Introduction to Web Programming
Course Project

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Weather App

Report

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Project Description

This is a report for the course project of the course Introduction to Web Programming, LUT University, autumn 2024. The project is to build a Weather App using web development tools taught in the course.

Declaration of AI usage

AI was used as a tool in the project. ChatGPT was used for the following tasks:

- Research and recommendations for best practices
- Troubleshooting
- Generating color codes for the app’s backgrounds

Goals

The main goal of the project is to create a functional weather app using the basic web programming framework from the course: JavaScript, HTML, and CSS. The app should be simple, and modern looking and show the user useful, topical weather information. The information should be fetched on demand from suitable weather APIs.

The user should be able to search for a location (city etc.) or use a geolocation feature to get weather data for the current location. s

The modern looks should be achieved using suitable fonts and icons. The app's style should change to reflect the current weather conditions. This includes dynamic backgrounds and element colors.

The app should also have a weather map function, which the user can use to see current weather conditions on the map.

Design choices

OpenWeatherMap was chosen as the main weather API for its relative ease of use and the possibility use the API for free. Weather API was chosen as the second source of weather data.

In addition to OpenWeatherMap and Weather API, Leaflet is used in the weather map function. Leaflet was chosen for its ease of use and the possibility to tile OpenWeatherMap data on top of the map.

JavaScripts Geolocation API can be used to get weather data for the current location.

For styling, Font Awesome icons are used to create a modern, minimalistic and consistent look across the app.

The app consists of 5 different pages to distribute the content logically.

Final product

The final product reached the goals set for the project very well. The implemented functionality is listed below.

Implemented Functionality

Dynamic backgrounds: the background of the app changes according to the weather and time of day. Transitions are animated for a smooth feel. Dynamic backgrounds can be demoed on the about-page.

Multiple pages: the app consists of 5 pages: home, forecasts, map, about and settings.

Main page: main page shows relevant weather data and an hourly forecast.

Forecasts: forecasts page shows a hourly forecast as well as a daily forecast. Additionally, the page contains a plot of the temperature forecast over the next 24 hours.

Weather map: weather map allows the user to see the current weather conditions on a map. The user can choose, which layers are shown on the map.

Settings page: the settings page allows the user to change between units. The settings page can be accessed from the cog-icon on the bottom left corner.

Geolocation: the Geolocation API can be used to find user's location. This can be done by pressing the arrow icon on the bottom right corner.

Location search: user can search for different locations using the search bar found from the top right corner of the app on desktop, or by pressing the search icon on the top right corner on mobile.

Responsive design: the app's design is responsive, and changes depending on the screen size.

Multiple data providers: OpenWeatherMap is the main weather data API, used for weather data, forecast data and weather map data. Weather API is used to fetch a more accurate 24 hour forecast on the forecasts page. Leaflet is used as the base for the weather map.

Weather icons: weather conditions are illustrated using Font Awesome icons.

Consistent, modern design: Font Awesome icons are used for styling the app.

Proposed points

Feature	**Max points**	**Proposed points**	**Justification**
Well written PDF report	3	3	Done.
Application is responsive and can be used on both desktop and mobile environment	4	4	The app is responsive
Application works on Firefox, Safari, Edge and Chrome	3	3	The app works on all browsers
The application has clear directory structure and everything is organized well	2	2	Different filetypes have been their own folders,
<Your own feature: describe why should it be accepted>*	**n**	3	Weather map functionality
<Your own feature: describe why should it be accepted>*	**n**	1	Multiple pages
User can search for locations	1	1	Implemented.
User can use his/her location GPS-coordinates (Geolocation API)	2	2	Implemented.
At least two data/forecast providers are used	3	3	OpenWeatherMap and Weather API
At least three data/forecast providers are used	2	3	OpenWeatherMap, Weather API, Leaflet Maps
User sees the current weather at a specific location	1	1	User can search for locations or use geolocation
User sees the forecast for the next 24 hour, hourly based	3	3	User can see forecast with 3 hour steps (OWM free tier limit)
User sees the forecast for the next 7 days	3	3	User can see the forecast for the next 5 days (OWM free tier limit)
All the weather forecast elements uses icons (and numbers) for e.g. sunny and cloudy weathers	3	3	Implemented using Font Awesome icons.
The look and feel of the application reflects the current weather	2	2	Implemented.
User sees simultaneously two forecast in a graph	3	0	

User has the option to tag some locations as her favorites and thus access them from the favorites menu	2	0	
User has an option to switch between celsius and fahrenheit degrees and kelvins	2	1	User can switch between celsius and fahrenheit
Sum	**39**	**38**	

Instructions for using the app

The app opens to the home page by default. From any screen, the user is able to return to the homepage by pressing either the Weather App logo on the top left corner or the ‘home’ -button on the top right corner. Searching for a location or pressing the ‘locate’ button on the bottom right corner also returns the user to the homepage, if weather data is loaded successfully (valid search terms are used or the user is located).

On the home page, the user can see relevant weather information, including current weather conditions and a forecast. The user can change the location of the weather data by performing a search for a location from the search bar on the top right corner or by pressing the ‘locate’-button on the bottom right corner.

User can press the cog-icon on the bottom left corner to go to the settings page. Here, the user can choose from either metric or imperial units for the app.

The ‘button on the top right corner takes the user to the forecasts page. Here the user can see an hourly forecast, a daily forecast as well as a temperature chart for the next 24 hours. The user can change weather data location similar to the homepage.

The ‘map’ button on the top right corner takes the user to the map page. The user can choose different layers for the map on the top right corner of the map, and change location similar to the homepage.

The ‘about’-button takes the user to the about-page. The about-page has a dropdown menu for different weather conditions and a day/night toggle which can be used to demo the dynamic backgrounds feature.

On mobile, the search bar can be shown by pressing the search icon on the top right corner. The navigation links (home, forecasts, map, about) can be found behind the three dots-icon.

Sources

OpenWeatherMap
Available: https://openweathermap.org/

OpenWeatherMap 5 day / 3 hour API Docs
Available: https://openweathermap.org/forecast5

OpenWeatherMap Weather Map 1.0 API Docs
Available: https://openweathermap.org/api/weathermaps

OpenWeatherMap Geocoding API
https://openweathermap.org/api/geocoding-api

Leaflet
Available: https://leafletjs.com/

Leaflet API Reference
Available: https://leafletjs.com/reference.html

Font Awesome icons
Available: https://fontawesome.com/icons

Font Awesome Docs
Available: https://docs.fontawesome.com/web

MDM Web Docs: JavaScript
Available: https://developer.mozilla.org/en-US/docs/Web/JavaScript

Frappe Charts Docs
Description:
Available: https://frappe.io/charts/docs

Weather API
Available: https://www.weatherapi.com/

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W3Schools: CSS Tutorial
Available: https://www.w3schools.com/css/default.asp

MDM Web Docs: Using CSS custom properties (variables)
Available: https://developer.mozilla.org/en-US/docs/Web/CSS/Using_CSS_custom_properties

W3Schools: How To Create a Toggle Switch
Available: https://www.w3schools.com/howto/howto_css_switch.asp

W3Schools: Create a Custom Select Menu
Available: https://www.w3schools.com/css/default.asp

MDM Docs: Geolocation API
Available: https://developer.mozilla.org/en-US/docs/Web/API/Geolocation_API

CartoDB map tile
Available: https://github.com/CartoDB/basemap-styles