World Clock Web Application

A project report submitted in Partial fulfilment, the requirement for the Degree
Of
Bachelor of Technology

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For the Session (2024-2025)

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CERTIFICATE

This is to certify that **Mr. Soumya Ranjan Patel** undertook this project entitled **"World Clock"**. He has completed the seminar for the partial fulfillment of the requirement for the degree of Bachelor in COMPUTER SCIENCE AND ENGINEERING from Centre for Post Graduate Studies, GIFT, Bhubaneswar.

Prof. Subhashree Shukla
Project Guide

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ACKNOWLEDGEMENT

I would like to express my deepest appreciation to Prof. Subhashree Shukla for providing me support and valuable suggestions during the time of project preparation. I would like to thank BPUT University and GIFT AUTONOMOUS (Gandhi Institute For Technology) for providing me this golden opportunity to enhance my knowledge in World Clock Web Application. At the end, I would like to express my sincere thanks to all the friends and others who helped us directly or indirectly during this project work.

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ABSTRACT

Title: "A Simple World Clock"

A World Clock is a comprehensive timekeeping tool that displays the current time across various time zones worldwide. It provides a user-friendly interface for individuals, businesses, and organizations to easily track time differences and coordinate activities on a global scale. The World Clock typically showcases time and date.

The primary intention behind creating a World Clock is to facilitate seamless global communication and collaboration. In an increasingly interconnected world, where business operations, virtual meetings, and international partnerships are commonplace, having a centralized timekeeping resource becomes crucial. The World Clock aims to eliminate the complexities of time zone calculations, fostering efficiency, and enhancing productivity for users across different geographical locations.

The World Clock is poised for a transformative future, focusing on AI-driven personalization for streamlined scheduling, enhanced collaboration tools, and seamless integration with smart devices. These updates aim to elevate the World Clock beyond a conventional timekeeping tool, making it an intelligent, user centric hub for global connectivity and efficient time management.

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1. INTRODUCTION

1.1 Introduction to World Clock Web Application

The World Clock Web Application aims to provide users with a convenient and efficient way to access real-time information on the current time in various cities around the world. In today's globalized world, where businesses and communication span across different time zones, having easy access to accurate time information is crucial for scheduling meetings, coordinating activities, and staying informed about global events.

1.2 Purpose of the Project

The primary purpose of developing the World Clock Web Application is to address the need for a user-friendly and reliable tool for viewing world clocks. By consolidating time information from different time zones into a single platform, the application simplifies the process of tracking time differences and ensures accurate timekeeping for users across different regions.

1.3 Problem in Existing Systems

Existing methods of accessing world time, such as manual conversion using online resources or built-in clock applications, often lack efficiency, accuracy, or user-friendly interfaces. Users may struggle with tedious calculations, inaccurate time displays, or difficulty in managing multiple time zones simultaneously. These limitations can lead to confusion, errors in scheduling, and inefficiencies in time management.

1.4 Solution of These Problems

The World Clock Web Application offers a comprehensive solution to these problems by providing a centralized platform for viewing world clocks with real-time updates. With an intuitive user interface, accurate timekeeping, and support for multiple time zones, the application simplifies the process of tracking time differences and enables users to manage their schedules more effectively. By offering a reliable and user-friendly solution, the application enhances productivity, facilitates global communication, and improves overall time management for users worldwide.

2. PROJECT ANALYSIS

2.1 Study of the System

In this section, we will delve into the analysis of the World Clock Web Application, examining the roles of different users and the underlying data management system.

2.1.1 Principal Role

The principal user of the World Clock Web Application is any individual or organization that requires access to accurate time information for multiple cities worldwide. This user primarily interacts with the application to view world clocks, track time differences, and coordinate activities across different time zones.

2.1.2 Staff Role

Staff members may include developers, administrators, or support personnel involved in the maintenance and operation of the World Clock Web Application. Their roles may include implementing updates, managing user accounts, troubleshooting issues, and ensuring the smooth functioning of the application.

2.1.3 DAO Role

The Data Access Object (DAO) plays a crucial role in managing data within the application. It handles tasks such as retrieving time zone data, updating clock information, and synchronizing time data with external sources. The DAO ensures the accuracy and reliability of time information displayed to users.

2.2 Hardware & Software Specifications

The hardware and software specifications required to run the World Clock Web Application are relatively minimal. The application can be accessed through any modern web browser on devices such as desktop computers, laptops, tablets, and smartphones. It is compatible with major operating systems, including Windows, macOS, Linux, Android, and iOS.

From a software perspective, the application utilizes web technologies such as HTML, CSS, and JavaScript for the frontend interface. Additionally, it leverages external libraries like Luxon for handling date and time operations efficiently. The application is designed to be lightweight, responsive, and accessible across different devices and platforms, ensuring a seamless user experience.

3. SELECTED SOFTWARE

3.1 HTML Introduction

HTML (Hypertext Markup Language) serves as the backbone of the World Clock Web Application, providing the structure and content markup for the web pages. It allows developers to create a semantic layout for displaying world clocks, navigation menus, contact information, and other essential elements of the application. HTML ensures accessibility, compatibility, and consistency across different web browsers and devices.

3.2 JavaScript Introduction

JavaScript is a key component of the World Clock Web Application, providing interactivity and dynamic behavior to the user interface. It enables real-time updates for world clocks, handles user interactions such as navigation menu clicks, and manages asynchronous data fetching. JavaScript enhances the user experience by delivering responsive and interactive features, making the application more engaging and efficient.

3.3 CSS Introduction

CSS (Cascading Style Sheets) is used for styling the visual presentation of the World Clock Web Application. It controls the appearance, layout, and design aspects of the user interface, including colors, fonts, spacing, and positioning. CSS ensures consistency, aesthetics, and responsiveness across different screen sizes and devices, enhancing the overall visual appeal and usability of the application.

3.4 Luxon Library

The Luxon library is utilized for handling date and time operations within the World Clock Web Application. It provides powerful and comprehensive functionalities for parsing, formatting, and manipulating date and time data in various time zones. Luxon simplifies tasks such as time zone conversions, daylight saving adjustments, and precise time formatting, ensuring accurate and reliable timekeeping for users worldwide. By leveraging Luxon, the application achieves consistency, accuracy, and efficiency in managing time-related functionalities, enhancing the user experience.

4. SOFTWARE REQUIREMENT SPECIFICATION

4.1. Introduction

4.1.1 Purpose

The purpose of this document is to define the requirements for the development of a web-based world clock application. This application will allow users to view the current time in various cities around the world.

4.1.2 Scope

The world clock application will provide users with the ability to:

- View the current time in multiple cities simultaneously.

- Easily navigate between different time zones.

- Have a user-friendly interface for a seamless user experience.

4.1.3 Definitions, Acronyms, and Abbreviations

- SRS: Software Requirements Specification

- HTML: Hypertext Markup Language

- CSS: Cascading Style Sheets

- JS: JavaScript

4.2. Overall Description

4.2.1 Product Perspective

The world clock application will be a standalone web application accessible through modern web browsers. It will not require any integration with external systems.

4.2.2 Product Features

- Display current time in multiple cities.

- Smooth navigation between different time zones.

- User-friendly interface with intuitive controls.

4.2.3 User Classes and Characteristics

The primary users of the world clock application are individuals who need to track time across different time zones. This includes travelers, remote workers, and anyone with international connections.

4.2.4 Operating Environment

The application will run in modern web browsers such as Google Chrome, Mozilla Firefox, Safari, and Microsoft Edge. It will be developed using HTML, CSS, and JavaScript.

4.3. System Features

4.3.1 Display Time in Multiple Cities

- Description: The application will display the current time in various cities around the world.

- Inputs: List of cities and their respective time zones.

- Outputs: Current time displayed for each city.

4.3.2 Navigation Between Time Zones

- Description: Users will be able to easily switch between different time zones to view the current time in different locations.

- Inputs: User interaction with the interface (e.g., clicking on a city).

- Outputs: Updated display showing the time in the selected time zone.

4.3.3 User Interface

- Description: The application will have a user-friendly interface with intuitive controls for easy navigation.

- Inputs: User interactions with buttons, dropdown menus, or other UI elements.

- Outputs: Visual feedback and updated display based on user interactions.

4.4. External Interface Requirements

4.4.1 User Interfaces

The user interface will consist of:

- A menu bar displaying the application name and navigation options.

- A main display area for showing the world clocks.

- Controls for navigating between time zones.

4.4.2 Hardware Interfaces

The application will run on any device with a modern web browser, including desktop computers, laptops, tablets, and smartphones.

4.4.3 Software Interfaces

The application will be developed using HTML, CSS, and JavaScript. It will utilize the Luxon library for handling time zones.

4.5. Non-functional Requirements

4.5.1 Performance

The application should load quickly and provide real-time updates of the current time without significant delays.

4.5.2 Usability

The user interface should be intuitive and easy to use, requiring minimal instruction for users to navigate between time zones.

4.5.3 Reliability

The application should be reliable, with minimal downtime and accurate time updates.

5. PROJECT DESIGN

5.1 Data Dictionary

The data dictionary outlines the key data elements used in the world clock application:

Field	Description
City	Name of the city for which time is displayed
Time Zone	Time zone of the city
Current Time	Current time in the specified city

5.2 E-R Diagram

5.2.1 Introduction

An Entity-Relationship Diagram (ERD) is a visual representation of the data structure and relationships within a system. It helps to illustrate how different entities in a system are related to each other.

5.2.2 Components of an ERD

- **Entities:** Represent objects or concepts in the system.

- **Attributes:** Properties or characteristics of entities.

- **Relationships:** Connections or associations between entities.

5.2.3 One methodology for developing an ERD

One common methodology for developing an ERD is to follow these steps:

1. Identify Entities: Determine the main objects or concepts in the system.

2. Define Attributes: Specify the properties or characteristics of each entity.

3. Establish Relationships: Identify the connections or associations between entities.

4. Refine and Review: Refine the ERD based on feedback and review from stakeholders.

E-R Diagram for World Clock Web Application

```
        +----------------------+
        |      City            |
        +----------------------+
        | CityID (PK)          |
        | Name                 |
        | TimeZone             |
        +----------------------+
             |
             |
             |1
             |
        +----------------------+
        |    CurrentTime   |
        +----------------------+
        | TimeID (PK)          |
        | CityID (FK)          |
        | CurrentTime      |
        +----------------------+
```
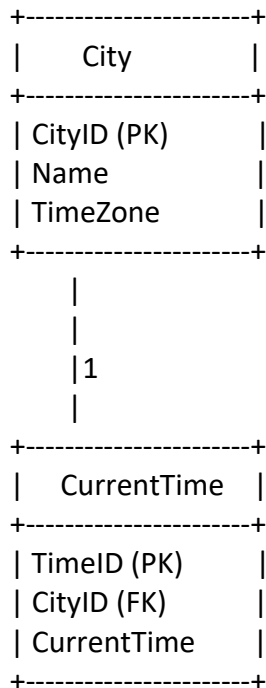
In the E-R diagram:

City: Represents the cities in the world with their respective time zones.

CurrentTime: Stores the current time for each city.

5.3 Source Code

Html

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <!-- Device time source -->
  <script src="https://cdn.jsdelivr.net/npm/
  luxon@2.1.1/build/global/luxon.min.js"></script>
  <link rel="stylesheet" href="style.css">
  <title>World Clock</title>
</head>
<body>
  <div>
    <div class="menu flex">
```

```html
        <div class="logo">World Clock</div>
          <div>
            <ul class="menu-item flex">
              <li class="list">
                <a href="#">Clocks</a>
              </li>
              <li class="contact">
                <a href="#">Contact</a>
              </li>
            </ul>
          </div>
        </div>
      <div class="time">Device Date and Time:<p></p></div>
    </div>
    <main class="flex direction arrange">
      <section class="clocks flex direction">
        <div id="clocks"></div>
      </section>
      <section class="contact-page direction arrange">
        <h2>Contact Information</h2>
        <ul>
          <li>Message me: soumya.patel2022@gift.edu.in</li>
          <li>Call me: +91 1234567890</li>
        </ul>
      </section>
    </main>
<footer>
  <p>Scroll down to change Clocks</p>
</footer>
<script src="script.js"></script>
<script src="./function.js"></script>
</body>
</html>
```

CSS

style.css

```css
* {
  box-sizing: border-box;
  margin: 0;
  padding: 0;
}

html,
body {
  font-family: Arial, sans-serif;
  background-color: burlywood;
```

```css
  height: 100%;
  display: flex;
  flex-direction: column;
  justify-content: space-around;
  overflow: hidden;
}

#clocks {
  text-align: center;
  display: flex;
  flex-direction: column;
  max-height: 30vh;
  overflow-y: auto;
  padding: 10px;
  scroll-snap-type: y mandatory;
  scroll-behavior: smooth;
}

.clock {
  flex: 0 0 auto;
  margin-bottom: 50px;
  margin-top: auto;
  padding: 10px;
  border: 2px solid #ffffffd9;
  border-radius: 20px;
  width: 400px;
  background-color: rgba(255, 255, 255, 0.503);
  font-size: x-large;
  height: 200px;
  scroll-snap-align: start;
}

.clock:nth-child(1) {
  background-image: url(Signatures/wp4496477-india-gate-wallpapers.jpg);
  background-size: cover;
  text-align:justify;
  color:aliceblue ;
}

.clock:nth-child(2) {
  background-image: url(Signatures/uwp4045561.png);
  background-size: cover;
  text-align: left;
  color: aliceblue;
}
```

```css
.clock:nth-child(3) {
  background-image: url(Signatures/HW-4020-0952.jpg);
  background-size: cover;
  text-align: left;
  color: aliceblue;
}

.clock:nth-child(4) {
  background-image: url(Signatures/chicago-1709724554162-9825.jpg);
  background-size: cover;
  text-align: left;
  color: aliceblue;
}

.clock:nth-child(5) {
  background-image: url(Signatures/Denver-Art-Museum-by-Austin-Matherne-837.jpg);
  background-size: cover;
  text-align: left;
  color: aliceblue;
}

.clock:nth-child(6) {
  background-image: url(Signatures/wp3369592-london-wallpaper-hd-1080p.jpg);
  background-size: cover;
  text-align: left;
  color: aliceblue;
}

.clock:nth-child(7) {
  background-image: url(Signatures/R.jpg);
  background-size: cover;
  text-align: right;
  color: aliceblue;
}
/* More child clocks to be added as necessary */


/* Hide scrollbar for WebKit browsers (Chrome, Safari) */
#clocks::-webkit-scrollbar {
  width: 0em;
}

#clocks::-webkit-scrollbar-thumb {
  background-color: transparent;
```

```css
}

/* Hide scrollbar for Firefox */
#clocks {
  scrollbar-width: none;
  scrollbar-color: transparent ;
}

/* Hide scrollbar for Edge and IE */
#clocks {
  -ms-overflow-style: none;
}
#clocks::-ms-scrollbar {
  width: 0em;
}
#clocks::-ms-scrollbar-thumb {
  background-color: transparent;
}

/* -------------------------------------------- */

.flex,
.homepage {
  display: flex;
}

.menu {
  font-size: 1em;
  justify-content: space-around;
  border-bottom: 3px solid;
  margin: 20px 50px 0;
  height: 50px;
  align-items: center;
  font-weight: bold;
}

.time {
  float: right;
  margin-top: 0px;
  margin-right: 50px;
}

.menu-item {
  list-style: none;
}
```

```css
.logo {
  font-size: 20px;
}
.menu-item li a {
  text-decoration: none;
  color: black;
}

.menu-item li a:active {
  color: red;
}

.menu-item li::after {
  content: '';
  border-right: 2px solid black;
  margin: 10px;
}

.direction {
  flex-direction: column;
}

.arrange {
  justify-content: center;
  align-items: center;
}

main {
  height: 70%;
}

.formsection,
.contact-page {
  display: none;
}

footer {
  border: 2px solid black;
  justify-self: auto;
  padding: 2%;
  margin: 0 2%;
}
```

Javascript

script.js

```javascript
// script.js
function updateClock(city, zone) {
  const options = { timeZone: zone, hour12: true, hour: 'numeric', minute:
'numeric', second: 'numeric' };
  const localTime = new Date().toLocaleTimeString('en', options);

  return `<div class="clock">
            <h2>${city}</h2>
            <p>${localTime}</p>
          </div>`;
}
function updateWorldClocks() {
  const timezones = [
    { city: "India", zone: "Asia/Kolkata" },
    { city: "New York", zone: "America/New_York" },
    { city: "Los Angeles", zone: "America/Los_Angeles" },
    { city: "Chicago", zone: "America/Chicago" },
    { city: "Denver", zone: "America/Denver" },
    { city: "London", zone: "Europe/London" },
    { city: "Paris", zone: "Europe/Paris" },
    { city: "Berlin", zone: "Europe/Berlin" },
    { city: "Moscow", zone: "Europe/Moscow" },
    { city: "Sydney", zone: "Australia/Sydney" },
    { city: "Japan", zone: "Asia/Tokyo" },
    { city: "China", zone: "Asia/Shanghai" },
    { city: "Dubai", zone: "Asia/Dubai" },
    { city: "Korea", zone: "Asia/Seoul" },
    // Add more time zones as needed
  ];

  const clockContainer = document.getElementById("clocks");

  clockContainer.innerHTML = "";

  timezones.forEach(entry => {
    const { city, zone } = entry;
    const clockHTML = updateClock(city, zone);
    clockContainer.innerHTML += clockHTML;
  });
}

updateWorldClocks();
setInterval(updateWorldClocks, 1000);
```

```
// //default Time...
const { DateTime } = luxon;
const now = DateTime.now();
const timely = document.querySelector('.time p');
timely.innerHTML = now.toLocaleString(DateTime.DATETIME_MED);
```

function.js

```
/* eslint-disable no-undef */
const section1 = document.querySelector('.clocks');
const section2 = document.querySelector('.contact-page');
const list = document.querySelector('.list');
const contact = document.querySelector('.contact');

function fun1() {
  section1.style.display = 'flex';
  section2.style.display = 'none';
}
function fun2() {
  section1.style.display = 'none';
  section2.style.display = 'flex';
}
list.addEventListener('click', fun1);
contact.addEventListener('click', fun2);
```

Preview
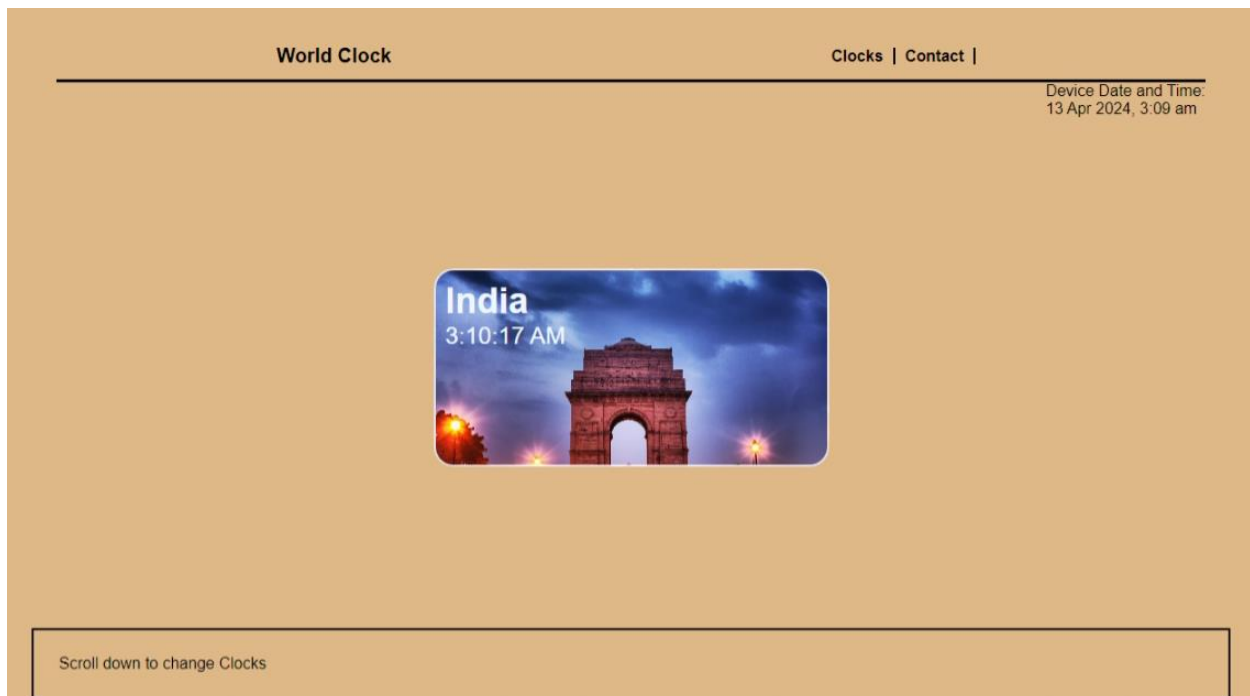
Home page (preview on a laptop/PC)

6. TEST CASES

6.1 Functional Test Cases

Functional test cases focus on verifying that the application behaves according to its specifications and meets user requirements. These test cases cover various scenarios and user interactions to ensure the correct functioning of features such as:

- Displaying world clocks for different time zones.

- Updating time information in real-time.

- Navigating between different sections of the application.

- Handling user inputs and interactions accurately.

6.2 Performance Test Cases

Performance test cases assess the responsiveness and efficiency of the World Clock Web Application under different load conditions. These test cases evaluate factors such as:

- Load time of the application on different devices and network speeds.

- Responsiveness of the user interface to user interactions.

- Scalability of the application when handling multiple concurrent users.

6.3 Usability Test Cases

Usability test cases evaluate the user experience and ease of use of the World Clock Web Application. These test cases focus on:

- Intuitiveness of the user interface.

- Clarity and readability of displayed information.

- Accessibility features for users with disabilities.

- Consistency of design and navigation across different pages.

6.4 Security Test Cases

Security test cases assess the resilience of the World Clock Web Application against potential security threats and vulnerabilities. These test cases include:

- Checking for vulnerabilities such as cross-site scripting (XSS) and SQL injection.

- Verifying the encryption of sensitive data during transmission.

- Ensuring proper authentication and authorization mechanisms are in place.

6.5 Compatibility Test Cases

Compatibility test cases verify that the World Clock Web Application functions correctly across different browsers, devices, and operating systems. These test cases cover:

- Testing the application on popular web browsers such as Chrome, Firefox, Safari, and Edge.

- Verifying compatibility with different screen sizes and resolutions.

- Ensuring consistent behavior across desktops, laptops, tablets, and mobile devices.

By systematically executing these test cases, we can ensure that the World Clock Web Application meets quality standards and delivers a seamless user experience across various dimensions.

7. LIMITATIONS AND IMPROVEMENTS

7.1 Limitations

7.1.1 Dependency on Device Time

- The application relies on the device's system time, which may not always be accurate if the device's time settings are incorrect or if the user manipulates the system time.

7.1.2 Limited Time Zones

- The application only supports a predefined set of time zones. Users may require additional time zones not currently available in the application.

7.1.3 User Interface Complexity

- The user interface may become cluttered or overwhelming when displaying a large number of world clocks, especially on smaller screens.

7.1.4 Lack of Customization

- Users cannot customize the appearance or arrangement of the world clocks according to their preferences.

7.2 Improvements

7.2.1 Synchronization with Time Servers

- Implement synchronization with reliable time servers to ensure accurate time updates independent of the device's system time.

7.2.2 Dynamic Time Zone Selection

- Allow users to dynamically add or remove time zones based on their preferences, providing a more customizable experience.

7.2.3 Enhanced User Interface

- Improve the user interface by implementing features such as collapsible sections or tabs to organize and display world clocks more efficiently.

7.2.4 Theme Customization

- Introduce options for users to customize the appearance of the world clocks, including themes, colors, and fonts.

7.2.5 Time Zone Converter

- Add a feature to convert between different time zones, enabling users to easily compare and coordinate times across different locations.

7.2.6 Geolocation Integration

- Incorporate geolocation functionality to automatically detect the user's location and display the local time without manual selection.

7.2.7 User Preferences

- Implement user preferences to save and load customized settings, providing a personalized experience across multiple devices.

7.3 Future Considerations

7.3.1 Mobile Applications

- Develop dedicated mobile applications for iOS and Android platforms to offer a seamless experience on smartphones and tablets.

7.3.2 Accessibility Features

- Enhance accessibility by incorporating features such as screen reader compatibility and keyboard navigation for users with disabilities.

7.3.3 Social Integration

- Integrate social features to allow users to share world clock configurations or current times with friends and colleagues.

7.3.4 Analytics and Usage Metrics

- Implement analytics to track user engagement and usage patterns, enabling data-driven decisions for future enhancements and optimizations.

7.3.5 Multi-Language Support

- Provide support for multiple languages to cater to a global audience and improve accessibility for non-English speakers.

Conclusion

Identifying the limitations and proposing improvements for the world clock application is crucial for enhancing its functionality, usability, and user satisfaction. By addressing these areas, the application can evolve into a more robust and feature-rich tool for users to track time across different time zones effectively.

8. CONCLUSION

In conclusion, the World Clock Web Application serves as a valuable tool for users to manage and track time across different time zones effectively. By providing real-time information on world clocks in a user-friendly interface, the application simplifies the process of coordinating activities, scheduling meetings, and staying informed about global events.

Throughout the development process, various functionalities and features have been implemented to enhance the user experience and meet user requirements. However, there are still areas for improvement, such as adding support for additional time zones, implementing user customization options, and enhancing offline functionality.

Despite these limitations, the World Clock Web Application demonstrates the potential to evolve into a more robust and versatile tool with further development and enhancements. By addressing user feedback, incorporating new features, and improving existing functionalities, the application can continue to meet the evolving needs of its users and provide a seamless experience for managing time across different regions.

In summary, the World Clock Web Application serves as a valuable asset for users seeking efficient time management solutions in today's globalized world. With ongoing development and improvements, the application holds promise for providing even greater utility and usability for users worldwide.

9. REFERENCES

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