EX: NO: 11	WEATHER FORECASTING USING API (MINI-PROJECT)
DATE:	

AIM:

To create a Java program, implementing a weather forecast application, fetching and displaying real-time weather details for a specified city using the OpenWeatherMap API.

ALGORITHM:

Step 1: Start the program.

Step 2: Initialize the JavaFX application by extending the Application class.

Step 3: Define constants for the OpenWeatherMap API key and the API URL template.

Step 4: Override the start method in the Application class.

Step 5: Create a TextField for user input to enter the city name.

Step 6: Create a Button to trigger the weather information retrieval.

Step 7: Set an event handler for the button to perform the following actions:

a. Retrieve the city name from the TextField.
b. Build the API URL using the city name and API key.
c. Open a connection to the API URL using HttpURLConnection.
d. Read the API response using BufferedReader.
e. Parse the JSON response using Gson.
f. Extract relevant weather information such as description, temperature, humidity, and wind speed.
g. Create a Label to display the weather forecast information.
h. Create a StackPane and add the label to it.
i. Create a Scene with the StackPane and set the scene for the primaryStage.
j. Show the primaryStage.

Step 8: Define a VBox layout to arrange the TextField and Button vertically.

Step 9: Create a Scene for the input layout with a specified size.

Step 10: Set the inputScene as the initial scene for the primaryStage.

Step 11: Display the primaryStage.

Step 12: Stop the program.

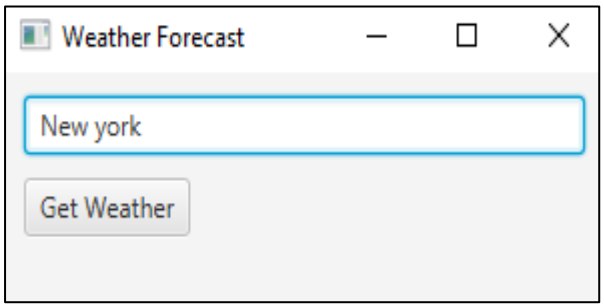
PROGRAM:

```
//Weatherforecast.java
package application;
import java.io.BufferedReader;
import java.io.InputStreamReader;
import java.net.HttpURLConnection;
import java.net.URL;

import com.google.gson.Gson;
import com.google.gson.JsonObject;

import javafx.application.Application;
import javafx.geometry.Insets;
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.scene.control.Label;
import javafx.scene.control.TextField;
import javafx.scene.layout.StackPane;
import javafx.scene.layout.VBox;
import javafx.stage.Stage;

public class Sample extends Application {
private static final String API_KEY = "8bb92dec3081493fe9eb79abab6f79db";
private static final String API_URL =
"http://api.openweathermap.org/data/2.5/weather?q=%s&appid=%s";

public static void main(String[] args) {
launch(args);
}

@Override
public void start(Stage primaryStage) throws Exception {
TextField cityInput = new TextField();

cityInput.setPromptText("Enter City Name");

Button getWeatherButton = new Button("Get Weather");
getWeatherButton.setOnAction(e -> {
try {
String cityName = cityInput.getText();
String apiUrl = String.format(API_URL, cityName, API_KEY);

URL url = new URL(apiUrl);
HttpURLConnection connection = (HttpURLConnection) url.openConnection();
connection.setRequestMethod("GET");

BufferedReader reader = new BufferedReader(new
InputStreamReader(connection.getInputStream()));
StringBuilder response = new StringBuilder();
String line;
```

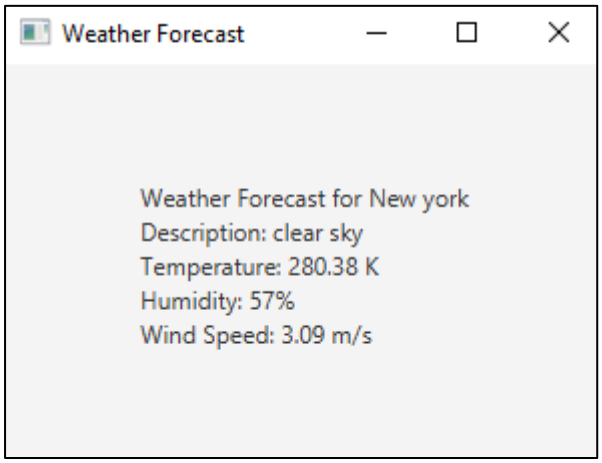
```
while ((line = reader.readLine()) != null) {
response.append(line);
}

reader.close();
connection.disconnect();

Gson gson = new Gson();
JsonObject jsonObject = gson.fromJson(response.toString(), JsonObject.class);

String weatherDescription = jsonObject
.get("weather")
.getAsJsonArray()
.get(0)
.getAsJsonObject()
.get("description")
.getAsString();

JsonObject main = jsonObject.getAsJsonObject("main");
double temperature = main.get("temp").getAsDouble();
int humidity = main.get("humidity").getAsInt();

JsonObject wind = jsonObject.getAsJsonObject("wind");
double windSpeed = wind.get("speed").getAsDouble();

Label label = new Label("Weather Forecast for " + cityName + "\n"
+ "Description: " + weatherDescription + "\n"
+ "Temperature: " + temperature + " K\n"
+ "Humidity: " + humidity + "%\n"
+ "Wind Speed: " + windSpeed + " m/s");

StackPane root = new StackPane();
root.getChildren().add(label);

Scene scene = new Scene(root, 300, 200);

primaryStage.setTitle("Weather Forecast");
primaryStage.setScene(scene);
primaryStage.show();
} catch (Exception ex) {
ex.printStackTrace();
}
});

VBox layout = new VBox(10);
layout.setPadding(new Insets(10));
layout.getChildren().addAll(cityInput, getWeatherButton);

Scene inputScene = new Scene(layout, 300, 100);

primaryStage.setTitle("Weather Forecast");
primaryStage.setScene(inputScene);
primaryStage.show();
} }
```

OUTPUT:

//Input City name



//Weather details for the entered city



RESULT:

Thus, the Java application for Weather Forecasting using API was successfully developed and implemented.