backgroundTint="#2196F3"

android:elevation="@dimen/cardview_default_elevation"
        android:fontFamily="@font/poppins_medium"
        android:textAllCaps="false" />

    <TextView
        android:id="@+id/status"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        android:fontFamily="@font/poppins_medium"
        android:gravity="center"
        android:visibility="invisible"
        android:text="Add New Station"
        android:textColor="#2196F3"
        android:layout_marginLeft="30dp"
        android:layout_marginRight="30dp"
        android:textSize="20dp"
        android:textStyle="bold" />

    <ImageView
        android:id="@+id/image"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:src="@drawable/queue"
        android:layout_gravity="center"
        android:layout_marginRight="20dp"
        android:layout_marginLeft="20dp"
        android:visibility="invisible"
        android:layout_margin="20dp"/>

</LinearLayout>
```

j. fuel_queue_item_layout.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.cardview.widget.CardView

xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:id="@+id/cardview1"
    android:layout_height="145dp"
    android:layout_width="match_parent"
    android:layout_marginTop="20dp"
    android:layout_marginStart="20dp"
    android:layout_marginEnd="20dp"
    app:cardCornerRadius="8dp"
    app:cardElevation="10dp" >

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:background="@color/white"
            android:orientation="horizontal">

            <ImageView
                android:id="@+id/video"
                android:layout_width="70dp"
                android:layout_marginLeft="20dp"
                android:layout_height="wrap_content"
                android:src="@drawable/veh" />

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="match_parent"
                android:background="@color/white"
                android:orientation="vertical">

                <TextView
                    android:id="@+id/txt1"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:fontFamily="@font/poppins_bold"
                    android:text="Station ID"
                    android:layout_marginTop="8dp"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt4"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:fontFamily="@font/poppins_bold"
                    android:text="Fuel Availability"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt2"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"

android:fontFamily="@font/poppins_medium"
                    android:text="Location"
                    android:layout_marginTop="5dp"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt3"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"

android:fontFamily="@font/poppins_medium"
                    android:text="Capacity"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
```

```
                    android:id="@+id/txt6"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"

android:fontFamily="@font/poppins_medium"
                    android:text="End"
                    android:gravity="center"
                    android:layout_marginBottom="10dp"
                    android:textColor="@color/black"
                    android:textSize="14dp" />


            </LinearLayout>

        </LinearLayout>

    </androidx.cardview.widget.CardView>
```

k. fuel_station_item_layout.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.cardview.widget.CardView

xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:id="@+id/cardview1"
    android:layout_height="250dp"
    android:layout_width="match_parent"
    android:layout_marginTop="20dp"
    android:layout_marginStart="20dp"
    android:layout_marginEnd="20dp"
    app:cardCornerRadius="8dp"
    app:cardElevation="10dp" >

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:background="@color/white"
            android:orientation="horizontal">

            <ImageView
                android:id="@+id/video"
                android:layout_width="70dp"
                android:layout_marginLeft="20dp"
                android:layout_height="wrap_content"
                android:src="@drawable/station" />

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="match_parent"
                android:background="@color/white"
                android:orientation="vertical">

                <TextView
                    android:id="@+id/txt1"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:fontFamily="@font/poppins_bold"
                    android:text="Station ID"
                    android:layout_marginTop="8dp"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt4"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:fontFamily="@font/poppins_bold"
                    android:text="Fuel Availability"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt2"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"

android:fontFamily="@font/poppins_medium"
                    android:text="Location"
                    android:layout_marginTop="5dp"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt3"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"

android:fontFamily="@font/poppins_medium"
                    android:text="Capacity"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt7"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"

android:fontFamily="@font/poppins_medium"
                    android:text="Capacity"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt5"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"

android:fontFamily="@font/poppins_medium"
                    android:text="Start"
                    android:gravity="center"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <TextView
                    android:id="@+id/txt6"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"

android:fontFamily="@font/poppins_medium"
                    android:text="End"
                    android:gravity="center"
                    android:layout_marginBottom="10dp"
                    android:textColor="@color/black"
                    android:textSize="14dp" />

                <Button
                    android:id="@+id/update"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:textSize="14dp"
                    android:padding="-2dp"
                    android:layout_marginLeft="10dp"
                    android:layout_marginRight="10dp"
                    android:text="Update"
                    android:textAllCaps="false"
                    android:fontFamily="@font/poppins_bold"
                    android:background="#008A06"
                    android:backgroundTint="#008A06"/>

            </LinearLayout>

        </LinearLayout>

    </androidx.cardview.widget.CardView>
```

5. Backend Development

5.1 Model

a. Queue_Fuel

```
/*
 * Model class for
 * fuel queue in the station
*/
```

```
public class FuelQueue
  {
     [BsonId]
     [BsonRepresentation(BsonType.ObjectId)]
     public String Id { get; set; } = String.Empty;

     [BsonElement("stationId")]
     public String FuelstationId { get; set; } = String.Empty;

     [BsonElement("vehicleNumber")]
     public String VehicleNumber { get; set; } = String.Empty;

     [BsonElement("user_id")]
     public String UserId { get; set; } = String.Empty;

     [BsonElement("no_of_liters")]
     public String NoOfLiters { get; set; } = String.Empty;

     [BsonElement("arrival_time")]
     public String ArrivalTime { get; set; } = String.Empty;

     [BsonElement("departure_time")]
     public String DepartureTime { get; set; } = String.Empty;

     //exit before having fuel and after having fuel
     [BsonElement("status")]
     public String Status { get; set; } = String.Empty;


 }
```

b. Station_Fuel

```
/* MODEL CLASS - Fuel Station */
    public class FuelStation
    {
        [BsonId]
        [BsonRepresentation(BsonType.ObjectId)]
        public String Id { get; set; } = String.Empty;

        [BsonElement("stationID")]
        public String StationID { get; set; } = String.Empty;

        [BsonElement("location")]
        public String Location { get; set; } = String.Empty;

        [BsonElement("capacity")]
        public String Capacity { get; set; } = String.Empty;

        [BsonElement("availability")]
        public String Availability { get; set; } = String.Empty;

        [BsonElement("type")]
        public String Type { get; set; } = String.Empty;

        [BsonElement("startingTime")]
        public String StartingTime { get; set; }

        [BsonElement("endingTime")]
        public String EndingTime { get; set; }

    }
```

c. User

```
  public class User
    {
        [BsonId]
        [BsonRepresentation(BsonType.ObjectId)]
        public String Id { get; set; } = String.Empty;
        [BsonElement("username")]
        public String Username { get; set; } = String.Empty;
        [BsonElement("email")]
        public String Email { get; set; } = String.Empty;
        [BsonElement("password")]
        public String Password { get; set; } = String.Empty;
        [BsonElement("role")]
        public String Role { get; set; } = String.Empty;
        [BsonElement("vehicleType")]
        public String VehicleType { get; set; } = String.Empty;
    }
```

d. FuelDatabaseSettings

```
public class FuelDatabaseSettings : IFuelDatabaseSettings
    {
        public string FuelCollectionName { get; set; } =
String.Empty;

        public string UserCollectionName { get; set; } =
String.Empty;

        public string DatabaseName { get; set; } = String.Empty;
        public string ConnectionString { get; set; } =
String.Empty;
        public string Collection_FuelStation { get; set; } =
String.Empty;
        public string CollectionName_FuelQueue { get; set; } =
String.Empty;
          }
```

e. IFuelDatabaseSetting

```
    public interface IFuelDatabaseSettings
{
    string FuelCollection { get; set; }
    string CollectionName_FuelStation { get; set; }
    string CollectionName_FuelQueue { get; set; }
    string CollectionName_User { get; set; }
    string DatabaseName { get; set; }
    string ConnectionString { get; set; }


}
```

f. UserRequest

```
    public class UserRequest
{
    public String Username { get; set; } = String.Empty;

    public String Email { get; set; } = String.Empty;

    public String Password { get; set; } = String.Empty;

    public String Role { get; set; } = String.Empty;

    public String VehicleType { get; set; } = String.Empty;
}
```

5.2 Controllers

a. Controller_FuelStation

```
public class FuelStationController : Controller
    {
        private readonly IFuelStationService fuelStationService;
        public FuelStationController(IFuelStationService 
fuelStationService)
        {
            this.fuelStationService = fuelStationService;
        }

        // Adding a Fuel Station
        [HttpPost("addToFuelStation")]
        public ActionResult<Station_Fuel> 
AddFuelStation([FromBody]Station_Fuel request)
        {
            DateTime now = DateTime.Now;
            if (request.StationID == null || request.Location 
==null || request.Capacity == null || request.Availability == null 
|| request.Type == null || request.StartingTime == null)
      {
                return BadRequest("Problem! Missing Fuel Station 
Details!");
            }
            Station_Fuel station = new Station_Fuel();
            station.StationID = request.StationID;
            station.Location = request.Location;
            station.Capacity = request.Capacity;
            station.Availability = request.Availability;
            station.Type = request.Type;
            station.StartingTime = request.StartingTime;
            station.EndingTime = "0.0.00";
            fuelStationService.CreateToFuelStation(station);
            return CreatedAtAction(nameof(GetFuelStation), new { id
= station.Id }, station);
        }


        //Retrieving a fuel station by its ID
        [HttpGet("getfuelstationById/{id}")]
        public ActionResult<Station_Fuel> GetFuelStation(String id)
        {
            var station = fuelStationService.GetFuelStation(id);
            if (station == null)
            {
                return NotFound($"Fuel Station with Id = {id} not
found");
            }

            return station;
        }



        //Create Queue
        [HttpPost("addFuelStationQueue")]
        public ActionResult<Queue_Fuel> AddQueue([FromBody]
Queue_Fuel request)
        {
            if (request.VehicleNumber == null || request.UserId ==
null || request.StationId == null || request.NoOfLiters == null)
            {
                return BadRequest("Missing Fuel Station Details!");
            }
            DateTime now = DateTime.Now;

            Queue_Fuel queue = new Queue_Fuel();
            queue.VehicleNumber = request.VehicleNumber;
            queue.StationId = request.StationId;
            queue.UserId = request.UserId;
            queue.NoOfLiters = request.NoOfLiters;
            queue.ArrivalTime = now.ToLongTimeString();
            queue.DepartureTime = "0.00.00";
            queue.Status = "IN";
            fuelStationService.CreateQueue(queue);
            return CreatedAtAction(nameof(GetFuelStation), new { id
= queue.Id }, queue);
        }

        //Get All Fuel Stations
        [HttpGet("getAllFuelStations")]
        public ActionResult<List<Station_Fuel>> GetAllFuelStation()
        {
            return fuelStationService.GetFuelStations();
        }

        //Get All Queues
        [HttpGet("getFuelQueue")]
        public ActionResult<List<Queue_Fuel>> GetAllFuelQueue()
        {
            return fuelStationService.GetAllQueue();
        }

        //Get One Queue
        [HttpGet("getqueue/{id}")]
        public ActionResult<Queue_Fuel> GetQueue(String id)
        {
            var station = fuelStationService.GetQueueone(id);
            if (station == null)
            {
                return NotFound($"Fuel Queue with Id = {id} not 
found");
            }

            return station;
        }

        //Update Fuel station by its ID
        [HttpPut("updateFuelStation/{id}")]
        public ActionResult UpdateFuelStationStatus(String id, 
[FromBody] Station_Fuel request)
        {
            DateTime now = DateTime.Now;
            if ( request.Availability == null || request.Type == 
null || request.StartingTime == null || request.EndingTime == null)
            {
                return BadRequest("Missing Fuel Station Details!");
            }
            Station_Fuel station = new Station_Fuel();

            station.Availability = request.Availability;
            station.Type = request.Type;
            station.StartingTime = request.StartingTime;
            station.EndingTime = request.EndingTime;


            fuelStationService.UpdateFuelStationStatus(id, 
station);
            return Content("Station Status Updated!");
        }

        //Update Queue Status for exit after having fuel
        [HttpPut("updateQueueState/{id}")]
        public ActionResult updateQueueStatus(String id, [FromBody] 
Queue_Fuel station)
        {

            String status = "Fuel Loaded";

            fuelStationService.UpdateQueueStatus( id);
            return Content(" Status Updated!");
        }

        //Update Queue Status for exit without having fuel
        [HttpPut("updateQueueStateTwo/{id}")]
        public ActionResult updateQueueStatusTwo(String id, 
[FromBody] Queue_Fuel station)
        {
            DateTime now = DateTime.Now;
            String status = "Did Not Load Fuel";

            fuelStationService.UpdateQueueStatus(id);
            return Content(" Status Updated!");
        }

    }
```

b. Controller_User

```
    //Base api
    [Route("api/[controller]")]
    [ApiController]
    public class UserController : ControllerBase
    {
        private readonly IUserService userService;
        public UserController(IUserService userService)
        {
            this.userService = userService;

        }

        // Retrieving users
        [HttpGet]
        public ActionResult<List<User>> Get()
        {
            return userService.GetUsers();
        }

        // Retrieving a user by ID/
        [HttpGet("{id}")]
        public ActionResult<User> Get(String id)
        {
            var user = userService.Get(id);
            if (user == null)
            {
                return NotFound($"user with Id = {id} not found");
            }

            return user;
        }

        // Inserting a user
        [HttpPost("registration")]
        public ActionResult<User>
Registration([FromBody]UserRequest request)
        {
            if (request.Username == null || request.Email == null||
request.Password == null || request.VehicleType == null)
            {
                return BadRequest("Fail to registre");
            }

            User user = new User();
            user.Username = request.Username;
            user.Email = request.Email;
            user.Password = request.Password;
            user.Role = request.Role;
            user.VehicleType = request.VehicleType;

            userService.Create(user);
            return  CreatedAtAction(nameof(Get), new { id = user.Id
}, user);
        }

        //Login in a user
        [HttpPost("login")]
        public ActionResult<User> Login([FromBody] UserRequest
request)
        {
            if (request.Username == null || request.Password
==null)
           {
                return BadRequest("Fail to login");
            }
            var existingUser =
userService.GetUserByUsername(request.Username);

      if (existingUser == null)
            {
                return NotFound($"user with username =
{request.Username} not found");
            }

            return Ok(existingUser);
        }

        //Updating a user by its ID
        [HttpPut("{id}")]
        public ActionResult Put(String id, [FromBody] User user)
        {
            var existingUser = userService.Get(id);

            if (existingUser == null)
            {
                return NotFound($"Student with Id = {id} not
found");
            }

            userService.Update(id, user);

            return NoContent();
        }
    }
```

5.3 Services

a. Service_FuelStation

```
public class Service_FuelStation : Service_FuelStationInterface

    {
        private readonly IMongoCollection<Station_Fuel>
_fuelStation;
        private readonly IMongoCollection<Queue_Fuel> _fuelQueue;

        // Initializing DataBase Connections
        public Service_FuelStation(IFuelDatabaseSettings settings,
IMongoClient mongoClient)
        {
    var database =mongoClient.GetDatabase(settings.DatabaseName);
            _fuelStation =
database.GetCollection<Station_Fuel>(settings.Collection_FuelStatio
n);
            _fuelQueue =
database.GetCollection<Queue_Fuel>(settings.Collection_FuelQueue);

        }

        // Create a new FuelStation
        public Station_Fuel
CreateToFuelStation(Station_Fuelstation)
        {
            _fuelStation.InsertOne(station);
            return station;
        }
        // Get a single Fuel Station
        public Station_Fuel GetFuelStation(string id)
        {
            return _fuelStation.Find(station => station.Id ==
id).FirstOrDefault();
        }
        // Get List of Fuel Stations
        public List<Station_Fuel> GetFuelStations()
        {
            return _fuelStation.Find(station => true).ToList();

        }

        // Update Fuel Station
        public void UpdateFuelStation(string stationId,
Station_Fuel station)
        {
            _fuelStation.ReplaceOne(station => station.Id ==
stationId, station);
        }

        // Update starting time and end time.
        public void UpdateStartTimeAndEndTime(string stationId,
Station_Fuel station)
        {
            Station_Fuel existingStation =
GetFuelStation(stationId);
            existingStation.StartingTime = station.StartingTime;
            existingStation.EndingTime = station.EndingTime;
```

```
           _fuelStation.ReplaceOne(station => station.Id
==existingStation.Id, existingStation);
        }

        public Station_Fuel GetStation(string id)
        {
           return _fuelStation.Find(station => station.StationID==
id).FirstOrDefault();
        }

        public void UpdateFuelStationStatus(String id, Station_Fuel
station)
        {
            DateTime now = DateTime.Now;
            Station_Fuel existingRequest = GetStation(id);
            existingRequest.Availability =station.Availability;
            existingRequest.Type = station.Type;
            existingRequest.StartingTime = station.StartingTime;
            existingRequest.EndingTime = station.EndingTime;
            _fuelStation.ReplaceOne(request =>request.StationID ==
existingRequest.StationID, existingRequest);

        }

        public Queue_Fuel CreateQueue(Queue_Fuel queue)
        {
            _fuelQueue.InsertOne(queue);
            return queue;
        }

        public List<Queue_Fuel> GetAllQueue()
        {
            return _fuelQueue.Find(station => station.Status ==
"IN").ToList();
        }

        public Queue_Fuel GetQueueone(string id)
        {
            return _fuelQueue.Find(station => station.VehicleNumber
== id).FirstOrDefault();
        }


        public void UpdateQueueStatus(string id)
        {
            DateTime now = DateTime.Now;
            Queue_Fuel existingRequest = GetQueueone(id);
            existingRequest.Status = "Pumped Fuel";
            existingRequest.DepartureTime = now.ToLongTimeString();
            _fuelQueue.ReplaceOne(request => request.VehicleNumber
== existingRequest.VehicleNumber, existingRequest);
        }

        public void updateQueueStatusTwo(string id)
        {
            DateTime now = DateTime.Now;
            Queue_Fuel existingRequest = GetQueueone(id);
            existingRequest.Status = "Did Not Pumped Fuel";
            existingRequest.DepartureTime = now.ToLongTimeString();
            _fuelQueue.ReplaceOne(request => request.VehicleNumber
== existingRequest.VehicleNumber, existingRequest);
        }

        public List<Queue_Fuel> GetAllQueueHistory()
        {
            return _fuelQueue.Find(station => true).ToList();
        }
    }
```

b. Service_FuelStationInterface

```
public interface Service_FuelStationInterface
    {
        /* Fuel Station
         * based
         * Services */

        // Retrieve List of fuel stations for the Users to Check.
        List<Station_Fuel> GetFuelStations();


        // DEtails of a single fuel station for Admin to check
        Station_Fuel GetFuelStation(String id);
        Station_Fuel CreateToFuelStation(Station_Fuel station);

        // Update start time and end time of fuel station queue.
        void UpdateFuelStation(String stationId, Station_Fuel
station);
        void UpdateFuelStationStatus(String id, Station_Fuel
station);
        void RemoveFuelStation(String id);
        void UpdateStartTimeAndEndTime(String id, Station_Fuel
station);

        // Insert Queue
        Queue_Fuel CreateQueue(Queue_Fuel queue);

        // Get all Queue
        List<Queue_Fuel> GetAllQueue();

        //Get Queue by ID
        Queue_Fuel GetQueueone(String id);
        Station_Fuel GetStation(string id);

        // Remove from Queue
        void UpdateQueueStatus(String id);
        void updateQueueStatusTwo(String id);

    }
```

c. Service_UserInterface

```
public interface Service_UserInterface
    {
```

```
List<User> GetStudents();
User Get(String id);
User Create(User user);
User GetUserByUsername(string username);
void Update(String id, User user);
void Remove(String id);
   }
```

d. Service_User

```
public class Service_User : Service_UserInterface
    {
        private readonly IMongoCollection<User> _user;

        public Service_User(IFuelDatabaseSettings settings,
IMongoClient mongoClient)
        {
            var database =
mongoClient.GetDatabase(settings.DatabaseName);
            _user =
database.GetCollection<User>(settings.Collection_User);
        }
        public User Create(User user)
        {
            _user.InsertOne(user);
            return user;
        }

        public User Get(string id)
        {
            return _user.Find(user => user.Id ==
id).FirstOrDefault();
        }

        public User GetUserByUsername(string username)
        {
            return _user.Find(user => user.Username ==
username).FirstOrDefault();
        }

        public List<User> GetStudents()
        {
            return _user.Find(user => true).ToList();
        }

        public void Update(string id, User user)
        {
            _user.ReplaceOne(user => user.Id == id, user);
       }
    }
```

6. Database

6.1 Database Design

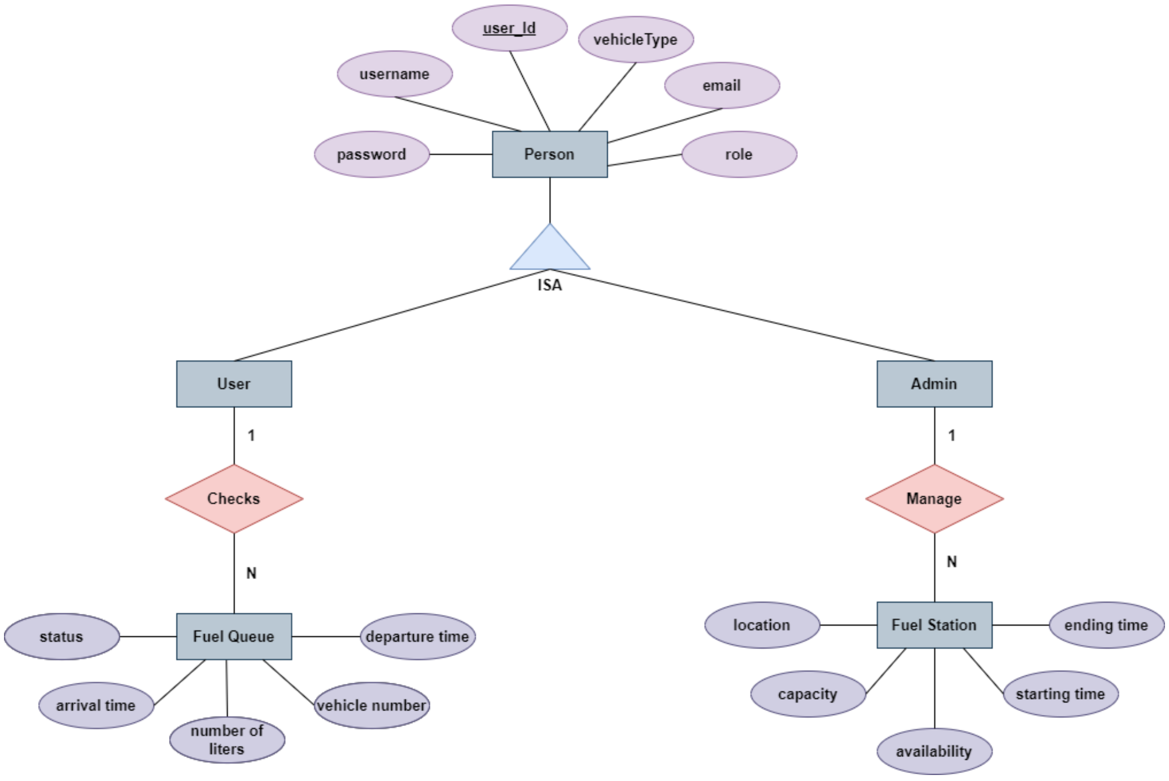
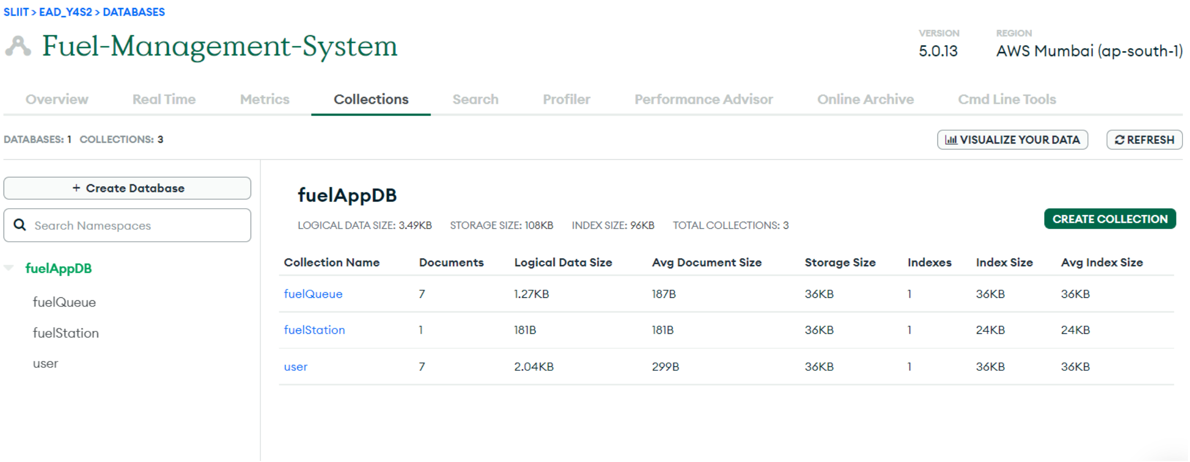


Figure 11: Database Design

6.2 MongoDB collection



DATABASES: 1 COLLECTIONS: 3

fuelAppDB

LOGICAL DATA SIZE: 3.49KB STORAGE SIZE: 108KB INDEX SIZE: 96KB TOTAL COLLECTIONS: 3

Collection Name	Documents	Logical Data Size	Avg Document Size	Storage Size	Indexes	Index Size	Avg Index Size
fuelQueue	7	1.27KB	187B	36KB	1	36KB	36KB
fuelStation	1	181B	181B	36KB	1	24KB	24KB
user	7	2.04KB	299B	36KB	1	36KB	36KB

Figure 12: MongoDB Collection

6.3 MongoDB Configuration

```
{
  "FuelDatabaseSettings": {
    "Collection_Fuel": "fuel",
    "Collection_User": "user",
    "Collection_FuelStation": "fuelStation",
    "Collection_FuelQueue": "fuelQueue",
    "DatabaseName": "fuelAppDB",
    "ConnectionString": "mongodb+srv://it19110530:root@fuel-management-
system.fdgrahm.mongodb.net/?retryWrites=true&w=majority"
  },
  "Logging": {
    "LogLevel": {
      "Default": "Information",
      "Microsoft.AspNetCore": "Warning"
    }
  },
  "AllowedHosts": "*"
}
```

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